A STUDY OF ABDOMINAL MEASUREMENTS IN ONE THOUSAND WOMEN AT TERM

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The birth of a baby has been and will be always an important event in the life of a person. This natural phenomenon has been studied for ages past quite extensively.

The most important aspect of a perfectly normal pregnancy which concerns everybody, is to know the date on which it will end. Besides the anxiety on the part of the patient or her relatives to know the due date, its knowledge is important to the obstetrician who has to deal with the problem of hospitalisation of patients at term coming from long distances, especially when the accommodation in hospitals is limited and household difficulties do not allow the women to stay away from their homes, unless it is absolutely necessary.

Various formulae and methods have been used for the assessment of the due date. The most accepted one of these is the one put forth by Naegele in which 280 days are counted from the first day of the last menstrual period and the date thus derived is presumed to be the date of the delivery. This, however, is correct up to about 15 days at either end of the date derived. This formula, to be useful, requires a definite and certain knowledge of the date of the last menstrual period. In our patients this is not often available due to lack of appreciation of such knowledge. Besides this, there are at least five different calendars used in computing the date in this part of the country. This is well borne out by the fact that in the year 1949-50 in the antenatal clinic of the J.A. and allied hospitals 1,176 patients were registered of whom 167 patients only could give a definite date of their last menstrual period by any calendar. Thus by the Naegele's method, the due date could be calculated in only 15% of our cases. Therefore, the teaching of the calculation of the due date to the students by this method only would be of little use to them in practice.

Under these circumstances it was thought profitable to assess the due date with data other than the date of the last menstrual period, and so this study was undertaken.

The other available methods for deriving the same information may now be examined. These consist of assessing the size of the pregnant uterus and this has been done in the following ways:—

(1) Estimating the height of the uterus in relation to the umbilicus.

(2) Measurements of the height of the uterus from the symphysis pubis and the circumference of the abdomen.

The concensus of opinion of obstetricians is that the height of the uterus is a reliable guide for the estimation of the length of a given pregnancy.

The height of the uterus considered in relation to the umbilicus is considered as being very useful, but, according to Speigelberg, the situation of the umbilicus varies from 13 to 28 cms. above the symphysis pubis so that there may be a difference of six inches in its position. He has, therefore, measured the distance from the symphysis pubis to the fundus of the uterus by a tape measure and stated his figures. This method is also preferred by R. W. Johnstone and Munro Kerr as being more precise. Macdonald's method is also based on this measurement (the height of the uterus measured as mentioned above in centimetres divided by 3.5 is equal to the number of lunar months of pregnancy).

Besides the height, the measurement of the circumference of the abdomen has also been considered by Munro Kerr as being a helpful guide.

Attempts at elucidating the due date by the methods and figures of Munro Kerr and by Macdonald's Law produced erroneous results in women of this country. It was, therefore, presumed that these figures and laws calculated on measurements in women of the western countries were unsuitable to our needs. On this score a study of one thousand cases was undertaken.

Of the patients admitted in the obstetric and gynaecologic unit, between April 1948 and April 1949, one thousand cases were studied. All these women belonged to the middle and lower economic units of the population. All of them had normal labour and each delivered a single normal and mature foetus weighing 5 pounds or more.

In each of these cases the height of the uterus, the circumference of the abdomen, parity, the weight of the baby at birth and the sex were recorded. The time interval between the taking of measurements and the labour was also noted.

Of these 1,000 women, 976 delivered within two days of taking the measurements; 16 delivered at an interval ranging from 2 to 7 days and only the remaining eight cases of the total of one thousand, delivered after more than a week.

The height of the uterus was taken in inches by an ordinary standard tape measure from the upper border of the symphysis pubis to the top of the uterus. This latter point was determined by putting one hand over the fundus vertically across the abdomen and taking the level of the hand as the highest point of the uterus.

The circumference was taken as the widest girth of the abdomen when the woman was lying in bed. This, when taken, was found to be roughly about the umbilicus or within an inch of it.

