HOUR OF BIRTH[1]

A Discussion as to the Hour at Which Birth Most Often Occurs

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THE majority of obstetrical treatises which refer to this subject state that birth usually occurs at night, and most commonly takes place at 3 o'clock A. M., and with this simple statement the subject is generally dismissed. In the text-books which enter farther into this matter, we most frequently find the diction which is commonly, but erroneously, credited to Spiegelberg. "Labor usually begins in the evening, most often between 9 and 12 P. M., terminates generally in the night, the maximum number of births occurring between 12 and 3 A. M." Moreover, some authors, as Jewett, quote Spiegelberg to the effect that "the end of labor occurs twice as often between 9 P. M. and 9 A. M. as in the other twelve hours. There is little wonder then that this idea has become prevalent among the laity, medical students and majority of general practitioners.

Yet if we turn our attention to even a theoretical consideration of this subject, we find it difficult to believe in the truth of the prevailing idea. There are so many variable factors in ovulation, insemination, pregnancy, and labor, that it is difficult to believe that they can be timed to such a nicety as to result in the birth of the majority of cases at any one hour of the day.

At the present time we believe that ovulation occurs independently of menstruation, and although many, as Leopold, Zweifel, and others, hold in its physiological periodicity for individuals, our knowledge of the histology and physiology of the ovary scarcely warrants us in believing that the ovum periodically escapes from the follicle at a certain definite and fixed moment, in each individual. Unfortunately our knowledge concerning the ripening of the human ovum is scanty; nor do we know the limit of time the spermatozoa retain their activity in the female generative tract, or the ripened ovum resist the entrance of the male element. We are ignorant, moreover, of the place of fertilization of the ovum in any given case, and if fertilized about the ovary or in the tube, do not know how long it may take for the egg to reach the uterine cavity. Yet it does not seem logical in the light of observations of other physiological phenomena, such as menstruation, lactation, etc., to assume that the combination of the factors essential for fertilization is ordained to take place within any one group of hours rather than another.

Although we are unable to accurately determine the duration of pregnancy, we may conclude from clinical studies that it presents considerable variations. The calculation of the time elapsing between a single coitus and labor has done little more than emphasize this fact. Thus, Duncan analyzed 46 such cases and found the average of the periods to be 275 days. Faye in 63 cases found it to be 270.6 days. Löwenhardt in 578 cases found it 272.2 days. Ahlfeld in 425 cases obtained an average of 271 days, but called attention to the fact that there was a difference of 99 days between the longest and shortest periods. Hecker in 108 cases figured an average of 273.5 days, with a difference between the longest and shortest period of 63 days. Veit in 43 cases showed an average of 276.4 days, with a difference between the extreme periods of the series of 36 days.

In the breeding of domestic animals in which conception as a rule follows a single act of sexual congress, similar variations have been noted by Tessier, Krahmer, Spencer, and others. Thus the average duration of gestation in rabbits is 31 days, the variation 8 days; in sheep an average of 151 days, with a variation of 26 days; in cows the average gestation is 283 days, but calving may occur between the 183d and 356th day; in mares the average period is 347 days, but foaling may occur between the 287th and 419th day.

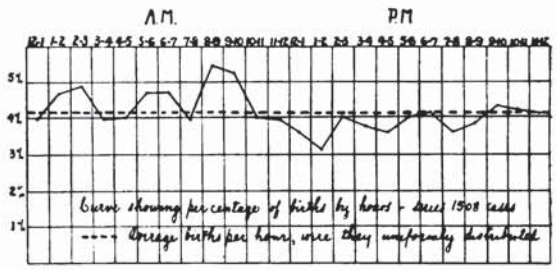
[1] Read at the May meeting of the Chicago Gynecological Society.

Many authors believe that various factors may influence the duration of pregnancy in the human species. Thus statistics have been adduced to show that the period of pregnancy is shorter in the earlier and later reproductive periods than in the middle period. Issmer states that the duration increases with each full term pregnancy up to the ninth, after which there is a decrease. He also claims that the average duration is greater in strong women than in weak. Others have adduced evidence to show that it is longer in those who rest a great deal during pregnancy than those who do muscular work. Moreover it would appear that pregnancy is habitually longer or shorter in some women than the accepted average.

We find also variations in the duration of labor, and although we are ignorant of the cause of the onset of labor, there is little proof that labor is most apt to begin at any one period of the day. We know that the labors of the same individual vary greatly in duration and character, and various statistics show that birth may occur at practically any time between 30 minutes and 70 hours following the first painful uterine contraction. It is clear, therefore, that in the theoretical consideration of our subject we are concerned with a number of extremely variable factors, and it is difficult to believe that they are so correlated by nature to result in a majority of births at any one hour of the day.

In 1903, while analyzing the labors of a series of cases in the obstetrical wards of the Johns Hopkins Hospital, we turned our attention to this subject and tabulated the hour of birth in 1,508 full term spontaneous labors. I am indebted to Prof. Williams for permission to use these cases.

The greatest number of births in this series occurred between 8 and 9 A. M. = 82 cases (5.44% of total, or 1.27% more than 1/24th of the series); the least number are recorded between 1 and 2 P. M. = 47 cases (3.11% or 1% less than 1/24th of the total). We think that undue importance should not be attributed to this fact, on account of the limited number of cases of our series giving unduly high percentage for each case, and especially because in 12 different hours the birth rate corresponded



to within 2% of 1/24th of the total number of cases.

TABLE I.

