

Reference Values for Stretched Penile Length in Healthy Preterm Egyptian Newborns

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ABSTRACT

Background: The examination of the external genital organs is important in neonatal screening. The diagnosis of micropenis early at birth is essential as it could be the only sign of deficiency of pituitary or hypothalamic hormones.

Objective: The aim of the present study is to determine the normal values of stretched penile length among preterm Egyptian newborns at different gestational ages.

Patients and methods: A cross sectional study was conducted on 1000 healthy preterm male. Stretched penile length (SPL) was registered during the first 72 hours of age. Birth weight and length were also recorded.

Results: In the gestational age between 32 and 36 weeks, the mean of SPL was 2.43 (SD 0.44) cm, and ranged from 1.5 to 3.8 cm. A chart was developed of penile length means, ± 1 SD, ± 2 SD, and ± 3 SD.

Conclusions: The results of the present study on Egyptian preterm neonates provide the first values for SPL (± 1 SD, ± 2 SD, and ± 3 SD) at different gestational ages and could be applied on Egyptian preterm.

Keywords: Preterm neonates, Stretched penile length, Egyptians, Chart, Cross sectional study, Cairo University.

INTRODUCTION

Genetic or endocrine diseases can be diagnosed by penile length (PL) assessment. Moreover, measurement of PL is also important in minor manipulation, such as circumcision ⁽¹⁾.

The penile size of the male fetus is affected by the level of hormones secreted by the hypothalamic, pituitary and testicular glands. Establishment of the normal values of penile sizes among preterm are beneficial for the diagnosis of endocrinal abnormalities which can affect the genital organs ⁽²⁾. The anthropometric measurement in neonates is correlated with the penile anthropometry. Various ethnic populations have different anthropometric measurement with changes in mean SPL and penile diameter (PD) ⁽³⁾.

Micropenis may be the only observed sign in neonates, for the diagnosis of deficiency of pituitary gland secretion a fatal but easily treated disease ⁽⁴⁾. Isolated growth hormone deficiency manifested by hypoglycemia; a metabolic emergency threatening life can be manifested by micropenis only ⁽⁵⁾.

The national percentile curves are important to be applied for each country. It can help the pediatrician to know normal variation in neonates and to diagnose the diseases early when treatment may yield better results ⁽⁶⁾. Caucasian and Asian healthy newborns had their normal genital anthropometric data ⁽⁷⁾. However, these data cannot be beneficial to Egyptian infants. Indeed, racial/ethnic differences in newborn penile sizes have been reported by previous studies ^(2,8,9). Therefore,

determination of the normal values of penile lengths for each race is important in penile size assessment for early detection of lethal diseases manifested by micropenis, and also to avoid its over diagnosis ^(10,11).

The present study aimed to find out the normal values of the stretched penile length (SPL) of Egyptian preterm infants.

PATIENTS AND METHODS

A cross sectional study was conducted on 1000 healthy preterm newly born boys. Their gestational ages were 32 weeks to less than 37 weeks.

The study was carried out at the Maternity Hospital of Kasr-el-Ainy Teaching Hospital, Faculty of Medicine, Cairo University.

The exclusion criteria for infants were neonates with hypospadias, endocrinal disorder, multiple congenital anomalies, maternal pregnancy history of hormonal drug use, and weight not appropriate for gestational age.

The gestational age was evaluated by registering the date of the last menstrual period; ultrasound examination, and if needed Dubowitz/Ballard score was applied ⁽¹²⁾.

A disposable wooden spatula was used to measure the SPL from the pubic ramus along the dorsum to the tip of the glans penis ^(13,14). The weight was registered using the Seca Baby Scale. Length was measured in the supine position using infantometer.

Ethical consideration:

The present study received the approval of Scientific Ethical Committee of the Faculty of Medicine, Cairo University. An informed written consent was taken from the guardians of each participant in the study. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Statistical Analysis

Data collected and encoded using Microsoft Excel software. Data were then imported into Statistical Package for Social Sciences (SPSS version 20.0) software for analysis. Quantitative data was expressed as the mean and SD, and median (range).

RESULTS

The present study included 1000 apparently well preterm male newborns with gestational ages of 32 to less than 37 weeks delivered at the Maternity Hospital of Kasr-el-Ainy Teaching Hospital.

