

Prevalence and Factors Associated with Renal Dysfunction Among hiv Infected Children Attending hiv clinic at Dodoma Referral Regional Hospital and Makole health Centre.

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Abstract

Background:

Human Immunodeficiency Virus infection (HIV) is a multisystem disease that contributes to significant morbidity. Renal involvement is reported to be common among patients with HIV. This study was carried out to determine renal involvement using simple bedside tests combined with ultrasonography examination.

Methodology:

A cross-sectional Study design was carried out and included, The Total number of 236 Children's Infected with HIV were Recruited at Dodoma Regional Referral Hospital and Makole Urban Health Centre. During the study Population included HIV/AIDS Positive Children male and Female were aged less than 15 years whether on or not on HAART regimen. The study duration was carried out for the period of six months (6 months).

Results:

The prevalence and factors associated with Renal dysfunction in HIV infected Children were among boys and girls Recruited infected children's were 52.5% and 47.5% Respectively and were by those accounting below 5 years were 39.8% and among above of Five years of the age recruited were 60.2%. The association of the number of the infected children with renal dysfunction prevalence was 56% and The association between HIV with the renal dysfunction with the estimated eGlomerular Filtration (eGFR) of below <60ml/min of the patient recruited below five years were 7.6% and above 5< Years of Age recruited were 80.8% with significantly P Value <0.001. Enrolled Children with Proteinuria Investigated accounted for the 20.5%. With this similar study that was conducted at MNH Fredrick et al which correlated with our study and findings. Proportional of the children with anemia account for Renal Dysfunction was 91.7% with significance P Value < 0.019.

Conclusion:

The prevalence of renal dysfunction among recruited patients were 56% and this finding are higher compared to previously research study. The association of Renal Dysfunction that were included in the study showed proportional with the association of High viral load, low CD4 count, Drug adherence, Malnutrition, Comorbidities anemia and over all HIV Human Immuno deficiency Staging.

Introduction

Renal dysfunction is defined as the disability of the kidney to

maintain normal functions so that waste products and metabolites accumulate in the blood system. The term encompasses all degrees

of decreased renal function, from damaged at risk through mild, moderate, and severe chronic kidney failure (1). Chronic kidney disease (CKD) is a chronic renal failure is a worldwide public health problem and is defined as the is defined as structural damage or functional impairment of kidneys by GFR <60 ml/min/1.73 m² for more than three months (2). However, there is rising incidence and prevalence of the kidney failure and is more prevalent in the elderly population despite of that the younger patients with the CKD typically experiences progressively loss of the kidney function, Associated with the increased risk of cardiovascular disease. In Tanzania 150,000 children aged between 0 and 14 years were estimated to require anti-retroviral therapy (ART) in 2011 (3). In Globally there is more than 3 million children who are living with HIV human immune deficiency virus and among that live under Sub Sahara Africa. In studies from Sub Sahara Africa the prevalence of markers of kidney disease among children with HIV varied greatly, ranging from 0 –31.6%, depending on the methods used to evaluate the kidney Kidney disease is an important complication in HIV- infected individuals and is associated with an increased risk of morbidity and mortality (4). Mostly of the HIV related are reported with the involvement of children manifested with the chronic kidney disease. There is a wide clinical spectrum of renal disease in the course of HIV infection and the mechanism of kidney involvement in HIV infection is multifactorial (5). There is a wide clinical spectrum of renal disease in the course of HIV infection and the mechanism of kidney involvement in HIV infection is multifactorial. Data on renal dysfunction among HIV infected children are scarce in Tanzania. Survival of HIV-infected children continues to increase and the use of anti-retroviral (ARVs) is expanding. Data on renal dysfunction among HIV infected children are very few in SSA including Tanzania hence our study has focused on prevalence of renal dysfunction among HIV infected children Knowing the prevalence of renal dysfunction and factors associated will help improve strategies on early detection and ultimately improve survival.

Methodology of the Study

The determination of the prevalence and the factors associated with the renal dysfunction in HIV Human immune deficiency virus in HIV infected attending HIV clinic at Dodoma. Regional Referral Hospital and Makole Health Centre in Dodoma Region. The main two objectives of the study were (a)Determination of the prevalence of renal dysfunction among Human immune deficiency Virus infected children. (b) Determination of the factors associated with renal dysfunction among HIV infected children. The study area site were Dodoma Regional Referral Hospital and Makole Health Urban Centre, the study design was the Crossectional analytical study and the study population were HIV/AIDs positive children, male and female's aged less than 15 years whether or not on HAART regimen. The Inclusion criteria of the study included all HIV positive children age ≤15years, irrespective of ART use and attending CDC- HIV clinic, Dodoma regional referral hospital and Makole Urban health Centre. and while the exclusion criteria were the children who were above the 17 years of the Age.

