# Growth centiles for Omani premature infants born at 26 weeks of gestation

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## ABSTRACT

**Objective:** The present growth chart used in the Sultanate of Oman does not contain centile measurements for infants born at 26-weeks of gestation. With the increased survival of these premature infants, there is a growing need to develop such a chart. The present study was conducted with the aim to look at the anthropometric measurements (weight, length and head circumference) of Omani premature infants born at 26-weeks of gestation and to develop centile charts for these measurements.

**Methods:** The study was conducted at the Special Care Baby Unit (SCBU) of the Royal Hospital, one of the major perinatal institutions in Muscat, Oman. A computerized database is maintained for all the admissions from 1996. We extracted the required anthropometric data for all 26-week gestation premature Omani infants admitted to SCBU from January 1996 to November 2003. A total of 49 babies were admitted during that period. Out of these, 43 had complete information on the growth parameters, including birth weight, length and head circumference. These parameters

were noted down and by using the statistical package, an analysis was performed to get the normal distribution curve. By using the Microsoft Excel program, graphs were generated for all the 3 growth parameters.

**Results:** The mean birth weight for the premature infants born at 26-week gestation was noted to be 908 ± 156 grams, with length and head circumference of 33.5 ± 2.5 and 24.5 ± 1.7 centimeters. The normal distribution curve was obtained with minimal skewing.

**Conclusion:** We were able to generate centile charts of the anthropometric measurements for Omani infants born at 26-weeks of gestation. The next step is to collect the national data from other institutions in Oman and then incorporate it into the present growth chart to make the charts more valid, reliable and applicable.

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The present growth chart used in the Sultanate of Oman ends at 28-weeks of gestational age. It does not include growth parameters for infants born at 26-weeks gestation. With the recent reports showing improved survival for these infants,[1,2] there is a growing need to develop the centile charts for these premature infants. We conducted this study to collect the anthropometric data on the infants born at 26-weeks of gestation and to develop the centile charts.

**Methods.** The Royal Hospital (RH) is one of the major perinatal institutions of the Sultanate of Oman with the birth rate of 5000 per year. The neonatal services at RH include both the inpatient and outpatient facilities. All the newborns delivered at RH are seen by the pediatric team. The majority of these infants were admitted to the 2 postnatal wards. The ill babies, requiring a higher level of care were admitted to the Special Care Baby Unit

(SCBU). The detailed records of all admissions and discharges are kept in SBCU registry. In January 1996, a computerized database (Visual Dbase) was generated and the records were then maintained in that database. For the present study, we extracted the required information from the same database. From January 1996 to November 2003, a total of 49 premature infants at 26-week gestation were born. Out of these, 43 infants had complete information on the growth parameters (birth weight, length and head circumference) available on the database. A selected search was performed for the fields of gestation, birth weight, length and head circumference.

In most of the cases, gestation was based on the maternal menstrual history (counting days from the last menstrual period). Antenatal scan and Dubowitz's scoring was not performed routinely for gestational assessment. On admission to the SCBU, the admitting nurse noted down the growth parameters. The weight was taken by using the digital weighing scale, while the length and head circumference by measuring tape. These measurements were entered into the database by one of the consultants of the unit. A statistical package for social sciences, version 7.5 for windows, was used for data analysis and generating distribution graphs. The Microsoft Excel program was used for generating the growth curves. The measurement points at third, tenth, fiftieth, ninetieth, and ninety-seventh centile for 26-week infants were taken from the SPSS data output, while the measurement for 28-week premature infants for the corresponding percentile were noted down from the available growth chart (chart for boys). The percentile lines crossing the points on y-axis at 28-weeks in the growth chart were taken as the growth measurement of 28-weeks infants. As the sample size was small, division into separate boys and girls charts was not considered.

**Results.** The mean birth weight for premature infants born at 26-week gestation was noted to be 908 ± 156 grams, with length and head circumference of 33.5 ± 2.5 and 24.5 ± 1.7 centimeters. The distribution of the measurements is shown in **Figures 1, 2 & 3**. The growth curve from 26 to 28-weeks is shown in **Figures 4, 5 & 6**.

