SCREENING OF KIDNEY DYSFUNCTION AND ITS ASSOCIATED RISK FACTORS AMONG PUBLIC SCHOOL LEARNERS IN BANGBANGOLAN ELEMENTARY AND NATIONAL HIGH SCHOOL, BARAOAS ELEMENTARY SCHOOL, PAO ELEMENTARY AND NATIONAL HIGH SCHOOL IN THE CITY OF SAN FERNANDO, LA UNION

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This study entitled “Screening of Kidney Dysfunction and Its Associated Risk Factors among Public School Learners in Bangbangolan Elementary and National High School, Baraoas Elementary School, Pao Elementary and National High School in the City of San Fernando, La Union” was conducted by the authors as part of the requirements for the Bachelor of Science in Medical Laboratory Science at LORMA Colleges – Center for Health Sciences. The authors declare that this manuscript is an original work and that all sources have been properly cited. Ethical standards were strictly observed, including the acquisition of informed consent and assent, and the confidentiality of participants was ensured throughout the study. The research was conducted with the approval of the City Health Office and participating schools. The authors report no conflicts of interest and no external funding, and all authors contributed to and approved the final version of the manuscript.

Abstract

This study examined the health profiles, prevalence, and risk factors of kidney dysfunction among public school learners in an upland setting, focusing on nutritional status, cardiometabolic indicators, and lifestyle-related risks. A quantitative approach was used, including demographic profiling, baseline health measurements (BMI, pulse rate, blood pressure, and temperature), and physician-validated urinalysis. Statistical analyses, particularly Fisher's exact test, were applied to determine associations between variables. Findings showed that more than half of the learners were undernourished (53.85% thinness), with some overweight cases, and exhibited cardiometabolic concerns such as tachycardia (23.08%) and elevated blood pressure (30.77%). Urinalysis revealed a high prevalence of kidney dysfunction (84.62%). However, no significant differences were found when grouped by health indicators or demographic variables. Although medical history, dietary habits, water intake, and drug use were identified as possible risk factors, no significant associations were observed, suggesting multifactorial causes. The findings highlight a dual burden of malnutrition and lifestyle-related risks among learners in rural areas with limited health resources. The study recommends larger, longitudinal investigations with more diverse populations and more comprehensive diagnostic and assessment methods to better identify key predictors.

Keywords: *Demographic Profile, Health Profile, Urinalysis, Prevalence of Kidney Dysfunction, Relationship, Risk Factor*

1. Introduction

Kidneys are essential for filtering waste and maintaining fluid and electrolyte balance, functions that are critical for children's growth and overall health; however, kidney dysfunction often develops silently, making early detection challenging (National Kidney Foundation, 2023). Defined as the inability of the kidneys to maintain homeostasis, kidney dysfunction may progress from acute to chronic stages if left undetected (Kidney Disease: Improving Global Outcomes, 2021). In children, it may result from congenital conditions, infections, or modifiable risk factors such as poor hydration, unhealthy diet, and improper drug intake, with environmental and socioeconomic factors further increasing vulnerability (Harambat et al., 2020; Santos et al., 2023; Sinha & Bagga, 2021). Beyond physical health, it can also affect cognitive function and academic performance (Kim et al., 2022). Globally, kidney disease affects millions, including a growing number of children (World Health Organization, 2024), and studies have shown that school-based urinalysis screening is an effective, low-cost strategy for early detection and prevention of complications (Honda et al., 2024; Patidar et al., 2021), highlighting the importance of monitoring kidney health among learners.

2. Objectives

The study aimed to detect early kidney function changes through urinary biomarkers among public school learners in San Fernando City, La Union. Specifically, it sought to answer the following questions:

1. What is the demographic profile of the learners in terms of:

   a. Age,

   b. Grade Level, and

   c. Gender?

2. What is the health profile of the learners in terms of:

a. BMI,

b. Pulse rate,

c. Blood pressure, and

d. Temperature?

3. What is the prevalence of kidney dysfunction among the learners based on the urinalysis results as validated by a physician's diagnosis?