Depended Variables and The Study Procedure

The dependent variables used were Renal Dysfunction defined as the estimation of GFR <60ml/min/1.73m². The participants were sampled by the consecutively sampling technique Informed con-

sent, taken from parents/guardians/caretakers of the patient, also information about blood and clean urine sample collection Structured questionnaire having research question were used. Anthropometric measures including: weight(kg), height(cm) or length (cm) were taken from the patient. eGFR was obtained from the Revised Schwartz equation which is estimated that GFR, mL/min/1.73 m² = k × height, cm / serum creatinine, mg/dL; where k = 0.413Malnutrition status(WHO)obtained by BMI for children >5years and Weight/height in children < 5year. Anaemia was consider to those with Hb < 11 g/dlProteinuria was obtained through urine dipstic Proteinuria was defined as positive dipstick test of: ≥ +1 corresponding to ≥ 30 mg/dl, validated for children with and without CKD.

Statistical Analysis

Data were analysed using the Statistical Package for social sciences (SPSS) version 20. Chi- square test was used to assess the association between variables and the logistic regression for the predictors, p-value <0.05 was considered as the Statistical significant. level of the significance was set as the P value less than 0.05.

Discussion

Chronic kidney diseases CKD is associated with an increased risk of cardiovascular disease and end-stage renal disease (6). However Chronic Kidney disease is more prevalent in the elderly population However, while younger patients with CKD typically experience progressive loss of kidney function, 30% of patients over 65 years of age with CKD have stable disease The Kidney Disease Outcomes Quality Initiative (KDOQI) of the National Kidney Foundation (NKF) established a definition and classification of CKD in 2002. The KDOQI and the international guideline group Kidney Disease Improving Global Outcomes (KDIGO) subsequently updated these guidelines (7). However, the stage of the kidney disease is classified as follows The stages of CKD are classified as follows:

Stage 1: Kidney damage with normal or increased GFR (>90 mL/min/1.73 m²)

Stage 2: Mild reduction in GFR (60-89 mL/min/1.73 m²)

Stage 3a: Moderate reduction in GFR (45-59 mL/min/1.73 m²)

Stage 3b: Moderate reduction in GFR (30-44 mL/min/1.73 m²)

Stage 4: Severe reduction in GFR (15-29 mL/min/1.73 m²)

Stage 5: Kidney failure (GFR < 15 mL/min/1.73 m² or dialysis).

From our study the Prevalence of renal dysfunction was found to be 56%, this seem quite high as compared to other study (8). Associated factors of renal dysfunction that where included in the study and showed association were: high viral load, low CD4 count, drug adherence, malnutrition, comorbidities, anemia and HIV staging (9). A systematic scoping review on renal manifestations of HIV during the antiretroviral era in South Africa found , 11 out of 21 studies were eligible for data extraction reporting HIV-associated nephropathy being the most prevalent finding (57.2%) with older age, a lower CD4 count, a low hemoglobin and a detectable viral load were associated with renal impairment A study conducted in Hong Kong, among 322 HIV infected children, 5.6% of patients had proteinuria and significant predictors were older age, lower CD4 count, and ART regimen where the use of indinavir was implicated, despite similar method and cut-off applied to calculated eGFR and proteinuria their prevalence

of renal dysfunction was only 5% In a study done in Mwanza on renal dysfunction among HIV individuals found that over 80% of HIV-infected patients starting ART had evidence of renal dysfunction, about 56% had (eGFR < 60 ml/min/1.73m²) and Proteinuria 36% (10). Factors predictive of renal dysfunction in multivariate analysis included female gender, (BMI) <18.5, CD4 counts <200

cells/mm³ and WHO clinical stage II or above (11). A Cross-sectional Study done on the Influence of HIV and Schistosomiasis on Renal Function; identified 50% prevalence of renal dysfunction of both HIV-infected children and their siblings (defined operationally as eGFR<60mL/min/1.73m² and/or albuminuria>20mg/L in a single urine dipstick test (12).

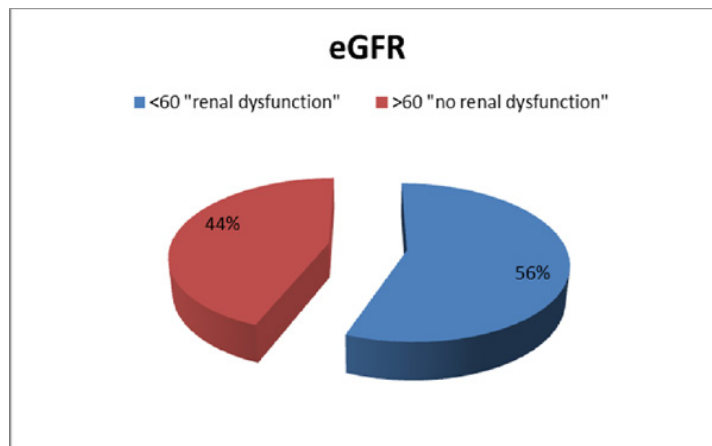


Figure 1: Prevalence of the renal dysfunction among the children Group.

