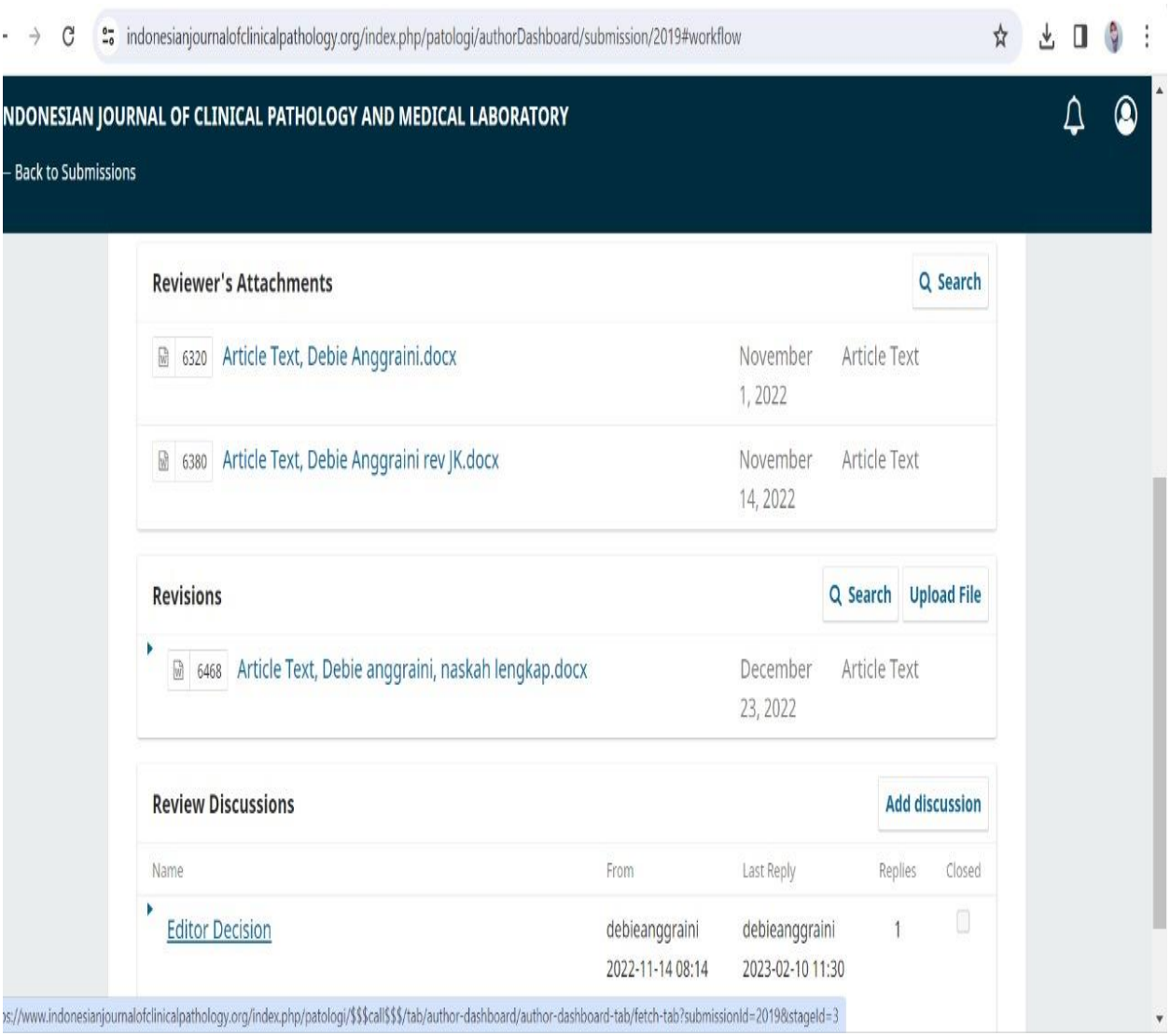
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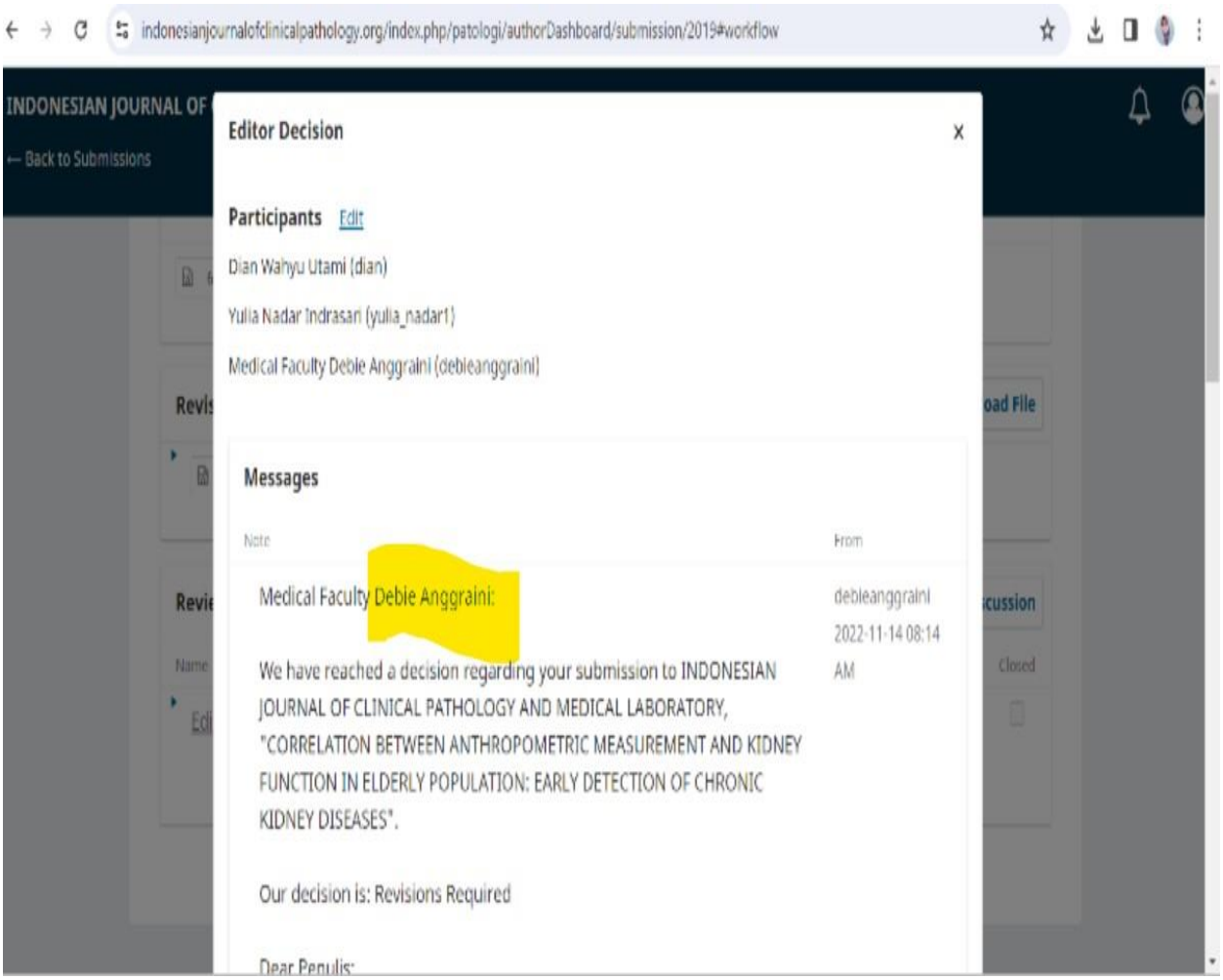
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2022-11-14 08:14 AM
We have reached a decision regarding your submission to INDONESIAN JOURNAL OF CLINICAL PATHOLOGY AND MEDICAL LABORATORY, "CORRELATION BETWEEN ANTHROPOMETRIC MEASUREMENT AND KIDNEY FUNCTION IN ELDERLY POPULATION: EARLY DETECTION OF CHRONIC KIDNEY DISEASES".
Our decision is: Revisions Required
Dear Penulis:

