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HEIGHT PREDICTION BASED ON THE LENGTH OF THE PROXIMAL II PHALANX BONE WITH DIGITAL RADIOLOGY IN THE BATAK TRIBE IN 2024

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Abstract:

Background: There are various incidents that can cause a person's limbs to be unrecognizable or dismembered, even leaving only bones, such as natural disasters, murder, terrorism, mutilation, and fires that can result in unrecognizable, damaged bodies, or even bone remains so that their identities are unknown. This research method is a correlative analytical study that aims to find the relationship between the length of the phalanx bone and height. The approach used in this study is cross-sectional where data collection is only done once and within a certain time. In this case, the purpose of the study was to see the relationship between height and the length of the proximal II phalanx bone in the Batak tribe. Results: Based on the results of the study, it can be concluded: TB, FP2R and FP2L data are normally distributed, p-value <0.05 (p = 0.001), There is a correlation (Sig FP2R = 0.200 (p> 0.05), with a moderate level of relationship between the length of the right proximal II phalanx bone (r = 0.353) and left (r = 0.400), in men and in women the correlation of the right proximal II phalanx r = 0.464), and the left proximal II phalanx (r = 0.479), with the height of the Batak tribe. Conclusion: that proximal phalanges 2 have a moderate relationship with height (r = 0.353- 0.479), so that proximal phalanges 2 can be a predictor of height.

Keywords: PROXIMAL, II PHALANX, BONE, DIGITAL RADIOLOGY

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Introduction

There are various incidents that can cause a person's limbs to be unrecognizable or dismembered, even leaving only bones, such as natural disasters, murder, terrorism, mutilation, and fires that can result in unrecognizable, damaged bodies, or even bone remains so that their identities are unknown[1.]

North Sumatra Province is one of the areas that has a high risk of natural disasters. This fact is proven by the existence of 493 natural disasters, where flooding was the most frequent event, 299 times between 2015 and 2016. On June 18, 2018, there was a sinking accident of the Motor Ship (KM) Sinar Bangun in Lake Toba, North Sumatra, which was caused by the passenger capacity exceeding the limit, which caused a number of victims to be missing and died[4].

Determining the identity of the victim is the same as determining the identity of the suspect of a crime is the most important part of the investigation. By being able to determine the identity of the victim correctly, errors in the investigation process can be avoided which can have fatal consequences.[5]

A study on estimating height from the phalanx bone was conducted by Iyoti Agrawal ed.al from S.N Medical College, Jodhpur, North India, identifying height from the length of the phalanx arm, conducted on 200 students and Stap aged 17-30 years.[14]

Until now, researchers have not found any research related to calculating height based on the length of the proximal II phalanx bone radiographically on the Batak tribe. Therefore, this study aims to examine the correlation between height and the length of the proximal II phalanx bone, in the Batak tribe population.

Methods and Materials

This study is a correlative analytical study that aims to find the relationship between the length of the phalanx bone and height. The approach used in this study is cross-sectional where data collection is only carried out once and within a certain time. In this case, the purpose of the study was to see the relationship between height and the length of the proximal phalanx II bone in the Batak tribe. The study was conducted at the Materna Hospital in Medan, starting in June 2024 until the minimum number of research subjects was reached. The total number of respondents in this study was 56 respondents, of which 37 were women and 19 were men, aged 21-25 years, with Inclusion criteria: Adult Batak tribe, Age 21-25 years, Able to stand upright alone without the help of others, Willing to participate as a subject in this study and has signed an informed consent form. Has no history of fractures of the palm and fingers of the right or left hand, Has no physical disabilities, congenital bone abnormalities since birth.Exclusion criteria: Has a history of fractures in the palm and fingers. Does not have the ability to stand alone, Has a history of surgical therapy affecting the palm and fingers, The presence of bone deformities such as scoliosis, kyphosis, lordosis, and dwarfism.

Height measurements were carried out using Wireless Bodyfrom ONEMED, Specifications: product type/model HT-721, maximum measured height 200 cm, accuracy: -+ 0.1 cm, 35 x 16 cm LCD screen, 3 small AAA batteries, Ultrasonic Height Meter product type, GEA brand, height is measured from the highest point of the head called the vertex to the lowest point, namely the heel/floor. The height measurement position is taken when the respondent is not wearing footwear and is standing on a flat surface while the back of the head, back, buttocks and heels are close to the wall with the head facing straight ahead. The Wireless Body Height Meter is placed right on top of the scalp and attached to the wall, then the respondent shifts to the right or left then presses the measuring tool button then sees the measurement results 31. Measurement of the length of the Phalanx proximal II bone, carried out after collecting data from the questionnaire, consent to participate in the study, and measuring height, after which the respondents were examined with X-Ray photos of both palms, and then measurements of the phalanx proximal II bone were taken, with a computer x-ray tool, namely the phalanx proximal II is measured through an x-ray photo displayed on the computer by drawing the axis line of the bone from the farthest point on the proximal and distal parts. The measurement results are obtained in millimeters.

