

The Incidence of Malnutrition in Children (Age 0 – 5 Yrs)

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Abstract

This study examined the incidence of malnutrition in children between the ages 0-5 years, in most developing countries, Nigeria included, the standard of living of the people are poor not only in terms of having less to eat or drink, but also in terms of all- year-round availability of food in quantity and quality. It defines and embraces an understanding of malnutrition, its possible causes, likely consequences and types of nutritional deficiency. This paper therefore focused on the need to educate mothers, societies and also government on good nutrition and adequate diet that should be given to the infants. Various factors that contribute to malnutrition in children and measures to be employed in its treatment were also identified such as good knowledge of breastfeeding. (Importance of breast milk in protecting the Newborn from infection is recognized worldwide) Infant morbidity and mortality have been directly affected by a decline in breastfeeding. Recommendations were also made on how to eradicate and eliminate the incidence of malnutrition in children in the emphasized age bracket.

Keywords: under-nutrition, over-nutrition, nutritional deficiencies, breastfeeding, balanced diet

Introduction

Malnutrition is a problem that defies pat solutions. It has many roots such as inadequate food supply, limited purchasing power, poor health conditions, and incomplete knowledge about nutrition. These causes often combine in different ways over time and place. In any combination, they are often aggravated by uncertain political commitment.

Malnutrition is every body's business, but nobody's main responsibility. The problem of malnutrition was recognized to be substantial, and the effectiveness of nutrition measures in reducing the number of deaths, decreasing the severity of childhood infection, and preventing forms of blindness, anemia-induced lethargy and other handicaps was reasonably well established and was in itself regarded as sufficient justification for investment in better nutrition.

The term malnutrition generally refers both to under nutrition and over nutrition, but in this context, we use the term to refer solely to a deficiency of nutrition (lack of one or two nutrients in a meal). Many factors can cause malnutrition, most of which relate to poor diet or severe and repeated infections, particularly in underprivileged populations. Inadequate diet and disease, in turn, are closely linked to the general standard of living, the environmental conditions, and whether a population is able to meet its basic needs such as food, housing and health care. Mal-nutrition is a disease condition that results when the nutrients are not consumed in the correct proportion as required by the body. Good diet helps for good intellectual development and growth, and also for the maintenance of good health.

Malnutrition is thus a health outcome as well as a risk factor for disease and exacerbated malnutrition, and it can increase the risk both of morbidity and mortality. Although it is rarely the direct cause of death (except in extreme situations, such as famine), child malnutrition was associated with 54% of child deaths (10.8 million children) in developing countries in 2001(WHO 2004). Malnutrition that is the direct cause of death is referred to as "protein-energy malnutrition" in this sense, nutritional status is clearly compromised by diseases with an environmental component, such as those carried by insect or protozoan vectors, or those caused by an environment deficient in micronutrients. But the effects of adverse environmental conditions on nutritional status are even more pervasive. Environmental contamination (e.g. destruction of ecosystems, loss of biodiversity, climate change, and the effects of globalization) has contributed to an increasing number of health hazards (Johns & Eyzaguirre, 2000), and all affect nutritional status.

Overpopulation, too, is a breakdown of the ecological balance in which the population may exceed the carrying capacity of the environment. This then undermines food production, which leads to inadequate food intake and/or the consumption of non-nutritious food, and thus to malnutrition.

On the other hand, malnutrition itself can have far-reaching impacts on the environment, and can induce a cycle leading to additional health problems and deprivation. For example, malnutrition can create and perpetuate poverty, which triggers a cycle that hampers economic and social development, and contributes to unsustainable resource use and environmental degradation (WEHAB, 2002). Breaking the cycle of continuing poverty and environmental deterioration is a prerequisite for sustainable development and survival.

The nutrition of an infant is very important to their development. Hence adequate provisions should be made to give them highly nutritious food and good care. It is important for every family to know the importance of food for their children in order to bring about good health.

It is therefore, becomes essential to study the incidence of mal-nutrition and the nutritional problems experienced by children.

Concept of Malnutrition

According to Bello (1985) nutrition is the science that deals with the study of intake of nutrients and their functions in the body. It also involves the study of the chemical and physical properties of nutrients their food sources, deficiency, symptoms and their appropriate proportion in a balanced diet.