The mean (SD) of gestational age was 34.18 (SD 0.67) weeks ranged from 32 to 36 weeks, and the mean (SD) of age was 42.90 (SD 0.56) hours ranged from 2-72 hours. The mean (SD) of birth weight was 2.23 (SD 0.64) Kg and ranged from 0.95 to 2.85 Kg. The mean (SD) of length was 44.93 (SD 4.26) cm ranged from 36 to 49.8 cm. The mean (SD) of stretched penile length was 2.43 (SD 0.44) cm ranged from 1.5 to 3.8 cm (**Table 1**).

Table 1: Description of the studied preterms.

Variable	Mean	SD	Range
Gestational age (weeks)	34.18	0.67	32-36
Newborn age (hours)	42.90	0.56	2-72
Birthweight (Kg)	2.23	0.64	0.95 -2.85
Length (cm)	44.93	4.26	36-49.8
Penile length(cm)	2.43	0.44	1.5-3.8

Mean penile length (cm) at different gestational ages is shown in **Table 2**.

Table 2: Mean, SD and ranges of stretched penile length (cm) at different gestational ages.

Gestational Age(weeks)	N	Mean ± SD	95% CI for mean	Range
32	246	2.05 ± 0.25	2.02-2.08	1.5-3
33	130	2.22 ± 0.38	2.15-2.29	1.5-3
34	126	2.34 ± 0.32	2.29-2.40	2-3
35	193	2.56 ± 0.33	2.52-2.61	2-3
36	305	2.78 ± 0.38	2.74-2.83	2-3.8

Minimum and maximum SPL in preterm infants were 2.05 to 2.78 cm at 32 to 36 weeks of gestational age respectively (**Table 3**).

Table 3: Mean, ± SD, ± 1 SD, ± 2 SD and ± 3 SD of stretched penile length.

Gestational age, week	Number	Length							
		-3 SD	-2 SD	-1 SD	Mean	SD	1 SD	2 SD	3 SD
32-	246	1.29	1.55	1.80	2.05	0.25	2.30	2.55	2.80
33-	130	1.07	1.45	1.84	2.22	0.38	2.60	2.99	3.37
34-	126	1.39	1.70	2.02	2.34	0.32	2.66	2.97	3.29
35-	193	1.56	1.90	2.23	2.56	0.33	2.90	3.23	3.57
36-	305	1.65	2.03	2.41	2.78	0.38	3.16	3.54	3.92

The chart of mean SPLs of preterm male newborns with ±1 SD, ±2 SD, and ±3 SD according to gestational age of neonates is demonstrated in Figure 1.