This study was carried out after obtaining ethical clearance approval from the Health Research Ethics Committee of the University of North Sumatra no. 731/KEPK /USU/2024.

Results

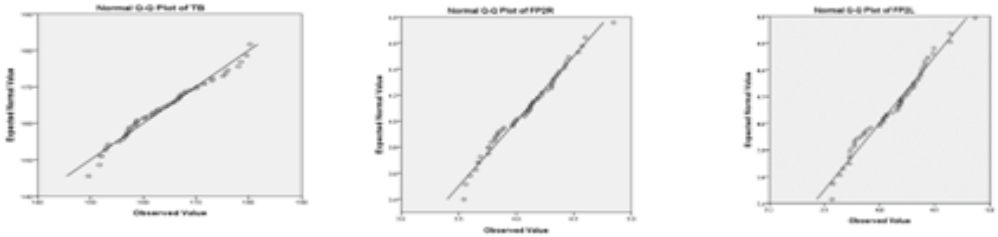
Descriptive Analysis Results

The results of the descriptive analysis regarding age, height, length of the right and left proximal II phalanx based on male and female gender with the following results.

Table 4.1 Descriptive statistics

N		Male	Female
Age (years)	Oldest	23	24
	Youngest	22	21
	Mean	22.74	22.68
Height (cm)	Longest	180	167
	Shortest	162	149
	Mean	172.29	159.10
FP2R (cm)	Longest	4.846	4.343
	Shortest	3.758	3.545
	Mean	4.333	3.948
FP2L (cm)	Longest	4.864	4.490
	Shortest	3.868	3.571
	Mean	4.346	3.988

Q-Q PLOTS Normality Test on Dependent Variables Height (TB), PF2R.FP2L



4.1.1 Pearson Correlation Test Results

Table 4.3 Correlation coefficient (level of relationship) of male Proximal Phalanx II Bones
Correlations

		TB	FP2R	FP2L
TB	Pearson Correlation	1	.353	.400
	Sig. (2-tailed)		.138	.089
	N	19	19	19
FP2R	Pearson Correlation	.353	1	.961**
	Sig. (2-tailed)	.138		.000
	N	19	19	19
FP2L	Pearson Correlation	.400	.961**	1
	Sig. (2-tailed)	.089	.000	
	N	19	19	19

**. Correlation is significant at the 0.01 level (2-tailed).

In the male data set, the results of the Pearson correlation above show a correlation between height and the right and left proximal II phalanx bones in men, the correlation obtained:

FP2R with TB (r = 0.353)

FP2L with TB (r = 0.400), has a better correlation than the others

Table 4.4 orrelation coefficient level of relationship) f female proximal II phalanx bones

Correlations

		TB	FP2R	FP2L
TB	Pearson Correlation	1	.464**	.479**
	Sig. (2-tailed)		.004	.003
	N	37	37	37
FP2R	Pearson Correlation	.464**	1	.971**
	Sig. (2-tailed)	.004		.000
	N	37	37	37
FP2L	Pearson Correlation	.479**	.971**	1
	Sig. (2-tailed)	.003	.000	
	N	37	37	37

**. Correlation is significant at the 0.01 level (2-tailed).

In the female data set, the results of the Pearson correlation above show a correlation between height and the right and left proximal II phalanx bones in women, the correlation obtained:

FP2R with TB (r = 0.464)

FP2L with TB (r = 0.479), has a better correlation than the others.

Table 4.5 Correlation coefficient (level of relationship) of the proximal II phalanx bones of men and women

Correlations

		TB	FP2R	FP2L
TB	Pearson Correlation	1	.696**	.684**
	Sig. (2-tailed)		.000	.000
	N	56	56	56
FP2R	Pearson Correlation	.696**	1	.976**
	Sig. (2-tailed)	.000		.000
	N	56	56	56
FP2L	Pearson Correlation	.684**	.976**	1
	Sig. (2-tailed)	.000	.000	
	N	56	56	56

**. Correlation is significant at the 0.01 level (2-tailed).

In the male and female data sets, the Pearson correlation results above show Sig (2-tailed) 0.000. because the Pearson value> 0.25, it can be said that all variables meet the requirements to be included in the linear regression analysis (correlation between height and right and left proximal II phalanx bones), the correlation is obtained:

FP2R with TB (r = 0.696)

FP2L with TB (r = 0.684)

Interpretation of the r value:

0.8 - 1 = very good

0.6 - 0.79 = moderate

0.4 - 0.59 = weak

It can be concluded that there is a statistically significant correlation between FP2R, FP2L with TB.

Conclusion

From this study, it is concluded that the proximal phalanx 2 has a moderate relationship with height so that the proximal phalanx 2 can be a predictor of height in the Batak tribe.

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