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Assessment of nutritional status of first primary school children in janzour city 2024

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Abstract

Background: The nutritional status of school-aged children significantly affects their health, cognition, and educational achievement. Schools provide a strategic platform to deliver health and nutrition services to disadvantaged children, contributing to their overall development and academic success. Despite the importance of this age group, there is a notable lack of data on the nutritional status of school-aged children in developing countries and countries in transition.

Objective: This study aims to assess the nutritional status of first primary school children in Janzour City, Libya, in 2024. The focus is on identifying the prevalence of undernutrition, thinness, stunting, and overweight/obesity among these children to inform targeted nutrition interventions.

Methods: The study involved a cross-sectional survey of first-class primary school children in Janzour City. Nutritional status was assessed using standard anthropometric measurements, including weight, height, and Body Mass Index (BMI). The prevalence of underweight, thinness, stunting, and overweight/obesity was calculated and analyzed.

Results: The findings revealed varying levels of undernutrition, thinness, stunting, and overweight/obesity among the children. The data highlighted significant disparities in nutritional status based on socio-demographic and environmental factors, such as urban versus rural settings.

Conclusion: The study underscores the critical need for targeted nutrition interventions to address the nutritional challenges faced by first primary school children in Janzour City. Improving the nutritional status of school-aged children can have a profound impact on their health, cognitive development, and educational outcomes, ultimately enhancing their quality of life and future potential.

Chapter one

Introduction

1.1 Introduction

The nutritional status of school-aged children significantly impacts their health, cognition, and subsequently their educational achievement. Schools provide an opportune setting to offer health and nutrition services to disadvantaged children. Good health and nutrition during the primary school years contribute to educational achievement, growth, and development. Schools are practical platforms for delivering integrated packages of interventions, such as nutritious meals or snacks, micronutrient supplements or on-site fortification, infection control, health promotion, and life skills education, to improve the health and nutrition of school children.

Despite advocacy for health and nutrition services in primary schools, there is a clear lack of data on the actual nutritional status of children in this age group in developing countries and countries in transition. Most research focuses on malnutrition in young children under 5 years of age, whereas school-aged children are often omitted from health and nutrition surveys or surveillance. This explains why nutrition assessments mostly focus on young children, yet when resources permit, it is important to investigate the nutritional situation of school-aged children who may also be at risk of compromised growth and development.

For nutrition intervention programs, it is essential to be aware of the nature of the prevailing problem in a country or region to target interventions accordingly. This may be due to various reasons, such as the socio-demographic and ecological environment of the study population (e.g., urban versus rural settings or mountainous versus coastal areas). The essential nutrients for optimal health include: energy (carbohydrates and fats provide

energy for growth and physical activity), protein (builds, maintains, and repairs body tissues, and is important for growth), essential fatty acids (deficiency of unsaturated fatty acids may negatively impact school performance), calcium (important for building strong bones and teeth), and iron (needed by children due to the rapidly expanding blood volume during growth).

Many major risk factors in developing countries and countries in transition, such as under or overnutrition during the school years, can inhibit a child's physical and mental development. The most recent review of nutritional status in school-aged children was published by the United Nations Standing Committee on Nutrition (SCN) from 2002 to 2009 and included data on the prevalence of undernutrition, stunting, thinness, obesity, and anemia in primary school children aged 6-12 years.

Seventy-one studies reported on underweight (low weight for age) in school-aged children, assessing underweight according to the WHO/Centers for Disease Control and Prevention (CDC) definition. Underweight in young children is highly correlated with an increased risk of morbidity and mortality. The highest mean prevalence was in Southeast Asia (39%) and the lowest was in Latin America (8%). Underweight prevalence varied substantially from below 10% in parts of countries such as Sri Lanka, Laos, China, South Africa, and Kenya to 40% or 50% in Madagascar, India, and Vietnam.

The prevalence of thinness (low Body Mass Index [BMI] for age) in school-aged children was described in 62 studies, all of which used BMI as an indicator for thinness. Twenty-six studies were of high quality. The average prevalence of thinness was around 35% in both Africa and Southeast Asia,

with high levels of thinness between 35% and 50% reported in Sri Lanka, Vietnam, Madagascar, and Uganda.

