Original Article

Correlation of Somatometric Parameters with Stretched Penile Length of a Newborn Baby Boy: A Cross Sectional Study

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Abstract

Background: *For assessing of external genitalia abnormality, penile length plays an important role. The length of penis increases significantly with gestational age and this may be affected by several maternal illnesses & also by fetal congenital abnormality. Till date in Bangladesh there is no study regarding any correlation between penile lengths with somatometric parameter of newborn.* ***Objectives :*** *This study was designed to find out the correlation of stretched penile length (SPL) with age, body length, body weight and head circumference of newborn baby boy of Bangladesh.* ***Materials and Methods:*** *This cross sectional study was conducted in Multicenter of Dhaka city (Dhaka National Medical Institute Hospital & Sir Salimullah Medical College & Mitford Hospital) in & out patient departments from January 2022 to December 2022. As the study subjects, a total of 100 newly born male babies (up to age 28 days) were enrolled by using a random sampling technique. Data were collected in a structured questionnaire from patients (mother) file and physical examination findings of the newborn and analyzed by using MS Office tools and SPSS Version 23.0.* ***Results:*** *The mean(±SD) age was 39.7(±47.7) hours & most age distribution of the study subjects was 50% between 24-48 hours. Out of 100 newborn baby 82% were born at term. The mean(±SD) stretched penile length of all (n=100) newborn baby was 2.25(±0.66) cm & there were significant differences of SPL among the different age groups. The factors (body length, body weight and head circumference) that were examined in this study showed significant positive correlations with stretched penile length. The age of the newborn baby showed a moderate positive correlation with stretched penile length (r=0.344, p<0.001). Similarly, body weight (r=0.364, p<0.001), body length (r=0.410, p<0.001), and head circumference (r=0.251, p=0.012) also showed moderate positive correlations with stretched penile length. This study also shows significantly higher mean(±SD) SPL (2.33±0.67 cm) at term compared with preterm (1.90±0.52 cm) (p<0.013).* ***Conclusion:*** *The somatometric parameters have significant positive correlation with stretched penile length of a newborn that might help to find out the causal relationship of a short penile length.*

Keywords: Micropenis, Stretched penile length, Head circumference, Newborn baby.

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Introduction

The length and width of human male genitalia is refers to as penile size.[1] Many adult are not satisfy with their penile length and goes to different medical disciplines.[2] Having several study in Bangladesh regarding adult penile size measurement in different dimensions with correlation of somatic parameter, but still no study available regarding the correlation of somatometric parameter of Bangladeshi newborn. As penile length is used to assess the external genitalia abnormalities like hypospadias, micropenis, or undescended testes, may be clinical signs for disorders of sex development (DSD) in children, for that reason need a normal reference range of newborn penile length which is needed for further investigation, diagnosis and management of DSD.[3,4] Schonfeld and Beebe was defined the small phallus in their seminal work as when the penile length smaller than 2.5 (cm) standard deviations (SD) below the mean is considered as micropenis & the length varies in different ethnicities.[5,6] It may occur as an independent abnormality by itself or as a clinical finding of many syndromes.[7] Exposure to endocrine-disrupting chemicals (EDCs) like several insecticide and herbicide, which has domestic

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exposure been suggested to contribute for the increase of external genital malformation in male newborns. In Northeastern Brazil, widespread use of pesticides found in slum where poor sanitary conditions were reported.[8] Over the past several decades male external genitalia malformation are increasing as a trend and genetic factors surely contribute to this trend also environmental factors are probably involved for this increase.[4,9]

Congenital hypopituitarism (associated with hypogonadotropic hypogonadism) may present with micropenis along with undescended testes. It is also seen in several syndromes like Klinefelter, Prader Willi & Noonan.[10,11] Congenital adrenal hyperplasia may initially present as ambiguous genitalia in an under virialized male with hypospadias and undescended testes. Micropenis or small phallus with varying degrees of hypospadias may be the only identifiable feature of a Disorder of Sex Development (DSD) in the newborn babies.[11]

In routine clinical neonatal examination external genitalia of newborns should be evaluated. There are many published articles regarding the relationship between penile size, height, weight, and BMI. Some believe that size of a penis is directly proportional to the height of a man.[9–11] Because of these, it is necessary to investigate the relationship between BMI, height, and weight in comparison with penile size among Bangladeshi men.

So, it is very important to identify the presence of micropenis in neonatal clinical examination as well as to find out the relationship of baby's height, weight and head circumference to avoid delay in diagnosis of these serious, sometime life-threatening conditions.