**Discussion.** As the observed distribution curve had minimal skewing, we successfully generated the centile chart for infants born at 26-weeks of gestation. However, this preliminary study showed only one point measurement of infants born at 26-weeks of gestation, which is merely a cross sectional representation.[3] The development of a longitudinal growth chart for the subgroup of premature infants based on birth weight and gestational age is required, as recommended in the literature.[4,5]

The study has some limitations. The anthropometric measurements and gestational assessment technique were not standardized. Different nurses took the measurements of length and head circumference of the babies born at 26-weeks of gestation. Thus, these measurements are prone to interobserver variability. However, the birth weight was taken by nurses using digital weighing scale, thus, the chance of variability was limited to minimum. To prevent the measurement from inter-observer variability for the measurement at 28-weeks, a single observer (SM) noted down the measurements from the growth charts. To rectify the problems listed above, a standard scale for length measurement could be developed. However, a standard scale for head circumference may not be feasible.

One could argue regarding the method used in the study for the gestational assessment. In the study, the gestational age of 26-weeks at birth was mainly based on history and information available in the antenatal card. The other standards for gestational assessment are the use of antenatal ultrasound and postnatal Dubowitz'scoring system, which were not carried out in all the cases. A variation of ± 2 weeks is known to occur with all the available ways of gestational assessment.[6] Thus, standardization of the gestational assessment would be difficult to observe in a retrospective study. In future studies at national level, a combination of all the above mentioned ways of assessment could be incorporated in the study protocol.

The main reason for the small sample size was due to the collection of data from a single institution. Also, infants born in RH prior to 1996 were not included due to the non-availability of computerized database. Similarly, 6 infants at 26-week gestation were excluded due to the missing information on the growth parameters. The other plausible explanation for the small sample size, is the fact that incidence of infants born at 26-weeks gestation is not high, approximately one per month.[1,2] For the same purpose, we used the boy charts to get the measurement of 28-weeks gestation. Further division into boys and girls charts would have resulted in reducing the numbers. Basing on the findings of our study, the next step is to collect the national data from other institutions in Oman and then incorporate it into the present growth chart. A separate chart for both female and male could be developed with large sample size. A census was conducted recently (8th December 2003) and the detailed report is to follow. A population based-study, in light of the census report, is required at national level with the assistance of the Ministry of Health.
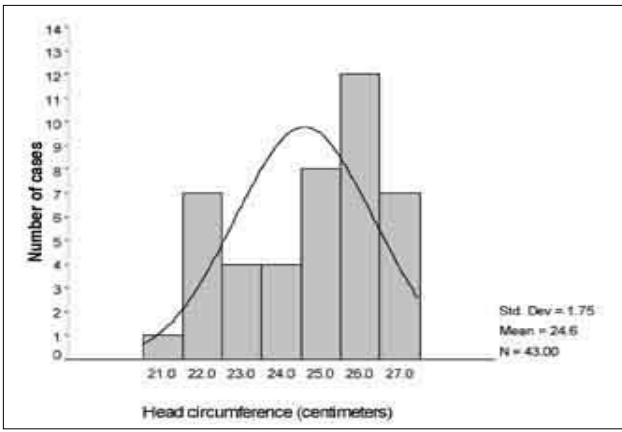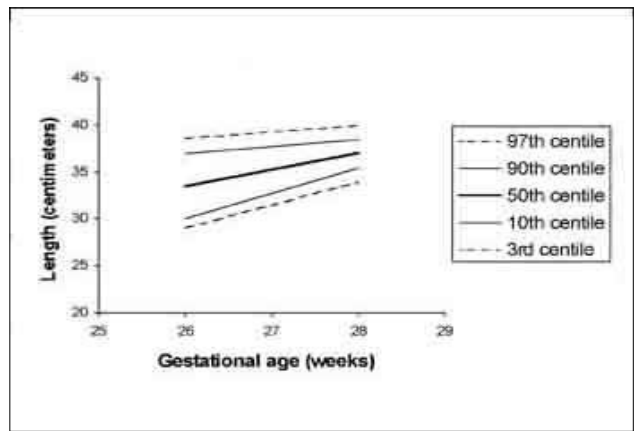
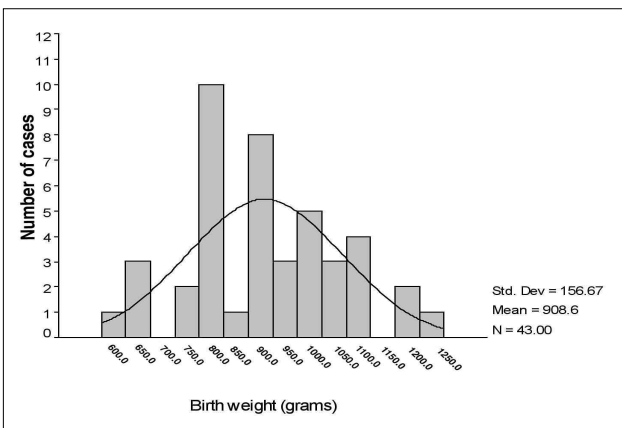**Figure 1 -** Distribution curve for the head circumference.
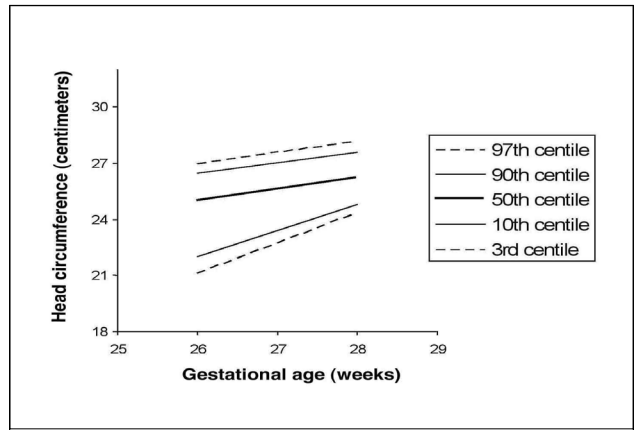