The study of nutrition is very essential because of the importance of food to the survival and development of human beings. Good nutrition is also essential for good intellectual development of human beings. People who are well fed have more resistance to disease than those who are poorly fed.

Ricketts (1982) pointed out that infancy and first few years of life are the most important years in life. This is because growth is rapid and the demands for all food nutrients are high. As a result, these nutrients need to be supplied in adequate amounts. When the supplies of the required nutrients are inadequate, extra strain is put on the body by infection; the child becomes ill as there is no enough defense mechanism. This illness can develop rapidly and may result to death. In most cases the right food given can bring a quick recovery.

Malnutrition

Whaley and Wong (1979) described malnutrition to be a general term used to refer to poor or inadequate nutrition. Olusanya (2000) on the other hand defined malnutrition as a diseased condition that results when the nutrients are not consumed in correct proportion as required by the body. There are two main forms of malnutrition, namely under-nutrition and over-nutrition.

According to Olusanya (2000) under-nutrition occurs when insufficient quantities of nutrients are consumed e.g. kwashiorkor and anemia are due to an insufficient consumption of protein and iron respectively. On the other hand over-nutrition is when an excess amount of some nutrients are consumed such as eating too much of calorie food which leads to obesity and too much of vitamins, particularly vitamin A and D that results in hyper-avitaminosis which has some ill-effects on the body. The cost of malnutrition has to be measured not only in terms of increased rates of morbidity and mortality, but also as reduced productive capacity, diminished mental potential, higher expenditure on health and unnecessary human suffering.

Causes of Malnutrition

Lack of knowledge of nutrition on the part of a home maker, results in nutritional problems in children. Uddoh (1980) attributed the causes of malnutrition to many extrinsic factors which are as follows:

- (1) Insufficient food production as a result of the mass exodus of people from the villages to the cities in search of better paid jobs.
- (2) Many people are illiterates or semi-illiterates and have no knowledge of nutrition.
- (3) Poor methods of food storage and transportation to big cities and towns.
- (4) Many persons are poor and do not have enough money to buy the right kinds of food.
- (5) Many people do not budget their house keeping money wisely. Consequently they spend a large part of the money on the latest fashionable clothes, but buy the cheapest and poorest quality of foods to feed their families.

Nutritional Deficiencies

Examples of protein energy malnutrition are kwashiorkor, marasmus and marasmic kwashiorkor. Other examples of malnutrition include obesity, nutritional anemia, rickets, infantile beriberi, and infantile scurvy.

According to Ricketts (1982) protein energy malnutrition is a range of pathological conditions arising from coincidental lack of proteins and calories (quality and quantity). It occurs most frequently in infants and young children and commonly associated with infection. Examples of protein energy malnutrition are kwashiorkor, marasmus and marasmic kwashiorkor.

Kwarshiokor

This is a form of severe protein energy deficiency disease occurring in early childhood usually between the ages of one and two years. Kwashiorkor occurs when the child is suddenly deprived of mother or the mother has become pregnant.

Uddoh (1980) highlighted the fact that kwashiorkor is a serious nutritional problem known in the world over by different names, including fatty liver disease, infant rouges, sugar baby in Jamaica (because young patient looks obese).it is known as obivosi in Uganda.

The followings are signs which are always present in a child who is suffering from kwashiorkor:

1. Failure of growth, weight and height are low for the age.
2. The child looks fat indicating oedema on the legs, feet and hands.
3. The skin looks discouraged and flaky.
4. The hair loses lustre and easily be pulled out.
5. The child lacks interest and looks unhappy. He does not seem to have the energy even to cry, hence he merely whimpers.
6. Digestion is affected; usually there is diarrhea and loss of appetite.

Marasmus

Another instance of protein energy malnutrition is marasmus. This occurs most frequently in children under one year old that are underfed, either because too little food is offered or because of poor absorption.

According to Uddoh (1980) marasmus has some symptoms that are quite similar to that of kwashiorkor that is why many people mistake them for each other. But the difference is that instead of oedema in kwashiorkor, the infant is dehydrated and it appears as skin and bones with dry body. He is said to have dry malnutrition. The child is seen with characteristic facial appearance, so striking in his appearance that he/she often resembles a little old man. In some instances, the child presents with vitamin deficiencies such as angular stomatitis, glossitis and cheilosis.