CORRELATION BETWEEN ANTHROPOMETRIC MEASUREMENT AND KIDNEY FUNCTION IN ELDERLY POPULATION: EARLY DETECTION OF CHRONIC KIDNEY DISEASES

Abstract

Background: Chronic kidney disease (CKD) is a very common clinical problem in elderly patients and is associated with increased morbidity and mortality. The a~~A~~ging process involves physiological and nutritional changes that will affect the nutritional status of elderly, this could~~will~~ lead to malnutrition and overweight. Aging is associated with considerable changes in body composition, higher BMI is associated with improved survival in patients with CKD and very low BMI levels have been consistently associated with high all-cause mortality in the elderly. The effect of changes in body fat percentage (BFP) in the elderly will affect the estimated glomerular filtration rate (eGFR) in the elderly. **Objective**: to determine correlation between anthropometric measurement and kidney function in elderly population. **Methods:** this research is an analytic observational study with cross sectional design with the research sample consisting~~s~~ of 42 elderly people ~~which~~ aged ≥ 60 years in Guguak , kabupaten 50 kota, West Sumatera, ~~Indonesia those fulfilled the inclusion criteria~~. Anthropometric measurements using the Waist-to-height-ratio (WHtR) method, waist-to-hip ratio (WHR), Waist circumference (WC) and body mass index (BMI) and Estimated glomerular filtration rate (eGFR) were~~as~~ calculated using the t~~T~~he Cockcroft and Gault formula. **Result**: The results of this study were;~~,~~ the mean age of cohort~~elderly~~ were 68±7.58 years old that consisting of 29.3% male and 70.7% female. The P~~p~~earson correlation of WHR with eGFR obtained p<0,05 with r = 0,439 and the P~~p~~earson correlation of BMI with eGFR obtained p<0,05 with r = 0,425.**Conclusion:** There was a moderate correlation between WHR with eGFR and BMI with eGFR in elderly population.

Keyword: Anthropometric Measurement, Kidney Function, eGFR, Elderly, Chronic Kidney Diseases

Abstrak

***Latar Belakang**: Penyakit ginjal kronis (PGK) merupakan masalah klinis yang sangat umum pada pasien usia lanjut dan berhubungan dengan peningkatan morbiditas dan mortalitas. Proses menua melibatkan perubahan fisiologis dan gizi yang akan mempengaruhi status gizi lansia, hal ini akan menyebabkan gizi buruk dan kelebihan berat badan. Penuaan dikaitkan dengan perubahan besar dalam komposisi tubuh, BMI yang lebih tinggi dikaitkan dengan peningkatan kelangsungan hidup pada pasien dengan CKD dan tingkat BMI yang sangat rendah telah secara konsisten dikaitkan dengan semua penyebab kematian yang tinggi pada orang tua. Pengaruh perubahan persentase lemak tubuh pada lansia akan mempengaruhi estimasi laju filtrasi glomerulus (eGFR) pada lansia. **Tujuan:** untuk mengetahui hubungan antara pengukuran antropometri dengan fungsi ginjal pada populasi lanjut usia. **Metode**: Penelitian ini merupakan penelitian observasional analitik dengan desain cross sectional dengan sampel penelitian 42 lansia berusia 60 tahun di Guguak, kabupaten 50 kota, Sumatera Barat, Indonesia yang memenuhi kriteria inklusi. Pengukuran antropometri menggunakan metode Waist-to-height-ratio*

Comment [R11]: Is this associated with aging? - perhaps dietary?

Comment [R12]: Surely these are opposites?