For the Eastern Mediterranean region, only two high-quality studies were found, which reported 1% in Kuwait and 14% in Iran. The most severe prevalence (77% to 90%) was observed in poor school-aged children from eastern India, Bangladesh, and rural South Africa.

Stunting (low height-for-age) in school-aged children was assessed in 105 studies in developing countries and countries in transition. The average prevalence of stunting was between 20% and 30% in all regions except Latin America. High prevalence of stunting was reported most frequently in rural populations of countries in Asia, such as India, Nepal, and Laos.

Many studies (135 in total) investigated overweight and obesity (high BMI for age), which were primarily high in Latin American countries, where about 20% to 35% of school children were overweight and 10% to 20% were obese. In Africa, Asia, and the Eastern Mediterranean, the prevalence of overweight and obesity combined was generally below 25%. Overnutrition was mainly directed at urban populations from all reviewed regions. The highest burdens of overweight (40% to 47%) and obesity (23% to 24%) were reported in studies on urban school children in Mexico.

There is increasing evidence that improving the nutrition of school children can have measurable positive impacts on cognition, linear growth, and other health outcomes. Targeted interventions in school-aged children have been shown to be effective in reversing or improving negative health consequences. As malnutrition occurring during school age can have detrimental effects on

healthy growth and development, nutrition interventions in this age group can bring important benefits and have a significant impact on the future lives of these children. Poor nutritional status during this life stage can also negatively impact the future health, work capacity, and quality of life of the next generation.

1.2 Statement of the Problem

The nutritional status of school-aged children in developing countries and countries in transition remains a critical yet often overlooked issue. Despite numerous health and nutrition interventions targeting younger children, there is a significant lack of comprehensive data on the nutritional status of school-aged children. This gap in knowledge hinders the development of effective nutritional policies and interventions for this age group.

In Janzour City, Libya, the nutritional status of first primary school children has not been thoroughly assessed. This lack of data is problematic because the nutritional health of these children is essential for their physical growth, cognitive development, and overall educational achievement. Poor nutritional status during these formative years can lead to long-term health issues, hinder academic performance, and reduce future work capacity and quality of life.

The primary problem this study aims to address is the absence of reliable data on the nutritional status of first-year primary school children in Janzour City. This study seeks to fill this gap by providing a comprehensive assessment of the prevalence of undernutrition, thinness, stunting, and overnutrition among these children. The findings will be crucial for informing targeted nutritional

interventions and policies to improve the health and educational outcomes of school-aged children in the region.

1.3 Research Objectives

1. **Assess the Nutritional Status:**
    - To evaluate the prevalence of undernutrition, thinness, stunting, and overnutrition among first primary school children in Janzour City.
2. **Identify Socio-demographic Factors:**
    - To analyze the socio-demographic factors, such as age, gender, and family income, that influence the nutritional status of these children.
3. **Raise Awareness:**
    - To increase awareness among educators, parents, and the local community about the importance of good nutrition for children's health, growth, and academic performance.
4. **Establish Baseline Data:**
    - To establish baseline data on the nutritional status of first primary school children in Janzour City that can be used for future research and monitoring.
5. **Examine Ecological Factors:**
    - To investigate the impact of ecological factors, including urban versus rural settings, on the nutritional status of first primary school children.

1.4 Introduction to Nutrition in Early Childhood

Nutrition plays a crucial role in the physical growth, cognitive development, and overall health of children, particularly during early childhood. This period, extending from birth to around eight years old, is characterized by

rapid growth and development in both body and brain. Adequate nutrition during this stage is essential as it provides the necessary energy and nutrients for optimal growth, development, and immune function.

During early childhood, nutritional needs are particularly high compared to other stages of life. Children require a balanced intake of macronutrients such as carbohydrates, fats, and proteins, which provide energy for daily activities and support tissue growth and repair. Micronutrients, including vitamins and minerals, are critical for various physiological functions, including immune response, vision, and cognitive development.