Marasmus is however brought about as a result of one or more of the followings:

1. Insufficiency of diet
2. Improper feeding habits:
 - a. Short period of breastfeeding followed by artificial feeding with wrongly reconstituted, over diluted milk.
 - b. Disturbed parent-child relationship
 - c. Congenital malformations e.g. cleft lip and palate
 - d. Metabolic abnormalities.

Clinical features of marasmus were highlighted; as growth retardation, loss of muscle and subcutaneous fat. The child loses weight, usually alert and hungry looking. Some may present with starvation stool. There may be vitamin deficiency as evidence by angular-stomatitis and keratomalacia, if complicated by tuberculosis there will be signs of chest abnormality.

Marasmic Kwarshiokor

Children classified as having marasmic kwashiorkor have clinical features of both marasmus and kwashiorkor. They are regarded as representing intermediate forms of severe protein energy malnutrition. Oedema is present and body weight is less than 60 percent of expected standard for age. Clinical features are psychological changes, skin and hair changes, a palpable fatty liver as well as other clinical features are commonly found in children with marasmic kwashiorkor. The syndrome is not as clear-cut as kwashiorkor and marasmus.

Over-Nutrition

Obesity is an example of over-nutrition. Alleyne (1977) pointed out that excessive accumulation of fats in subcutaneous and other tissues of the body result in obesity. Its diagnosis is not made arbitrarily on weight but on clinical appearance because it is difficult to pin point an example between good nutrition and over-nutrition. The causes of obesity include:-

- i. Excessive intake of food
- ii. Genetic predisposition, that is, runs in the family.
- iii. Lack of activity and exercise and
- iv. Chronic illness with prolonged hospitalization.

Rickets

Rickets is a disease of children in which the bones are softened and deformed. It arises as a result of deficiency of vitamin D and failure to absorb calcium from the small intestine. It has been found that this disease seems to be a disease of poverty. This is because milk which provides calcium and cream butter and egg that provide vitamin D are too expensive for poor families to afford.

Noticeable among the signs of rickets are bow legs or knock-knees, spinal curvature, pigeon-chest, enlarged wrist, knee and ankle joint, delayed eruption of the teeth, and pot-belly due to lack of muscle tone.

Infantile Scurvy

Scurvy is a disease precipitated from prolonged lack of ascorbic acid. This acid is obtained from fruits and vegetables. This causes a disturbance in the structure of the connective tissue. The symptoms of this vitamin C deficiency include poor appetite, swelling and bleeding of gum, bleeding under the skin (haemorrhage) bruise anywhere in the body and delay in eruption of teeth.

Cases of scurvy are very complicated; sometimes it can be mistaken for rheumatic fever or osteomyelitis because of the pain cause by haemorrhage. The refusal of the child to use one leg may cause the disease to be mistaken for paralysis of the muscle.

The signs of scurvy are general weakness of the body, disorder and anaemia follows when the diseases prevalent among the artificially fed babies because less ascorbic acid vitamin C is present in cow's milk than human milk. In another instance it may be due to lack of insufficient intake of fruits and vegetables which are sources of vitamin C.

Infantile Beriberi

Infantile beriberi is the major cause of infant death between ages of two to five months; the affected child shows sign of puffiness, restless and cried a lot, passing less urine and become poisoned with dyspnea which result in early death. This disease is one of the nutritional deficiency diseases occurring in breast fed infants usually between the ages two months to five months. When the thiamine intake of mother falls below 0.5mg for every 10MJ eaten there is danger of beriberi. She may be eating a diet of low thiamine content, hence cannot supply her infant enough. In any case, the major cause of this disease is insufficient supply of thiamine in the diet.

Child Malnutrition

Even though it has long been recognized that malnutrition is associated with mortality among children (Trowell, 1948; Gomez et al., 1956), a formal assessment of the impact of malnutrition as a risk factor was only recently carried out. In the early 1990s, results of the first epidemiological study on malnutrition showed that malnutrition potentiated the effects of infectious diseases on child mortality at population level (Pelletier, Frongillo & Habicht, 1993), a result that up until then had only been observed clinically. In fact, most malnutrition-related deaths were associated with mild-to-moderate, rather than severe, malnutrition, because the mild-to-moderately malnourished population was much bigger than the severely malnourished population. The study also confirmed that malnutrition has a multiplicative effect on mortality. Taking into account all underlying causes of death, the results suggested that malnutrition was an associated cause in about one half of all child deaths in developing countries. From a national policy perspective, however, the epidemiological study had a limitation: the global estimate of malnutrition-associated mortality could not be applied to countries with distinct disease profiles.