Comment [R13]: Does that depend on the eGFR calculation?

(WHtR), waist-to-hip ratio (WHR), Lingkar pinggang (WC) dan indeks massa tubuh (IMT) dan Estimasi laju filtrasi glomerulus (eGFR) dihitung menggunakan Rumus Cockcroft dan Gault. ***Hasil****: Hasil penelitian ini, rata-rata usia lanjut usia adalah 68±7.58 tahun yang terdiri dari 29,3% laki-laki dan 70,7% perempuan. Korelasi pearson WHR dengan eGFR diperoleh p<0,05 dengan r = 0,439 dan korelasi pearson IMT dengan eGFR diperoleh p<0,05 dengan r = 0,425.* ***Kesimpulan:*** *Terdapat korelasi sedang antara WHR dengan eGFR dan IMT dengan eGFR pada populasi lanjut usia.*
Kata Kunci*: Pengukuran Antropometri, Fungsi Ginjal, eGFR, Lansia, Penyakit Ginjal Kronis*

I. Background

The ~~A~~aging process involves physiological and ~~nutritional~~ dietary changes that could~~will~~ affect the nutritional status of elderly, this will lead to malnutrition and overweight, including redistribution of adipose tissue, with fat accumulation in the trunk and viscera (1)(2). The aging process causes a decrease in hormone levels and changes in metabolic rate, which in turn affect their anthropometric measurements, increasing morbidity and mortality in elderly (2). Nutritional status is a condition body which is influenced by the level of nutrients in the body and its ability to maintain normal metabolic integrity which affects the health status of the elderly (3) Health status is influenced by the cumulative effect of comorbidities, functional status, medical history and economic status. Hormonal, metabolic, and other changes can affect the nutritional status of the elderly, which will predispose to disease (2)(3).

Several epidemiological studies have reported that obesity is associated with the development of chronic kidney disease (CKD) and end-stage renal disease (ESRD). Previous studies have shown that a high body mass index (BMI) is a strong independent risk factor for the occurrence of ESRD in Asian and Caucasian populations(4). Besides obesity, very low BMI levels have been consistently associated with high all-cause mortality. The effect of changes in body fat percentage (BFP) in the elderly on longitudinal changes will affect the estimated glomerular filtration rate (eGFR) in the elderly.(3,5)

~~Status~~ Anthropometry is an important tool in assessing nutritional status that is used to evaluate weight-related conditions in the elderly and indirectly evaluates body composition and risk of acute and chronic disease in the elderly (6)(7). Anthropometric status measurement methods including body mass index (BMI), waist circumference (WC), waist-to-hip ratio (WHR), and waist-hip ratio (WHR) have been widely used and regarded as alternatives to BMI. Recently, the ratio of waist circumference to height (WHtR) has been proposed as an anthropometric measure to assess central adiposity, because it is closely associated with cardiometabolic risk factors and mortality in elderly (3)(8). National Institute for Health and Clinical Excellence (NICE) and National Institute of Health (NIH) recommends these measures as a practical tool to measure risk factors for diseases like diabetes and hypertension, especially in persons with a BMI range under 35 kg/m2(1,9). Some, but not all clinical trials reported improved kidney function after intentional weight loss in obese individuals.(8)

Comment [R14]: See previous comment in Abstract

Comment [R15]: In malnutrition?

Comment [R16]: Which ones?

Comment [R17]: Because …?