Table 1: Socio-demographic characteristics of study participants

Variables	Frequency	Percentage (%)
Gender	Male	52.5
	Female	47.5
Age of patient	< 5 years	39.8
	> 5 years	60.2
Level of education	Not schooling	22
	Primary/Secondary	78
Parent health status	Alive	66.5
	Deceased	33.5
Parent level of education	No formal education	29.9
	Primary school, and above	70.1
Parent marital status	Married	54.8
	Single	45.2
Parent employment status	Unemployed	29.3
	Employed	70.7
Care and Treatment Centers	Dodoma	77.18
	Makole	29.9
Area of residence	Urban	83.9
	Rural	16.1

Table 2: The association between HIV associated renal dysfunction and selected variables among HIV infected children in Dodoma region based on univariate analysis

Variables	eGFR		Total	OR (95% CI)	p Value
	< 60 - RD	> 60 - No RD			
Co-morbidities					
Yes	128 (97%)	4 (3.8%)	132 (55.9%)	800 (195.242 - 3277.991)	< 0.001
No	4 (3.0%)	100 (96.2%)	104 (44.1%)		
Malnutrition					
Malnourished	101 (77.1%)	31 (29.8%)	132 (56.2%)	7.928 (4.415 - 14.235)	< 0.001
Good nourished	30 (22.9%)	73 (70.2%)	103 (43.8%)		
Proteinuria					
No protein	23 (17.4%)	42 (40.4%)	65 (27.5%)	80 (95.242 - 120.991)	0.001
Protein +	27 (20.5%)	13 (12.5%)	40 (16.9%)		
Protein ++	73 (55.3%)	47 (45.2%)	120 (50.8%)		
Protein +++	9 (6.8%)	2 (1.9%)	11 (4.7%)		
Anaemia					
Yes	121 (91.7%)	11 (10.6%)	132 (55.9%)	93.0 (38.638 - 223.844)	< 0.001
No	11 (8.3%)	93 (89.4%)	104 (44.1%)		
Viral Load (copies/ml)					
viral load <1000	10 (7.6%)	122 (92.4%)	74 (100%)	0.009 (0.003 - 0.022)	< 0.001
viral load >1000	94 (90.4%)	10 (9.6%)	83 (100%)		

Table 3: The association between HIV associated renal dysfunction and selected variables among HIV infected children in Dodoma region based on multivariate analysis

Factors	eGFR		Univariate			Multivariate		
	+ RD	- RD	OR	95% CI	p - Value	OR	95% CI	p - Value
Child age			43.476	19.907-94.950	0.000	0.020	0.009-0.44	0.999
< 5 year	10 (7.6%)	122 (92.4%)						
> 5 year	84 (80.8%)	20 (19.2%)						
Parent level of education			0.422	0.222 - 0.803	0.008	2.196	0.75 - 7.03	0.114
Never attended	15 (20.3%)	32 (38.6%)						
Primary school/above	59 (79.7%)	51 (61.4%)						
Duration of ART			0.465	0.271 - 0.799	0.006	11.942	0.632 - 225.492	0.098
<5 years	69 (52.3%)	73 (70.2%)						
> 5 years	63 (47.7%)	31 (29.8%)						
Drug adherence status			0.579	0.344 - 0.974	0.039	24.42	1.192 - 499.741	0.038
Good	10 (7.6%)	94 (90.4%)						
Poor	122 (92.4%)	10 (9.6%)						

Results

The prevalence and factors associated with Renal dysfunction in HIV infected Children were among boys and girls Recruited infected children's were 52.5% and 47.5% Respectively and were by those accounting below 5 years were 39.8% and among above of Five years of the age recruited were 60.2% .The association of the number of the infected children with renal dysfunction prevalence was 56% and The association between HIV with the renal dysfunction with the estimated eGlomerular Filtration (eGFR) of below <60ml/min of the patient recruited below five years were 7.6% and above 5< Years of Age recruited were 80.8% with significantly P Value <0.001.Enrolled Children with Proteinuria Investigated accounted for the 20.5 % .With this similar study that was conducted at MNH Fredrick et al which correlated with our study and findings. Proportional of the children with anemia account for Renal Dysfunction was 91.7% with significance P Value < 0.019.

Conclusion

Renal dysfunction poses a significant burden among HIV patients Majority of patients had renal dysfunction Poor drug adherence, malnutrition and anemia being the major contributing factor.

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