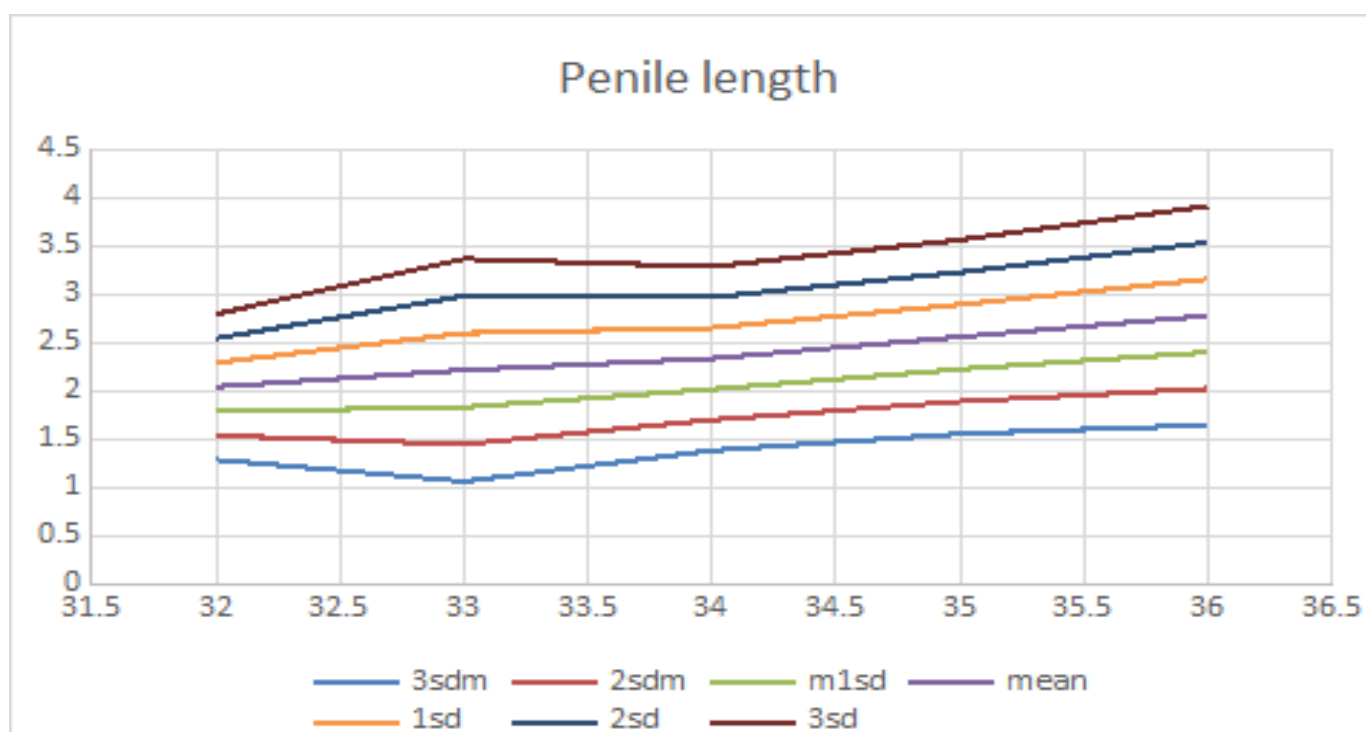


Figure 1: Stretched penile length with mean and ± 1 SD, ± 2 SD, and ± 3 SD lines based on different gestational age of the studied preterm.

DISCUSSION

In the current study, the mean of stretched penile length (SPL) was 2.43 (SD 0.44) cm with a range of 1.5 - 3.8 cm. Different values of SPL in newborn infants from different countries and geographical areas were reported in several studies. The mean penile length was 3.2 (SD 0.3) cm in a study in Iran ⁽¹⁾, 3.06 (SD 0.26) cm in Japan ⁽¹⁵⁾, 3.4 (SD 0.37) cm in Egypt ⁽¹⁶⁾ and 3.1 (SD 0.41) cm in China ⁽¹⁷⁾. These differences in penile length values are attributed to the variation in geographic areas, countries and ethnicity of the studied groups. An Egyptian study on 2972 boys aged 1-5 years, had established SPL percentile curves ⁽⁶⁾. In another study a reference value for normal SPL in 1000 full term Egyptian boys aged 1 day to 13 years was reported ⁽¹⁸⁾. Other cross-sectional study on 1850 healthy Egyptian full term boys aged 0 -24 months, reported the penile length and circumference ⁽¹⁹⁾. Also, a reference values for penile length in healthy term Egyptian newborn infants was reported by other studies ^(20,16). Comparison of SPL from Egyptian studies is not possible, because it is the first Egyptian study to measure SPL in preterm.

The result of the present study is different from the previous studies in other countries.

They have reported varying SPL in preterm infants ranging from 1.1-4.1 cm ^(1,7,21). The mean SPL, of 336 Turkish preterm infants, was 2.5 (SD 0.565) cm ranged 1.1-4.1 cm ⁽²¹⁾, which is higher than the value of the current study. In another study in Iran ⁽¹⁾ reported the

mean SPL of 384 preterm was 20.66 (SD 2.50) mm. The lower and upper limits (± 3 SD) of mean SPL were 13.16-28.16 mm, which are lower than that of the current study.

Environmental, climatic, nutritional, endocrine and genetic variations is probably the explanation of difference in penile length between various populations ^(22,23). The present study is the first study to measure SPL in an Egyptian healthy preterm neonates, because different ethnic groups have different SPL, further Egyptian studies are needed. An infant with micropenis associated with other genital abnormalities compound diagnostic difficulties due to the lack of age-appropriate normal data in this preterm group. Linear regression analysis in several studies reported a significant correlation between SPL, body length and GA ^(8,17,24), but some studies found no such correlations ^(3,25).

In conclusion, the study has reported the first mean values for SPL by GA for Egyptian preterm newborns and more Egyptian studies are required.

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