Comment [R18]: Rephrase this - it doesn't make sense

Comment [R19]: This depends on whether of=r not BMI is used in the eGFR calculation

A higher BMI is associated with improved survival in patients with CKD and on dialysis. It is not yet known whether obesity is less harmful or even protective in the elderly, and whether BMI is an appropriate marker of obesity for predicting adverse outcomes in this population.(4)(10)(11). BMI and body weight reduce slightly or do not change at all in the elderly, despite the loss of height, bone, and muscle during the aging process(4). Aging is associated with considerable changes in body composition A standard anthropometric measurement tool employed by the World Health Organization (WHO) is the Body Mass Index (BMI) which uses a ratio of height and weight to classify adults as underweight, normal, overweight or obese(9)

Screening for Chronic Kidney Disease Among Older People Across Europe (SCOPE) focuses on assessing the nutritional status of participants with data obtained from reliable and detailed analysizes of the relationship between kidney function and nutritional status(3)(12). The purpose of this study was to assess the relationship between anthropometric measurement (by using the Waist-to-height-ratio (WHtR) method, waist-to-hip ratio (WHR), Waist circumference (WC), ~~and~~ body mass index (BMI)) and kidney function in the elderly aged 60 years or older. Given that appropriate management of older patients with CKD may contribute to a slower loss of renal function (potentially preventing renal failure) and allow for better control of its consequences.

II. Methods

Design of the Study and Study Population

This research consisteds of 42 elderly people which aged ≥ 60 years in Guguak, Kabupaten 50 Kota, West Sumatera, Indonesia. Only people aged 60 or more were asked to participate because of the high prevalence of CKD in this population. ~~Data collection was carried out by researchers with the assistance of experts for venous blood specimen collection~~. Data collection was carried out after obtaining approval from the research ethics committee of the Faculty of Medicine, Andalas University and obtaining a research permit from the relevant agency. All subjects who met the inclusion and exclusion criteria were asked to participate in the study by signing an informed consent document.

Anthropometric measurement using the Waist-to-height-ratio (WHtR) method, waist-to-hip ratio (WHR), Waist circumference (WC) and body mass index (BMI). Waist-to-height-ratio calculated as waist circumference in cm divided by height in cm; WC calculated as Place the tape measure directly on skin, Measure the waist is halfway between the lowest rib and the top of the hipbone. It is roughly in line with the belly button; BMI calculated as Weight (kg)/Height $(m)^2$, to categorize whether a person is underweight, normal weight, overweight, or obese. ~~depending on what range the value falls between.~~

Samples of serum were coded, shipped to the central laboratory at Siti Rahmah Hospital, Padang, and stored at 4^0C until analysis. The lab took a blood sample from a peripheral vein. Then the blood sample was put into an EDTA tube or~~and~~ a gel separator tube and then brought to

Comment [R110]: Add a reference

Comment [R111]: They cant meet both!

Comment [R112]: You defined the abbreviations for these earlier so use the abbreviations

the laboratory using an ice cold pack in a carrier box. Laboratory analysed serum samples to measured creatinine concentrations using standard enzymatic automated methods. The study protocol was approved by the Ethical Clinical Research Center, Medical faculty of Universitas Baiturrahmah.

Comment [R113]: Add details of method and that the assay was in control

Statistical Analysis:

Univariate Analysis

All data obtained wereill be recorded and tabulated and then presented in the form of narratives, tables, graphs and diagrams. The data obtained wasill be processed statistically using SPSS 25.0.(source of software)

Bivariate Analysis

If the data wais normally distributed, then this bivariate analysis usinges Pearson's test with SPSS program. If the data distribution is non-Gaussianabnormal then the data wasill be transformed so that it is normally distributed. However, if after the transformation the data still shows an abnormal data distribution, then the Spearman test is continued. The waist-to-height ratio(WtHR), waist-to-hip ratio (WHR), Waist circumference (WC), body mass index (BMI) and kidney function in elderly relationship is said to be statistically significant if the p value < 0.05. The data obtained will statistically processed using SPSS 25.0.

Comment [R114]: How was this determined? Normal or non-normal?

Comment [R115]: Spearman rank test?

Comment [R116]: Abbreviations again

III. Results

This sampleresearch consistsed of 42 elderly people which aged ≥ 60 years in Guguak, Kabupaten 50 Kota, West Sumatera, Indonesia. The results of this study, the mean age of elderly were 68±7.58 years old that consisting of 29.3% male and 70.7% female.