Materials and Methods

This cross sectional study was conducted in Multicenter of Dhaka city (Dhaka National Medical Institute Hospital & Sir Salimullah Medical College & Mitford Hospital) in & out patient departments from January 2022 to December 2022. The newly born male babies (up to age 28 days) were considered as study population. After full explanation of the study procedure informed written consent was taken. Data were collected from patients (mother) file. Penile length was measured by using a scale while pressing the supra-pubic pad of fat maximally up to tip of the glans penis in supine position. Height and occipitofrontal circumference (OFC) were also measured by measuring tape. Data were collected in a structured questionnaire analyzed using MS Office tools and SPSS version 23.0.

Results

Majority of newborn (50.0%) were within the 24-48 hour's age group. Among the study subject 82% were born at term & 18% were at pre-term. The mean(±SD) stretched penile length (SPL) of all (n=100) newborn baby was 2.25(±0.66) cm (Table-3) & there were significant differences of SPL among the different age groups ($p<0.001$) such as SPL was 2.36(±0.65) cm of <24 hours age group (n=30), 2.06 ± (0.47) cm of 24-48 hours age group (n=50), 2.14 (±0.62) cm of 48-72 hours age group (n=14) and 3.60(±0.62) cm of >72 hours age group (n=6).

Table-1: Age distribution of the study subjects (n=100)

Age group	Frequency	%
<24 hrs	30	30.0
24-48 hrs	50	50.0
48-72 hrs	14	14.0
>72 hrs	6	6.0
Total	**100**	**100.0**
Mean(±SD) hours	39.7(±47.7)	
Median	24.0	
Range (min -max)	(0.5-240) hours	

Table-2: Distribution of the study subjects according to gestational age (n=100)

Gestational age (weeks)	Frequency	Percentage (%)
Term (>37 weeks)	82	82.0
Preterm (<37 weeks)	18	18.0
Total	100	100.0

Table-3: Comparison of stretched penile length (cm) among different age group (n=100)

Age group	Number of newborns	Stretched penile length (cm)		*p*
		Mean±SD	Min-Max)	
<24 hours	30	2.36±0.65	1.60–4.00	<0.001
24-48 hours	50	2.06±0.47	1.30–3.00	
48-72 hours	14	214±0.62	1.10–3.00	
>72 hours	6	3.60±0.62	2.80–4.00	
Total	**100**	**2.25±0.66**	**1.10–4.00**	

p-value obtained by ANOVA test, *p*<0.05 considered as a level of significant

Table-4: The correlation between stretched penile length (cm) with age (hours), body weight (kg), body length (cm) and head circumference (cm) (n=100)

	Factors	Pearson correlation test	
		r-value	*p*-value
Stretched penile length (cm) with	Age of newborn baby (hours)	+0.344	<0.001
	Weight (kg)	+0.364	<0.001
	Height (cm)	+0.410	<0.001
	Head circumference (cm)	+0.251	0.012

p <0.05 considered as 'statistically significant'.

Table-4 indicates significant positive correlations between stretched penile length and all the factors examined. The age of the newborn baby showed a moderate positive correlation with stretched penile length (r=0.344, p<0.001). Similarly, body weight (r=0.364, p<0.001), body length (r=0.410, p<0.001), and head circumference (r=0.251, p=0.012) also showed moderate positive correlations with stretched penile length.

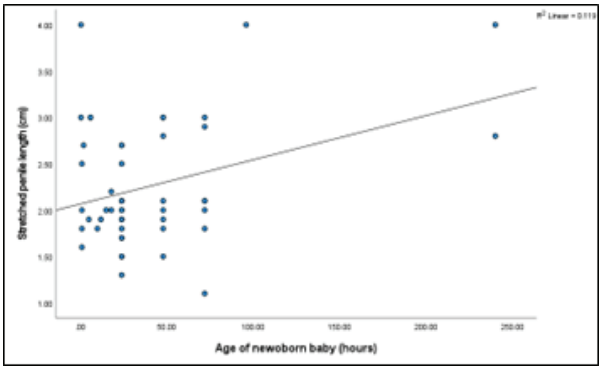

Figure-1: Scatter diagram showing significant positive correlation of stretched penile length with age of the newborn baby (r=0.344, p<0.001).

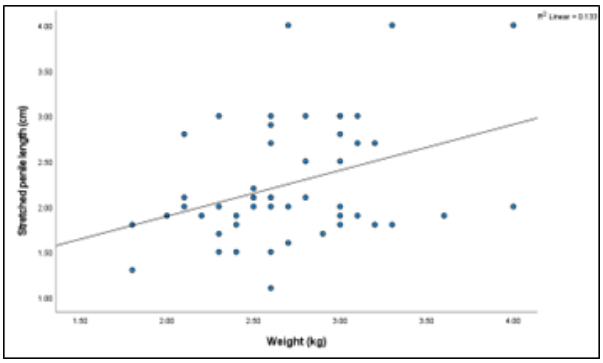

Figure-2: Scatter diagram showing significant positive correlation of stretched penile length with weight of the newborn baby (r=0.364, p<0.001).