Malnutrition in children can be assessed using anthropometry, biochemical indicators (e.g. a decrease in serum albumin level) and clinical signs of malnutrition (e.g. oedema, hair and skin changes). The advantage of anthropometry is that body measurements are sensitive over the full spectrum of malnutrition, whereas biochemical and clinical indicators are useful only when a child is at least moderately malnourished. A disadvantage of anthropometry is its lack of specificity, because changes in body

Measurements are also sensitive to several other factors such as altitude, stress and genetic heritage. In children up to five years of age, however, the effects of these factors on growth have not reached their full potential, and their effects on anthropometric measurements are negligible compared to the effect of malnutrition. Common anthropometric indicators of child malnutrition are combinations of body measurements and age, because the short-term response of a child's body to inadequate food intake is to slow or stop growth. , usually as a consequence of famine or severe disease; and underweight, or low weight-for-age, reflects both wasting and stunting, and is thus a synthesis of the current status of body proportion and linear growth (de Onis et al., 1993; WHO, 1995a). In women of reproductive age (15–44 years), it has been recommended that BMI values be used to measure the prevalence of maternal underweight, which are determined by dividing the weight of the mother (in kilograms) by her height in metres squared (WHO, 1995a). This indicator is in line with the index currently recommended for monitoring anthropometry in adults (WHO, 1995a).

To assess the prevalence of LBW and IUGR, it is recommended that infants be weighed as soon as possible after birth, and an attempt made to get information from the mother on the gestational age of her newborn in completed weeks (based on, for example, her last menstrual period). Conducting a population-based survey to obtain a national average birth weight may not be feasible, in which case local or regional surveys can be used to help estimate national levels of LBW until better methods are available. The best indicator of fetal malnutrition would be IUGR, but given that information on gestational age is rarely available, LBW should be used as a proxy. The other way is to use surveillance systems that collect anthropometric data from existing programmes. Criteria for good data quality are:

- A clearly defined, population-based sample
- A probabilistic sampling procedure – a sample size that gives results of sufficient precision and power
- The use of appropriate equipment to collect the data
- The use of standard measuring techniques (de Onis et al., 1993).

The study is important as it will educate parents on the need to provide balanced diet to improve the health of their children. An old adage says “health is wealth” children who are well fed will grow to create wealth for themselves, parents, community, state and country. The study will also help teachers to educate their pupils and students about the importance of balanced diet. Balanced diet or good nutrition is good for human health especially growing children. The study will make known to teachers and students the various factors that contribute to the malnutrition of children.

Curriculum designers would find the study useful as the content which is about balanced diet can be made an important aspect of the school curriculum.

The study will encourage educational administrators to develop policies that will facilitate the teaching of nutrition in schools.

Malnutrition and Child Growth

Malnutrition commonly affects all groups in a community, but infants and young children are the most vulnerable because of their high nutritional requirements for growth and development. Another group of concern is pregnant women, given that a malnourished mother is at high risk of giving birth to a LBW baby who will be prone to growth failure during infancy and early childhood, and be at increased risk of morbidity and early death. Malnourished girls, in particular, risk becoming yet another malnourished mother, thus contributing to the intergenerational cycle of malnutrition.

In developing countries, poor prenatal conditions are responsible for approximately 23% of all deaths among children younger than five years old. These deaths are concentrated in the neonatal period (i.e. the first 28 days after birth), and most are attributable to LBW (Kramer, 1987). LBW can be a consequence of IUGR, preterm birth, or both, but in developing countries most LBW births are due to IUGR. Although the etiology of IUGR is complex, a major determinant of IUGR in developing countries is maternal undernutrition.