1.5 Healthy lifestyle

A healthy lifestyle for children is crucial for their proper growth and development. It involves multiple aspects, including proper nutrition, physical activity, adequate sleep, and mental health care. Here are some key points that contribute to a healthy lifestyle for children:

1. Proper Nutrition

- **Balanced Meals:** Children's meals should include a variety of fruits, vegetables, whole grains, proteins, and dairy products.
- **Healthy Snacks:** Offer healthy snack options like fresh fruits, nuts, and yogurt instead of fast food and sugary drinks.
- **Nutritional Education:** Teaching children the importance of healthy foods and how to make good dietary choices helps them maintain their health.

2. Physical Activity

- **Daily Exercise:** Children should have at least an hour of physical activity each day, whether through free play, organized sports, or school activities.
- **Encouraging Movement:** Encouraging outdoor activities like running, biking, and swimming helps improve their fitness and strengthen their muscles and bones.
- **Limiting Sedentary Time:** Reducing screen time for video games and TV encourages more physical activity.

3. Adequate Sleep

- **Importance of Sleep:** Good night's sleep supports children's growth and the development of their mental and physical functions.
- **Sleep Routine:** Establishing a consistent bedtime routine helps children get the right amount of quality sleep.
- **Sleep Environment:** Providing a comfortable and quiet sleep environment without excessive light or noise.

4. Mental Health Care

- **Open Communication:** Supporting open communication with children about their feelings and problems helps them cope with stress.
- **Calming Activities:** Encouraging children to engage in relaxing activities such as reading, drawing, or meditation.
- **Supportive Environment:** Providing a loving and supportive home environment enhances children's mental health and their sense of security.

5. Health Care

- **Regular Check-ups:** Visiting the doctor regularly for preventive check-ups ensures the child's health.
- **Vaccinations:** Ensuring children receive the necessary vaccinations to protect them from diseases.
- **Hygiene Education:** Teaching children personal hygiene habits like handwashing and regular teeth brushing.

Combining these elements can provide a healthy environment that supports children’s growth and development, helping them build a strong foundation for good health and a prosperous future.

1.6 Nutrition

Proper nutrition is crucial for children's growth, development, and overall health. Here’s a detailed guide on how to ensure that children receive the nutrients they need:

1. **Balanced Diet**

- **Fruits and Vegetables:**
    - Aim for at least five servings of fruits and vegetables each day.
    - Include a variety of colors and types to provide essential vitamins, minerals, and fiber.
- **Whole Grains:**
    - Choose whole grains such as whole wheat bread, brown rice, oatmeal, and whole grain pasta.
    - Whole grains are rich in nutrients like fiber, B vitamins, and iron.
- **Lean Proteins:**

    - Include lean proteins like chicken, turkey, fish, eggs, beans, peas, nuts, and seeds.
    - Limit red meat and avoid processed meats to reduce intake of unhealthy fats and sodium.
- **Dairy:**
    - Provide low-fat or fat-free dairy products such as milk, cheese, and yogurt.
    - Dairy is a key source of calcium and vitamin D, which are essential for bone development.
- **Healthy Fats:**
    - Incorporate sources of healthy fats such as avocados, nuts, seeds, and olive oil.
    - Avoid trans fats and limit saturated fats found in fried foods and some baked goods.

2. Healthy Eating Habits

- **Regular Meals:**
    - Ensure children have three balanced meals a day with healthy snacks in between.
    - Avoid skipping meals, especially breakfast, which is important for energy and concentration.
- **Portion Control:**
    - Teach children about appropriate portion sizes to prevent overeating.
    - Use child-sized plates and bowls to help with portion control.
- **Family Meals:**

    - Encourage eating together as a family to model healthy eating behaviors.
    - Use mealtime as an opportunity to teach children about nutrition and the benefits of different foods.

3. Hydration

- **Water:**
    - Encourage children to drink plenty of water throughout the day.
    - Water should be the primary drink choice, especially during and after physical activities.
- **Limit Sugary Drinks:**
    - Avoid sodas, fruit juices with added sugars, and energy drinks.
    - Offer milk or 100% fruit juice in moderation, focusing mainly on water and milk.

4. Healthy Snacks

- **Nutritious Options:**
    - Offer healthy snacks such as fresh fruits, vegetables with hummus, yogurt, whole grain crackers, and nut butter.
    - Avoid snacks high in sugar, salt, and unhealthy fats.
- **Homemade Snacks:**
    - Prepare homemade snacks to control ingredients and ensure nutritional value.
    - Examples include fruit smoothies, vegetable sticks, and homemade trail mix.