4. Is there a significant difference on the prevalence of kidney dysfunction among learners when grouped according to their health and demographic profile?

5. What are the risk factors to kidney dysfunction among public school learners in terms of:

a. medical history,

b. diet,

c. water intake, and

d. drug intake?

6. Is there a significant relationship between identified risk factors and the prevalence of kidney dysfunction among public school learners?

3. Materials and Method

3.1 Research Design

This study employed a descriptive quantitative research design, a method used to systematically collect and analyze numerical data to describe the characteristics of a population or phenomenon. This design incorporated both correlational and comparative components to screen for potential

kidney dysfunction among public school learners, using the urinalysis dipstick test and a structured questionnaire. Quantifiable data were obtained from reagent strip results for leukocytes, nitrite, urobilinogen, protein, pH, blood, specific gravity, ketones, bilirubin, and glucose, along with information on participants' health profiles, demographic profiles, health-related behaviors, and possible risk factors associated with kidney dysfunction.

3.2 Population and Locale

A total of thirteen (13) learners were selected as participants, with the sample size determined and provided by the City Health Office (CHO) of the City of San Fernando, La Union. The sample distribution consisted of three (3) students from Bangbangolan Elementary School, four (4) students from Bangbangolan National High School, two (2) students from Baraoas Elementary School, two (2) students from Pao Elementary School, and two (2) students from Pao National High School. A stratified random sampling method was used across grade levels and gender to ensure balance and to reduce sampling bias.

3.3 Inclusion and Exclusion Criteria

Inclusion criteria were: (1) learners who were currently enrolled in a public school in the City of San Fernando, La Union; (2) learners who had completed their parental and guardian consent, for whom learner assent forms were available; and (3) learners who were17 available during the scheduled time of data collection. The exclusion criteria were the learners without parental consent or who were unwilling to participate.

3.4 Data Gathering Tools

Data were collected using complete urinalysis with microalbumin testing and a structured questionnaire. Urinalysis included physical, chemical (dipstick), and microscopic examination,

with microalbumin testing performed to detect early signs of albuminuria not usually identified by routine dipstick testing. All urine samples were collected using sterile containers and analyzed following standard laboratory and biosafety protocols under the supervision of licensed medical technologists.

The structured questionnaire was used to obtain information on the learners' demographic profile and possible risk factors for kidney dysfunction, including medical history, diet, water intake, and drug use. In addition, basic health measurements such as body mass index (BMI), pulse rate, blood pressure, and body temperature were recorded to provide supporting data on the participants' physiological status and potential indicators of kidney-related abnormalities.

4. Results

The study presents the results and discussion of the data analysis and the findings of the study. It provides a detailed interpretation of the findings based on the objectives and statements of the problem.

4.1 Demographic Profile of the Learners in terms of Age, Grade Level, and Gender

The demographic distribution of the learners showed variation in age, grade level, and gender, with the highest proportion being 13-year-old learners (23.08%), followed by those aged 7, 8, and 12 years (15.38% each). In terms of grade level, Grade 7 had the highest representation (38.46%), indicating a concentration of early adolescent participants. Regarding gender, males (53.85%) slightly outnumbered females (46.15%). Overall, the results show that the sample is composed largely of early adolescents, particularly Grade 7 learners, with a relatively balanced gender distribution. This demographic composition is important as adolescence is a critical developmental stage where lifestyle behaviors such as diet, hydration, and medication use begin to significantly influence kidney health.

4.2 Health Profile of the Learners in terms of BMI, Pulse Rate, Blood Pressure, and Temperature

The health profile revealed notable variations in the learners' physical and vital indicators. For BMI, more than half (53.85%) were classified as moderately to severely thin, while only 30.77% were normal, and small proportions were overweight or obese. This indicates a double burden of malnutrition. In terms of pulse rate, most learners (76.92%) were within normal range, although 23.08% exhibited tachycardia. For blood pressure, 30.77% showed elevated readings while the rest were normal. Lastly, 92.31% of learners recorded below-average body temperature. Overall, the findings suggest that although some vital signs remain within normal ranges, a considerable proportion of learners exhibit nutritional imbalance and abnormal physiological indicators that may reflect underlying health vulnerabilities.