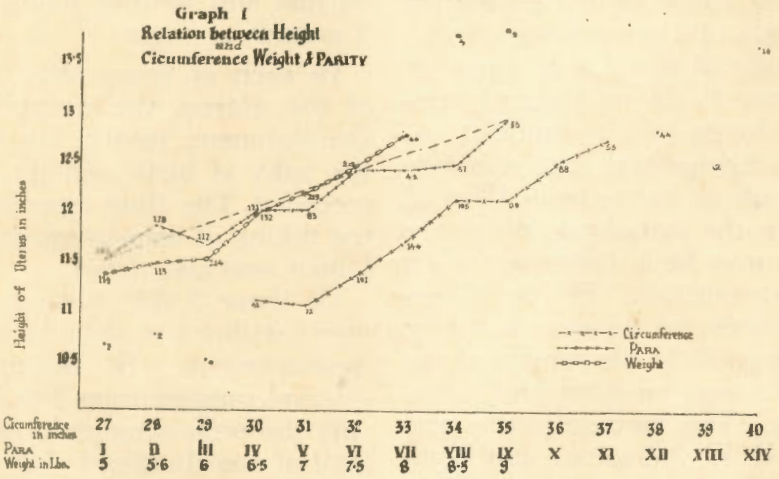
The data thus obtained have been studied by working out different averages and then plotting the figures in the form of graphs, which are attached.

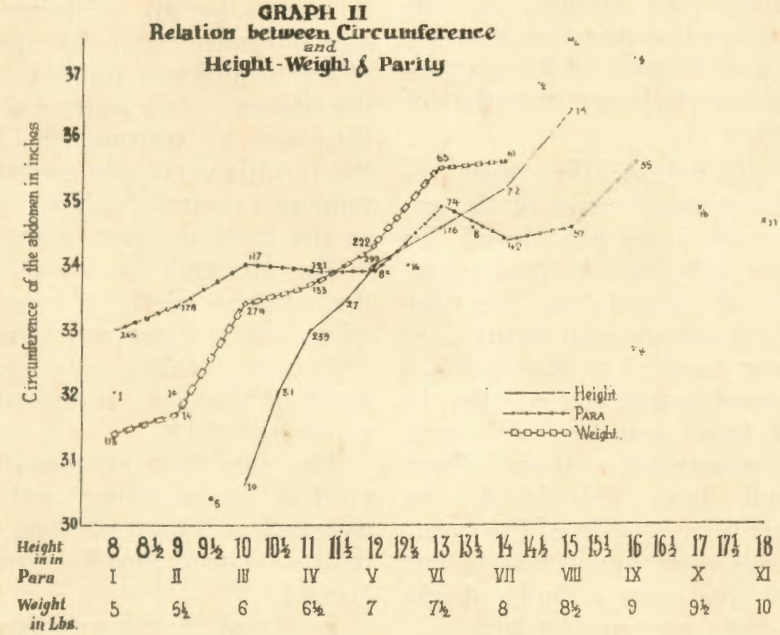
In Graph I, the average height of

the uterus has been studied in relation to the different circumferences, birth weights of the new-born and with the varying parity of the patients. It is apparent that the height of the uterus is seen to rise uniformly with increasing circumference.

The height also appears to increase uniformly with the increasing weight of the child.

Both these curves of the average heights in varying circumferences and weights appear to run parallel to one another.





In Graph II, the average circumference is studied in the varying height, weight and parity groups.

With an increase in the height, the circumference also appears to rise in proportion.

With increasing weight groups a rise in average circumference is also seen. Besides this, both the circumference curves run almost parallel to one another.

With variation of the weight of the child, the average height in each group varies from 11.3 to 12.8 inches in graph I, whereas with the change in parity it ranges from 11.5 to 12.9 inches in the same graph.

The average circumference varies with the weight from 31.4 to 35.7 inches and with parity from 33 to 35.6 inches.

These figures also indicate the average measurements that can be expected at term.

In Graph III, the average weight of the child is studied in relation to the varying height, circumference and parity groups. In general, it may be said that with increase in circumference, height and parity, the weight of the baby shows a corresponding increase.

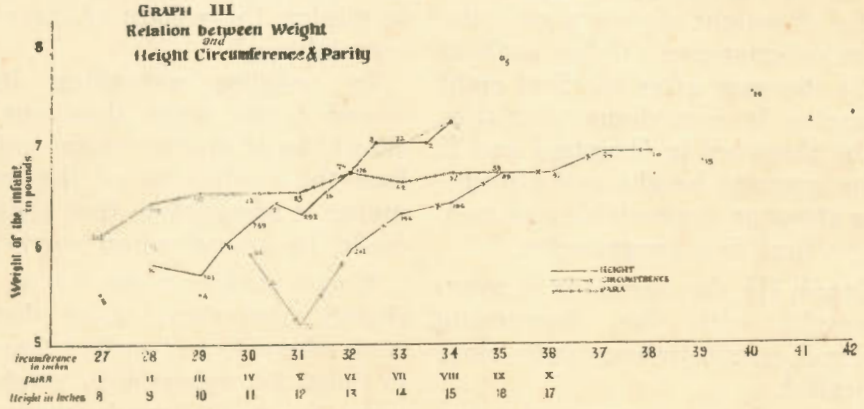
In this graph, at one place however, the average weight for a circumference of 31 inches shows a decrease of 0.7 lbs. than the average weight in the previous smaller circumference of 30 inches. No definite explanation can be given and it is probably an error of observation.