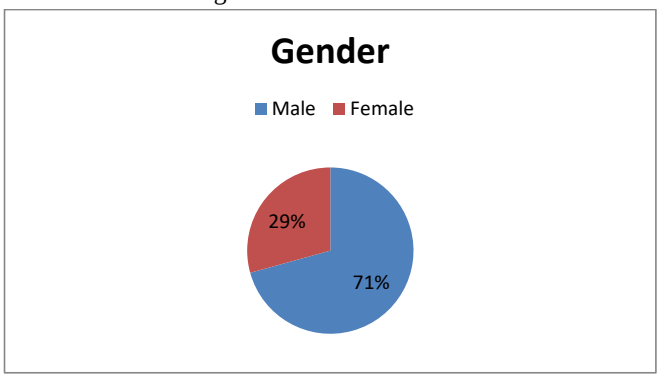

Figure 1. Distribution of Elderly Patients by Gender

Waist-to-height ratio (WHtR)

waist-to-height ratio calculated as waist circumference in cm divided by height in cm. WHtR values below 0.50 as low-risk to health, 0.5 to 0.6 as suggestive of risk, and greater than 0.60 as high-risk. In this study, we found the elderly with high-risk to health were 52%.

Comment [R117]: Reference?

Waist-to-hip ratio (WHR)

Waist-to-hip ratio was determined by dividing waist circumference by hip circumference. WHO recommends cut-off points for WHR 0.90 and 0.80 for men and women respectively, where a higher ratio indicates an in- creased risk of various health complications. The results of this study found 98 % of elderly with normal waist-to-hip ratio. All study samples have been categorized according to their respective genders.

Comment [R118]: Reference to method of classification?

Waist Circumference (WC)

Obesity in this study was found to have a waist circumference ≥95 cm. The results of this study found 47.6 % of elderly with central obesity. The mean waist circumference in elderly 93.3 ± 10.02 cm with 77 cm minimum value and maximum value of 110 cm. WHO recommends cut-off points for waist circumference as 85 cm and 80 cm for men and women respectively, where a higher ratio indicates an in- creased risk of various health complications. In this study, we found the elderly with normal waist circumference 52.4%, and elderly with central obesity were 47.6%. All study samples have been categorized according to their respective genders.

Comment [R119]: Reference?

Comment [R120]: Reference needed

Body Mass Index

Normal BMI if BMI <25 kg/m2, overweight if BMI 25≤ BMI <30 kg/m2 and obese if BMI ≥30 kg/m2. In this study, found the elderly with normal BMI were 50%, the elderly with overweight ~~were~~ 38% and the elderly with obese were 12%. ~~A higher BMI is associated with improved survival in patients with CKD and on dialysis~~. ~~It is not yet known whether obesity is less harmful or even protective in the elderly.~~

Comment [R121]: Reference

Table 1. Anthropometry Measurement In Elderly

Variable	N (%)	Mean	Minimum Value	Maxkimal Value
WHtR		0.624±0.07	0.503	0.758
Low risk	0			
suggestive of risk	20 (48%)			
high-risk	22 (52%)			
WHR		0.553±0.10	0.38	0.90
Normal	41(98%)			
High	1 (2%)			
Waist Circumference (cm)		93.3 ± 10.02	77	110
Normal	22 (52.4%)			
Central obesity	20 (47.6 %)			
BMI		24.86±5.13	15.0	42.9
Normal weight	21(50%)			
Overweight	16 (38%)			
Obese	5 (12%)			

Estimated glomerular filtration rate (eGFR)

Glomerular filtration rate calculated by measuring the clearance of inulin by the kidney is considered "Gold standard"; precise measurement of GFR is possible but expensive, time consuming and impractical. For this reason, there has been a constant strive to develop an equation which can estimate GFR reliably from blood and urine biochemical markers such as creatinine. These are rapid and cost-effective. However, with age there is a change in both renal physiology and muscle mass, both of which may affect eGFR calculation

Estimated glomerular filtration rate (eGFR) was calculated using the The Cockcroft and Gault formula (CG) eGFR C_{Cr}={((140–age) x weight)/(72xS_{Cr})}x 0.85 (if female).