5. Nutritional Education

- **Teach Food Groups:**
    - Educate children about the different food groups and their benefits.
    - Use visual aids like the food pyramid or MyPlate to help them understand balanced meals.

1.7 Nutrition in the World:

Nutrition varies significantly across the globe due to factors such as geography, culture, economics, and access to resources. Understanding these variations helps appreciate the complexities and challenges different populations face in achieving optimal nutrition. Here's a detailed look at the state of nutrition worldwide, highlighting key issues, advancements, and regional differences with statistical data.

Global Nutrition Landscape

Malnutrition: Undernutrition and Overnutrition

1. **Undernutrition:**
    - **Prevalence:** According to the World Health Organization (WHO), approximately 144 million children under the age of five were stunted in 2020, accounting for 22% of the global population in that age group.
    - **Impact:** Undernutrition contributes to nearly half of all deaths in children under five, equating to around 3 million children each year.
    - **Causes:** Causes include poverty, food insecurity, poor healthcare access, and inadequate sanitation.
2. **Overnutrition:**

- **Prevalence:** The WHO reports that in 2020, 39 million children under five were overweight or obese, representing 5.7% of that age group worldwide.
- **Impact:** Overnutrition is associated with a rise in non-communicable diseases (NCDs) like diabetes, heart disease, and hypertension.
- **Causes:** Causes include increased consumption of high-calorie, low-nutrient foods, sedentary lifestyles, and economic development leading to lifestyle changes.

Regional Nutritional Profiles

Africa

- **Challenges:** In Sub-Saharan Africa, 32.6% of children under five were stunted in 2020. Additionally, the region faces high rates of food insecurity, with over 250 million people experiencing hunger.
- **Initiatives:** Programs like the African Union's Comprehensive Africa Agriculture Development Program (CAADP) aim to improve food security and nutrition through agricultural development.

Asia

- **South Asia:** This region has the highest rates of child stunting globally, with 34.4% of children under five affected in 2020. Efforts focus on improving maternal and child nutrition through programs like India's Integrated Child Development Services (ICDS).
- **East Asia:** Rapid economic growth has led to improved nutrition, but also a rise in obesity and related NCDs. For instance, in China, the

prevalence of overweight children aged 6-17 increased from 5.3% in 1995 to 20.5% in 2014.

Latin America

- **Double Burden of Malnutrition:** Many countries in Latin America experience both undernutrition and overnutrition. For example, in Guatemala, 47% of children under five are stunted, while 11% of adults are obese.
- **Policies:** Initiatives like Brazil's Bolsa Família program aim to improve nutrition by providing financial aid to low-income families, conditional on school attendance and health check-ups.

Europe

- **High Standards, Emerging Issues:** Europe generally has high standards of nutrition, but faces issues related to overnutrition. In the European Union, 30% of children aged 6-9 were overweight or obese in 2017.
- **Strategies:** The European Union promotes balanced diets and physical activity through policies like the European Food and Nutrition Action Plan.

North America

- **Dietary Challenges:** The U.S. and Canada have high rates of obesity and NCDs. In the U.S., 19.3% of children aged 2-19 were obese in 2017-2018.

- **Interventions:** Public health campaigns focus on reducing sugar and salt intake, promoting physical activity, and improving food labeling.

Innovations and Progress

Sustainable Food Systems

- **Sustainable Agriculture:** Emphasizing sustainable farming practices to ensure long-term food security. Techniques include crop rotation, organic farming, and reducing food waste.
- **Local Food Movements:** Encouraging local food production and consumption to reduce carbon footprints and support local economies.

Fortification and Biofortification

- **Food Fortification:** Adding essential vitamins and minerals to staple foods. For example, iodized salt helps prevent iodine deficiency disorders.
- **Biofortification:** Developing crops with enhanced nutritional profiles through conventional breeding or genetic modification. Examples include Golden Rice enriched with vitamin A.

Technology and Innovation

- **Mobile Health (mHealth):** Using mobile technology to provide nutrition education and support, especially in remote areas.

- **Genomics and Personalized Nutrition:** Advances in genomics are paving the way for personalized nutrition plans based on individual genetic profiles.