This graph studied for weight variation shows the weight curves for different heights and circumferences running very close together.

The curve for varying parity shows, however, a different behaviour and the average weight variation ranges from 6.1 to 6.7 pounds only. This is markedly different from the variations in the height groups from 5.7 to 6.9 pounds and in the case of circumference groups from 5.2 to 6.9 pounds.

This weight variation with parity confirms the findings of other authors, viz. that the influence on the weight of the child is more manifest in later pregnancies. It also corroborates the finding that the first born children are usually the lightest in weight.

GRAPH III
Relation between Weight and Height Circumference & Parity



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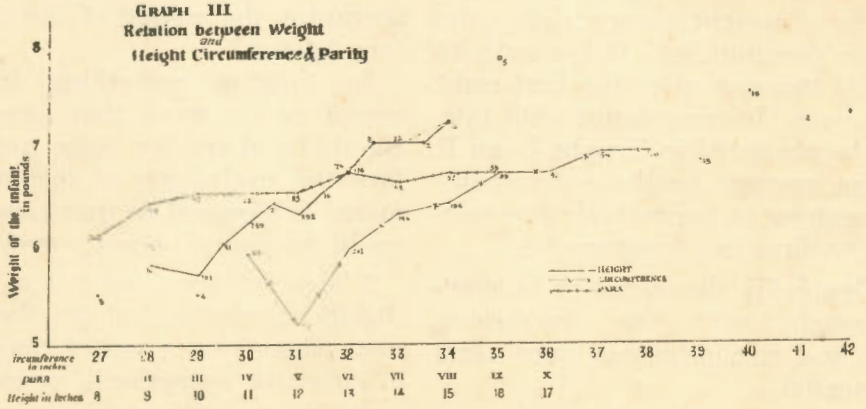

Discussion.

In Graph I, as also in Graph II, the curves of the average height and of the circumference in relation to one another behave in almost similar manner. This indicates the close relationship between these two factors. This is further confirmed by the behaviour of curves in Graph III in which average weights have been studied in relation to the height and circumference variation. Thus, it may be said that the height and the circumference behave in a reciprocal fashion. This is quite plausible since the uterus contains sufficient quantity of fluid in which the baby can float and therefore the expansion of the uterus indicated by the height and circumference of both vertical and transverse diameters should be proportionate. It is obvious that both these diameters will increase with the increase in size of the child. This is seen in Graph III.

The circumference and height also increase with increasing parity. This is probably due to the increasing weight of child. As mentioned above, increase of weight with parity is not very marked, and whatever rise of weight occurs is after the first five pregnancies. Other authors find this increase after the first eight pregnancies. In accordance with this, it can be observed in Graphs I and II that the average height and circumference show an appreciable rise only after the first five pregnancies.

In Graph III, the variation in average weight with the increasing height and circumference runs close and parallel.

Thus, for the assessment of a patient as being at full term, and also for the size of the baby, the three factors of height, circumference and the parity seems to be of unmistakable importance; and of these the first two are more influential than the third one, namely parity.

Graph III also indicates a birth weight variation from 5.7 to 6.9 pounds. This suggests an average of 6.3 pounds as the birth weight. This figure is exactly the same as is derived by actual calculations in this series.

The study of the measurements at term assumes importance from many different points of view. The lack of a correct information regarding the date of the last menstrual period raises many practical difficulties. The estimation of the length of pregnancy whether of full term or not is also difficult when it has occurred during lactational amenorrhoea. Besides, the mere determination of the confinement date and the assessment of weight of the child would be of great help in many other difficult circumstances. This would be remarkably so in cases of disproportion. This however would not be admissible until these figures are applied for determining the weight of the child before labour.*

In judging something inside a closed cavity more than one datum should be of greater value, and therefore the usefulness of the measurements is assessed so that judgements could be sound when correct infor-

*I may venture to mention at this, a slightly premature, stage that in few cases where I have applied these figures to judge the approximate weight of the foetus the results have been encouraging.

mation is lacking.

Conclusions.

1. The average figures for the height and circumference worked out for the western countries are not applicable in this country.
2. The height and circumference of the abdomen are both equally important for determining the length of pregnancy.
3. The circumference of the abdomen does not increase out of proportion in parous women as is commonly believed.
4. The average birth weight of the baby in this analysis is 6.3 pounds which is a good average for Indian children.

Acknowledgement

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