Evidence has shown that there is a greater incidence of IUGR births among women who are underweight or stunted prior to conception or who fail to gain sufficient weight during pregnancy (Kramer, 1987; King & Weininger, 1989; WHO, 1995a; Bakketeig et al., 1998), compared to women with normal weight and weight gain. Growth assessment is the single measurement that best defines the health and nutritional status of a child, because disturbances in health and nutrition, regardless of their etiology, invariably affect child growth. There is ample evidence that the growth (height and weight) of well-fed, healthy children from different ethnic backgrounds and different continents is remarkably similar, at least up to six years of age (Habicht et al., 1974). Moreover, growth assessment is universally applicable: it does not pose any cultural problems; measuring equipment is easy to transport; the tools are simple and robust, can be set up in any environment; users require little training; and the procedure is inexpensive and non-invasive (WHO, 1995a). Studies have demonstrated that the more malnourished children are, the sicker they are and the higher their risk of early death (Pelletier, 1991; Toole & Malkki, 1992; Man et al., 1998). Severe malnutrition leads not only to increased morbidity (incidence and severity) and mortality, but can also lead to impaired psychological and intellectual development. Growth retardation in early childhood, for example, has been linked to the delayed acquisition of motor skills (Heywood, Marshall & Heywood, 1991; Pollitt et al., 1994) (and to delayed mental development (Pollitt et al., 1993; Mendez & Adair, 1999). These outcomes can have severe consequences in adult life, such as significant functional impairment (Martorell et al., 1992; WHO, 1995a) that can affect a person's economic productivity. Not surprisingly, malnutrition is closely associated with socioeconomic status variables such as income and education.

Measures towards Eliminating Malnutrition

Whaley and Wong (1979) suggested that to eliminate malnutrition, adequate food supplies alone is not the answer. This is because some population with high standard of living has nutritional problems related to overeating and poor eating habits. Nutritional counseling must take into account all the variables influencing the physical and physiological make up of each individual.

Donald (1977) stated that it is most important for a country to have a nutrition education programme for all its citizens and various institution of learning. This should be from a very effective platform for the spread of basic nutritional knowledge. If each individual child carries this knowledge home she can help to influence the family members. With their co-operation, much can be achieved in promoting good nutritional health in the community. She further stressed that many nutritional diseases prevalent to a large extent by improper use of available food sources. Nutrition education helps in the proper utilization of such food sources.

Nutrition of Children and its Importance

According to Bello (1985) "man is what he eats" from digestion, assimilation and utilization of food, the body grows and functions. Proper nutrition implies receiving adequate food and supplements to convey the nutrients required for adequate nutrition allows for health, growth and development of the body. Without proper nutrition and exercise, optimal health and well being cannot be attained.

It is however unfortunate that in Nigeria, a high percentage of parents cannot feed their children on balanced diet. Most children are often fed on carbohydrates which can get cheaply and can quickly satisfy hunger without giving any thought to other nutrients necessary for the proper development and growth of children. This condition, if prolonged, leads to nutritional deficiency diseases.

Uddoh (1980) pointed out that children are more prone to nutritional deficiencies during the early years of rapid growth, which may be described as extending from movement of the conception through gestation, infancy and up to the age of five years, early severe malnutrition retards cell division in the human brain. Bello (1985) added that the nutritional deficiencies of childhood cannot be compensated for by improved nutrition in adulthood. For this reason, infants should be made to feed on nutritious food right from the time they are in their mother's womb.

Meaning of Balanced Diet

Olusanya (2000) said that balanced diet contains all the nutrients in the required proportion for the body. All these nutrients perform specific functions in the body and their lack or shortage in our diets results in deficiency diseases.

The nutrients include carbohydrates, proteins, fats and oils, vitamins, mineral elements and water.

Carbohydrates: They are required in fairly large quantities by the body. Carbohydrates serve as source of heat and energy to the body. A deficiency of carbohydrate leads to wasted muscles because the body protein is used in energy production.

Proteins: They are the main body building food substances necessary for building new cells and repairing worn out tissues. The enzymes and hormones found in the body are made up of proteins. A deficiency of protein leads to poor growth and lowered resistance to infections. In infants, it leads to kwashiorkor and marasmus.

Fats and Oils: They serve as source of heat and energy and also assist in maintaining constant body temperature. Fats and oils promote healthy hair and skin. The excessive consumption can lead to overweight or obesity

Vitamins: Vitamins are required in a very little quantity for the normal functioning of the body. Vitamins cannot be produced by the body hence; they must be included in our meals. The deficiency of vitamins leads to poor bone development. In infants, the condition is known as Rickets. It also leads to retarded growth in children and skin infection.