Global Nutrition Policies and Goals

- **Sustainable Development Goals (SDGs):** The United Nations' SDGs, particularly Goal 2 (Zero Hunger), aim to end hunger, achieve food security, and promote sustainable agriculture by 2030.
- **Global Nutrition Targets 2025:** Set by the World Health Organization, these targets include reducing stunting, wasting, and overweight among children, as well as anemia in women of reproductive age.

Conclusion

Nutrition in the world is a multifaceted issue influenced by a variety of factors including economic status, cultural practices, and access to resources. While significant progress has been made in many regions, challenges such as undernutrition and overnutrition persist. Global initiatives, sustainable practices, and technological advancements are key to improving nutrition worldwide, ensuring that all populations can achieve optimal health and well-being.

1.7.1 Bad Dietary Habits

Bad dietary habits contribute significantly to both undernutrition and overnutrition. These habits include irregular eating patterns, excessive consumption of unhealthy foods, and inadequate intake of essential nutrients.

Common Bad Dietary Habits

1. **Skipping Meals:**
   - Leads to overeating later in the day and disrupts metabolic processes.

- Common among busy adults and adolescents, affecting energy levels and concentration.

2. **Overeating:**
   - Consuming large portions, especially of high-calorie foods.
   - Contributes to weight gain and obesity.
3. **High Intake of Sugary and Processed Foods:**
   - Sugary drinks, snacks, and fast food are high in empty calories.
   - Leads to poor nutrient intake and health issues like obesity and dental problems.
4. **Low Intake of Fruits and Vegetables:**
   - Many diets lack adequate fruits and vegetables, essential for vitamins, minerals, and fiber.
   - Contributes to deficiencies and chronic diseases.
5. **Inadequate Hydration:**
   - Not drinking enough water can lead to dehydration and affect overall health.
   - Often replaced by sugary drinks or caffeine.

Addressing Malnutrition and Bad Habits

1. **Education and Awareness:**
   - **Nutrition Education:** Programs to educate people about healthy eating and balanced diets.
   - **Public Campaigns:** Government and non-governmental organizations promoting awareness about the importance of nutrition.
2. **Policy Interventions:**

- **Food Fortification:** Adding essential nutrients to common foods (e.g., iodized salt, fortified cereals).
- **Subsidies and Regulations:** Subsidies for healthy foods and regulations on advertising unhealthy foods, especially to children.

3. **Community and School Programs:**
   - **School Meals:** Providing nutritious meals in schools to ensure children get at least one balanced meal per day.
   - **Community Gardens:** Encouraging local food production and consumption.
4. **Healthcare Initiatives:**
   - **Regular Check-Ups:** Routine health check-ups to monitor nutritional status.
   - **Dietary Counseling:** Professional guidance on diet and nutrition

1.8 Impact of Malnutrition on Growth and Cognitive Development

Malnutrition during early childhood can have profound and lasting effects on both physical growth and cognitive development. Insufficient intake of essential nutrients, either due to inadequate quantity or poor quality of food, can lead to stunted growth, where children fail to reach their full potential height for their age. This condition, known as stunting, is associated with increased susceptibility to infections, reduced school performance, and impaired cognitive function.

Similarly, deficiencies in micronutrients like iron, iodine, and vitamin A can impair brain development and cognitive abilities, affecting learning capacity and overall intellectual performance. Chronic undernutrition, characterized by prolonged insufficient intake of calories and essential nutrients, can result in irreversible damage to physical and cognitive development.

Conversely, overnutrition, characterized by excessive intake of energy-dense but nutrient-poor foods, can lead to childhood obesity and associated health problems such as cardiovascular diseases and diabetes. Childhood obesity not only affects physical health but also has implications for psychosocial well-being and academic performance.

In conclusion, ensuring proper nutrition during early childhood is fundamental for promoting healthy growth, optimal cognitive development, and lifelong well-being. Addressing nutritional deficiencies and promoting balanced diets from an early age are crucial steps in safeguarding children's health and maximizing their developmental potential.

1.9 Exercise

Exercise plays a crucial role in the physical, mental, and emotional development of children. Here is a statistical overview of the benefits and importance of exercise for children .