Comment [R122]: Move this to the Introduction.

Comment [R123]: Why use this formula? It is not widely used clinically. The CKD-EPI is widely used and doesn't include weight

Table 2. Estimated Glomerular Filtration Rate In Elderly Using The Cockcroft And Gault Formula

CKD Category	N (%)	Term
Stage 1	2 (5%)	eGFR >90, Normal
Stage 2	6 (14%)	eGFR 60-89, mildly decreased
Stage 3A	4 (10%)	eGFR 45-59, mildly to moderately decreased
Stage 3B	14 (33%)	eGFR 30-44, moderate to severely decreased
Stage 4	12 (28%)	eGFR 15-29, severely decreased
Stage 5	4 (10%)	eGFR < 15, Kidney failure

The results of this study obtained 33% of the elderly with eGFR 30-44, namely CKD Grade 3B, with kidney function moderate to severely decreased, 10% elderly were in kidney failure.

Tabel 3. Correlation Between Anthropometric Measurement And Kidney Function In Elderly

	eGFR
WHtR	r = -0.156; p > 0.05
WHR	r = 0.439; p < 0.05*
WC	r = -0.066; p > 0.05
BMI	r = 0.425; p < 0.05*

The Ppearson correlation of WHR with eGFR obtained p<0,05 with r = 0,439 and Ppearson correlation of BMI with eGFR obtained p<0,05 with r = 0,425.

IV. Discussion

~~A standard anthropometric measurement tool employed by the World Health Organization (WHO) is the Body Mass Index (BMI) which uses a ratio of height and weight to classify adults as underweight, normal, overweight or obese. Anthropometric measurements such as waist circumference and waist hip ratio (WHR) are regarded as alternatives to BMI. As fat in the abdominal region is associated with increased health risks, the National Institute for Health and Clinical Excellence (NICE) and National Institute of Health (NIH) recommends these measures as a practical tool to measure risk factors for diseases like diabetes and hypertension, especially in persons with a BMI range under 35 kg/m2. Several studies have shown that there is a strong positive association between cardiovascular risk factors with measures of waist circumference or WHR instead of BMI alone(13)~~

Various methods for nutritional assessment have been described in the literature 5, and use of conventional methods has been recommended due to their practicality, low cost, and diagnostic precision (6). Such methods feature anthropometry, and body mass index (BMI), waist circumference (WC), and waist-to-hip ratio (WHR) have been widely used 7,8,9. Recently, waist circumference to height ratio (WHtR) has been proposed as an anthropometric measure to assess central adiposity, since it is closely associated with cardiometabolic risk factors and mortality, independently of body weight 10,11,12. The correlation between variables that measure obesity in the elderly individual is still not well established, due to the distribution of adiposity in the aging process, especially in the abdominal region. WHtR is thus an alternative anthropometric index of central obesity that avoids the limitations of WC due to the inclusion of height in the index, averting potential confounding from height in cardiometabolic risk(13)

Estimates of glomerular filtration rate (eGFR) should provide accurate measure of an individual's kidney function because important clinical decisions such as timing of renal replacement therapy and drug dosing may be dependent on eGFR. In old people, there is age-related physiological change in the kidney, which could lead to reduced GFR (14). By knowing changes in body composition through anthropometric measurements, it is hoped that it can contribute to early detection of decreased kidney function or prevent the incidence of CKD in elderly population.

Comment [R124]: Repetitive from Introduction

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Comment [R125]: Abbreviations again

Comment [R126]: There should be more analysis of what the study found?
What are the limitations of the study? What is the power of the study?

V. Conclusion

There was a moderate correlation between WHR with eGFR and BMI with eGFR in elderly population.

Comment [R127]: What next should happen?

VI. Referencese

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