Mineral Elements

Mineral elements are also required in a very minute quantity by the body. They perform a variety of functions like growth and vital metabolic activities. The deficiency of mineral elements leads to accumulation of water in the tissue that is oedema, dental caries (dental decay) severe anemia and slow growth.

Water

Water is the major component of all the living things. It aids the digestion of food and absorption of nutrients in the body. It also regulates the body temperature.

Breastfeeding

Caliendo (1979) observed that breast milk is the best infant food. Milk that comes from the mother's breast for the first few days after delivery is thin and watery and is called COLOSTRUMS.

They recommended that children should be put to their mother's breast as soon as they are born so that they can take colostrums. Colostrums contain some antibodies manufactured in the mother's blood to give initial immunity against certain diseases. It protects children from certain infections. It also helps clear out the baby's first sticky stools called meconium.

Uddoh (1980) also mentioned that colostrums have a higher content of protein, fat soluble vitamins and electrolytes and less fat than ordinary breast milk. It is now known to be of great value to a newly born baby. The advantages of breastfeeding are as follows:-

- *Breastfeeding is a cheaper method of feeding. It does not need elaborate preparation, unlike the artificial feeding where one has to wash and sterilize the feeding bottle and mix the infant milk formula.
- *The breast fed babies have greater resistance to infection than the artificially fed ones. Therefore they are less likely to die in their first year of life.
- *Breastfed babies have acquired immunity against measles and smallpox during the early week of life. The intimacy of breastfeeding gives the body relationships.
- *Breastfed babies are less likely to have constipation like those fed with infant milk formula. Therefore breast milk alone is enough for babies up to the age of six months.
- *Breast milk contains more of the nutrients necessary for a baby than any other food.

Summary and Conclusion

In summary, 42% of all deaths of children younger than five years of age are caused by malnutrition. Diarrhoeal disease associated with malnutrition is the biggest contributor to mortality (15.6%), followed by lower respiratory infections (9.1%). Malnutrition is also associated with 16.6% of the total morbidity. Cycle of poverty and malnutrition, and to waste human potential. Governments will be unable to accelerate economic development over the long term until their children are assured of optimal growth and development.

Approximately 27% (168 million) of children younger than five years are underweight (WHO,2003), but the highest proportions of malnourished children are in the higher mortality countries of South-East Asia (in SEAR B, SEAR D) and the Eastern Mediterranean (in EMR D), as well as in countries of the AFR D and AFR E sub regions.

The impact of malnutrition was examined for the health outcomes: diarrhoeal diseases, acute respiratory infections, malaria, measles and protein-energy malnutrition. The results confirm that underweight is the single largest risk factor to health at the global level, causing 3.7 million deaths in children under five years old (i.e. 6.7% of all deaths worldwide). In developing countries with high mortality, it causes more than 13% of all deaths and 15% of DALYs¹, and about 3% of all DALYs in developing countries with low mortality, ranking fourth after alcohol use, high blood pressure and tobacco use. Prüss-Ustün et al. (2003)

This study was designed to identify various factors that contribute to malnutrition in children and suggest measures to be employed in its treatment.

In conclusion, mothers did not give their children balanced diet, and they did not have good knowledge of breastfeeding. Some mothers lacked the knowledge of normal time for artificial feeding and have contributed to malnutrition in children.

Moreover, if the mothers play very well their roles of breastfeeding at the appropriate time as well as preparing balanced diet from local food stuffs, malnutrition will greatly be reduced.

The government has not played the role of sensitizing the public on the need for balanced diet.

Recommendations

Sequels to the conclusion above, the following recommendations are given:

1. The importance of good nutrition for pregnant and lactating mothers should be emphasized by the government and health workers.
2. Proper introduction of weaning diet and discouraging cultural beliefs and taboos which interfere with child's nutritional status should be embarked upon by the government and the health workers.
3. Nutrition education should be given to the mothers to aid adequate feeding of their children.
4. Government should subsidize balanced diet for the school age children.
5. Government should sponsor jingle on electronic media to sensitize parents on importance of balanced diet.
6. Government should emphasize the teaching of nutrition in schools.
7. Government should enlighten the public on the need for balanced diet.

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