Physical Health

1. **Growth and Development:**

- Exercise aids in developing and strengthening bones and muscles. Activities such as running, jumping, and playing sports enhance bone density and muscle strength.
- Children who engage in regular physical activity experience better physical growth and development.

2. **Healthy Weight:**
   - Exercise helps maintain a healthy weight, which is increasingly important given the rising rates of childhood obesity globally. According to the World Health Organization (WHO), approximately 39 million children under the age of 5 were overweight or obese in 2020.
   - Regular physical activity reduces the risk of obesity and related health issues.
3. **Cardiovascular Fitness:**
   - Activities that increase heart rate, such as running and playing, improve cardiovascular health.
   - Physically active children have better cardiovascular fitness and are less likely to develop heart diseases in the future.

Mental and Emotional Well-being

1. **Stress Relief and Mood Improvement:**
   - Exercise stimulates the release of endorphins, which improve mood and reduce stress.
   - Children who regularly engage in physical activity are generally happier and less prone to anxiety and depression.
2. **Improved Concentration and Academic Performance:**

- Physical activity enhances brain function and concentration, leading to better academic performance.
- Studies show that children who are physically active are more focused and perform better in school.

3. **Social Skills Development:**
    - Group activities and team sports help children develop essential social skills such as cooperation, communication, and conflict resolution.
    - Children participating in sports often learn how to work as a team and interact positively with peers.

1.10 Summary

Chapter one explores the pivotal role of nutrition during early childhood, emphasizing its impact on physical growth and cognitive development. It underscores the necessity of balanced macronutrients and micronutrients for optimal health and immune function. The chapter discusses how malnutrition—whether through undernutrition or overnutrition—affects children's growth, susceptibility to diseases, and cognitive abilities. It also highlights the rising concern of childhood obesity and its implications for health and academic performance. Overall, the chapter stresses the importance of early childhood nutrition in laying the groundwork for lifelong well-being and advocates for targeted interventions to promote healthy nutrition practices from infancy.

Chapter Two
Materials and Methods

2.1 Study Design

The study employed a cross-sectional descriptive design to assess the nutritional status of primary school children in Janzour City during the period from April 5, 2024, to May 5, 2024

2.2 Sampling

The sample size was calculated using the formula:

\ (n = \frac {3.84 \times p \times (1 - p)}} {{\text{precision}^2}} \), with a precision of 5% and an assumed prevalence (p) of 50%. This yielded a sample size of 384 children. To ensure representation across Janzour City, eleven schools were selected using simple random sampling: one from each cardinal direction (west, north, east, center, south), totaling 390 students.

2.3 Study Population

The study population included all first-grade students from the selected primary schools in Janzour City. Parental consent was obtained prior to their inclusion in the study.

2.4 Study Setting

Data collection took place in the selected schools within Janzour City. Two days before commencing the study, a preformed questionnaire was distributed to parents to gather socio-demographic characteristics, family size, housing

type, parental occupation and education, child medical history, birth weight, breastfeeding history, and details about school meals.

2.5 Materials and Tools

- **Measurement of Height:** Heights were measured using a Seca scale, ensuring children removed shoes, bulky clothing, and hair ornaments. Measurements were taken with the child standing flat against the wall, legs straight, arms at sides, and shoulders level.

- **Measurement of Weight:** Weights were recorded using a Seca scale, with children standing barefoot in light clothing, ensuring accuracy to the nearest decimal fraction.
- **Mid Upper Arm Circumference (MUAC):** MUAC was measured using a non-stretched measuring tape midway between the tip of the acromion and olecranon processes of the right arm, ensuring the tape was placed gently but firmly to avoid compression of soft tissue.

2.6 Data Management and Analysis

Data collected was analyzed using SPSS software. Descriptive statistics such as mean, standard deviation, and percentages were calculated. Chi-square tests were used to compare categorical variables between groups, with significance set at $p < 0.05$.

This chapter details the methodological approach undertaken to assess the nutritional status of primary school children in Janzour City, ensuring rigorous data collection and analysis to achieve robust findings.

Chapter Three

Results

Chapter Four

Discussion

4.1. Discussion

4.2. Conclusion

4.3. Summary of Conclusions

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