Discussion

As derived from the present data, the mean(±SD) stretched penile length of all newborn infants was 2.25(±0.66) cm. Kollurage et al, a Sri Lankan study found that, SPL of their neonates was 3.03(±0.37) cm.[11] Both were compatible with other Asian studies, such as 2.83(±0.49) cm in Tamil Nadu[12] and 3.00(±0.4) cm reported from China. The Asian SPL considered as being shorter than Caucasian.[13] The

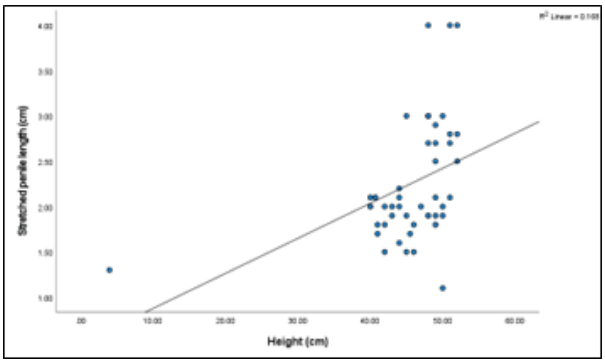

Figure-3: Scatter diagram showing significant positive correlation of stretched penile length with height of the newborn baby (r=0.410, p<0.001).

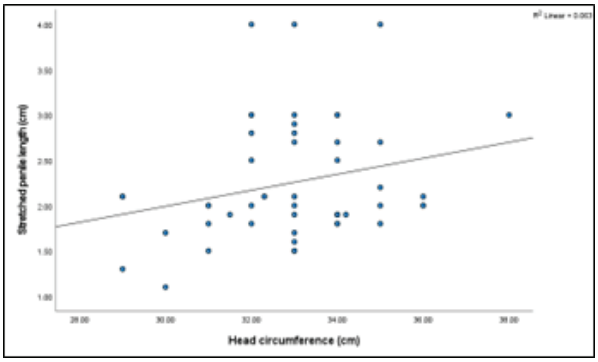

Figure-4: Scatter diagram showing significant positive correlation of stretched penile length with head circumference of the newborn baby (r=0.251, p=0.012)

present study shows, there were significant differences of SPL among the different age groups (p<0.001) such as SPL was 2.36(±0.65) cm of <24 hours age group (n=30), 2.06(±0.47) cm of 24-48 hours age group (n=50), 2.14(±0.62) cm of 48-72 hours age group (n=14) and 3.60(±0.62) cm of >72 hours age group (n=6). This study also shows significantly higher mean(±SD) SPL 2.33(±0.67) cm at term compared with preterm 1.90(±0.52) cm (p<0.013). Matsuo et al, study shows no apparent relationship between gestational age and penile length at 37-42 weeks. These findings suggest that gestational age may be an important factor to consider when evaluating stretched penile length in newborn baby boys.[14]

Table-4 indicates significant positive correlations between stretched penile length and all the factors examined. The age of the newborn baby showed a moderate positive correlation with stretched penile length (r=0.344, p<0.001). Similarly, body weight (r=0.364, p<0.001), body length (r=0.410, p<0.001), and head circumference (r=0.251, p=0.012) also showed moderate positive correlations with stretched penile length. On the other hand Kollurage et al, study showed no statistically significant correlation with birth weight, gestational age and OFC. The only statistically significant positive correlation with the length (Pearson r = 0.134, p= 0.01) is compatible with established data.[11] Fok et al, and Çamurdan et al, reported a weak but significant correlation between the SPL and birth weight.[13,16] However, parallel to the findings of Boas et al, we did not find any correlation between SPL and birth weight.[17] Fok et al reported statistically significant positive correlation with length and SPL, while Kutlu et al found statistically significant positive correlation of SPL with the length, weight and head circumference.[13,15]

Spyropoulos et al, found that penile length was insignificantly and negatively correlated with age, weight, BMI and waist/hip ratio and positively correlated with height. In the same study, a significant positive correlation was reported between penile length and index finger length.[18]

Limitations

A limitation of our study was the relatively small sample size compared to other studies on penile length.

Conclusion

The results of this study suggest that somatometric parameters such as height, weight and head circumference are related to penile length, though the clinical significance is not clear. Further studies are needed to find out this causal relationship.

Conflict of interest: No conflict of interest.

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