4.3 Prevalence of Kidney Dysfunction among Learners Based on Urinalysis Results

The urinalysis results showed a high prevalence of possible kidney dysfunction among the learners. Out of 13 participants, 11 (84.62%) exhibited findings suggestive of kidney dysfunction, while only 2 (15.38%) had normal results. These findings were identified from five (5) public schools, indicating that the presence of abnormal urinary markers was not isolated to a single institution. Although these results are based on screening rather than confirmatory diagnosis, they suggest a high occurrence of possible renal abnormalities among the sampled learners.

4.4 Significant Difference in Kidney Dysfunction When Grouped According to Health Profile

Statistical analysis using Fisher's Exact Test revealed no significant difference in kidney dysfunction prevalence when grouped according to BMI ($p = 0.641$), pulse rate ($p = 0.423$), blood pressure ($p = 1.000$), and temperature ($p = 0.154$) at the 0.01 level of significance. This indicates that these health indicators did not significantly differentiate learners with kidney dysfunction from those without. The findings suggest that kidney dysfunction in this sample may not be

directly associated with individual vital signs or BMI alone, possibly due to the small sample size and limited variability in results.

4.5 Significant Difference in Kidney Dysfunction When Grouped According to Demographic Profile

Results showed no significant difference in kidney dysfunction prevalence when grouped according to age ($p = 0.795$), grade level ($p = 1.000$), and gender ($p = 0.462$). Since all p-values were above the 0.01 level of significance, the null hypothesis was accepted for all demographic variables. This indicates that kidney dysfunction was not significantly associated with demographic characteristics in this study, suggesting that other non-demographic factors may play a more important role in influencing kidney health among learners.

4.6 Relationship Between Identified Risk Factors and Prevalence of Kidney Dysfunction

The fisher's exact test analysis from table 14 below revealed that none of the identified risk factors medical history ($p = 1.000$), dietary intake ($p = 0.333$), water intake ($p = 1.000$), and drug intake ($p = 1.000$) showed a significant relationship with the prevalence of kidney dysfunction at the 0.01 level of significance. All variables failed to reject the null hypothesis, indicating that these risk factors, as measured in this study, did not statistically differentiate learners with kidney dysfunction from those without. This indicates that these variables, when analyzed individually, did not significantly predict kidney dysfunction among the learners.

5. Discussion

The findings of this study revealed a notably high prevalence of possible kidney dysfunction among public school learners, despite most demographic and health profile variables showing no significant differences. The high rate of abnormal urinalysis results may reflect early, asymptomatic kidney changes, supporting

previous literature that kidney dysfunction in children often develops silently and may not be immediately associated with observable clinical indicators. Although learners exhibited nutritional imbalance and some abnormal vital signs, these factors, along with identified risk behaviors such as diet, hydration, and drug intake, were not statistically significant predictors, suggesting a multifactorial nature of kidney dysfunction possibly influenced by unmeasured environmental, genetic, or socioeconomic factors. The results highlight the importance of early screening through school-based urinalysis and reinforce the need for broader and more comprehensive studies to better understand underlying causes and improve early detection among pediatric populations.

6. Conclusion

The study revealed a high prevalence of kidney dysfunction among public school learners based on physician-validated urinalysis results. Although statistical analyses showed no significant relationship between the identified risk factors and kidney dysfunction prevalence, the findings highlighted the possible contribution of poor hydration, unhealthy dietary habits, medical history, and improper drug intake to kidney health vulnerability. The study also demonstrated the importance of school-based kidney health screening programs for early detection and prevention of renal complications among learners.

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9. Author's Biodata

The authors are third-year students of the Bachelor of Science in Medical Laboratory Science program at LORMA Colleges. This research was conducted as part of their academic requirement in fulfillment of their degree. Their study reflects their interest in early detection of diseases and the identification of risk factors affecting community health.