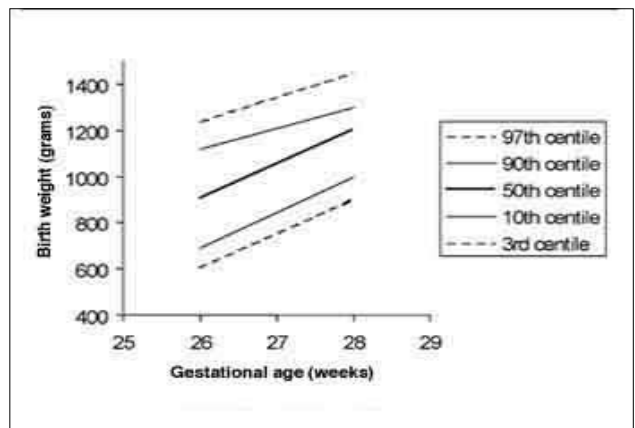**Figure 4 -** Growth chart for head circumference (26 - 28 weeks).
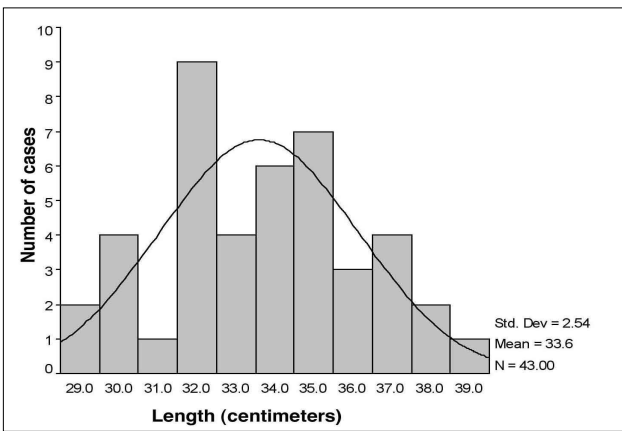


**Figure 2 -** Distribution curve for the length.



**Figure 5 -** Growth chart for length (26 - 28 weeks).



**Figure 3 -** Distribution curve for the weight.



**Figure 6 -** Growth chart for weight (26 - 28 week).

In conclusion, we were able to develop preliminary growth centile charts for infants born at 26-weeks of gestation. A follow up study with data collected at national level is required to further validate our findings.

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