HOURS OF DAY WHEN DELIVERY TOOK PLACE IN 1,508 CASES

Between				Cases	% of Total
12 and	1	A. M.		60	3.98
1 "	2			70	4.64
2 "	3			74	4.9
3 "	4			59	3.98
4 "	5			61	4
5 "	6			71	4.7
6 "	7			71	4.7
7 "	8			60	3.98
8 "	9			82	5.44
9 "	10			79	5.24
10 "	11			61	4
11 "	12			59	3.98
12 "	1	P. M.		54	3.6
1 "	2			47	3.11
2 "	3			61	4
3 "	4			57	3.78
4 "	5			54	3.6
5 "	6			61	4
6 "	7			63	4.17
7 "	8			54	3.6
8 "	9			58	3.84
9 "	10			65	4.31
10 "	11			64	4.24
11 "	12			63	4.17

Six hours are credited with more than ¼ of 1% of what would be the average rate per hour if the births were absolutely evenly distributed. Four of these are in the hours of night usually devoted to sleep. Six hours are credited with less than ¼ of 1% of 1/24th of the total cases. One of these is an hour in which the average man is in sleep.

If we divide the day into three periods of eight hours each, we find that 1.3% more cases than its quota of 33⅓% were born within the hours which are customarily observed for sleep.

From this will be seen that birth in this series was fairly evenly divided in the various periods,

but that from 2 to 6% more cases were born in the so-called night division than the day. The greatest variation is seen in the last division which we have made for purpose of comparison with Jewett's quotation of Spiegelberg, that "the end of labor occurs twice as often between 9 P. M. and 9 A. M. as in the other 12 hours." This division presents the greatest variation in our series, 6%, or 3% more than half the cases, being born within the 12 hours from 9 P. M. to 9 A. M.

TABLE II.

CASES BY HOURS ARRANGED IN ORDER OF FREQUENCY

		Cases	Per Cent
Less than	50 cases per hour	1 P. M. 47	3.11
Between	51 and 55 cases per hour	12 M. 54	3.6
		4 P. M. 54	3.6
		7 P. M. 54	3.6
Between	56 and 60 cases per hour	3 P. M. 57	3.78
		8 P. M. 58	3.84
		2 A. M. 59	3.91
		11 A. M. 59	3.91
		7 A. M. 60	3.98
		12 P. M. 60	3.98
Between	61 and 65 cases per hour	3 A. M. 61	4
		10 P. M. 61	4
		2 P. M. 61	4
		5 P. M. 61	4
		6 P. M. 63	4.17
		11 P. M. 63	4.17
		10 P. M. 64	4.24
		9 P. M. 65	4.31
Between	66 and 70 cases per hour	1 A. M. 70	4.64
Between	71 and 75 cases per hour	5 A. M. 71	4.7
		6 A. M. 71	4.7
		2 A. M. 74	4.9
Between	76 and 80 cases per hour	9 A. M. 79	5.24
More than	81 cases per hour	8 A. M. 82	5.44

1,508 BIRTHS IN 8-HOUR GROUPING:

	Cases	Per Cent
Between 10 P. M. and 6 A. M.	522	34.6
6 A. M. " 2 P. M.	513	34.
2 P. M. " 10 P. M.	473	31.4

Dividing the day into two periods of 12 hours each, we find the following:

1,508 BIRTHS

	Cases	Per Cent
Between 7 A. M. and 7 P. M.	738	49
7 P. M. " 7 A. M.	770	51
Between 8 A. M. and 8 P. M.	752	48.6
8 P. M. " 8 A. M.	756	51.4
Between 9 A. M. and 9 P. M.	708	47
9 P. M. " 9 A. M.	800	53

When we turn to the literature we find to our astonishment that its greatest part has been on record for some 50 years, and consequently has been available for obstetrical text-books. Veit's series considers the greatest number of cases, embracing 14,036 records. He found the greatest number of births within any one hour in his series occurred about 1 o'clock A. M. and was 698 cases or 4.9 per cent, i. e., .73 per cent more than 1/24th of the total; the least number were observed about 5 P.M.= 507 cases, 3.6 per cent, or .57 per cent less than 1/24th of the total. There were 6,653 births between 7 A.M. and 7 P.M., or 47.4 per cent of the total; in contrast with 7,383 cases, 52.6 per cent, in the night hours between 7 P.M. and 7 A.M., showing that 2.6 per cent more than one half of the cases were born within this period.

White's report of recent date (1905) includes 4,000 cases, but is not arranged according to hours, and consequently is not available for detail study. He, however, groups his cases between 8 A.M. and 8 P.M. and found that 1,979 cases or 49.4 per cent were born between the day hours in contrast with 2,021 or 50.5 per cent delivered in the night, a variation of but .6 per cent from an equal division. White's table of 8-hour periods is interesting in comparison with ours, the slighter variation from the average of 33⅓ per cent being due doubtless to his greater number of cases.

Periods	No. of Cases (White)	Per Cent	No. of Cases (Author)	Per Cent
10 P. M. to 6 A. M.	1,391	34.7	522	34.6
6 A. M. to 2 P. M.	1,308	32.7	513	34.
2 P. M. to 10 P. M.	1,301	32.5	473	31.4

Berlinski recorded 809 births. The greatest number per hour was observed about 4 A.M. and 1 P.M., each 44 cases, 4.9 per cent or .73 per cent more than 1/24th of the total. The least number per hour occurred about 7 A.M. and 8 P.M., each 27 cases, 3.33 per cent, or .8 per cent less than the mean average per hour. Between the night hours of 7 P.M. and 7 A.M. were delivered 51.4 per cent as apposed to 48.6 per cent born during the day.

Thus we see that the hour of the day which presents the highest birth rate varies in different statistics.

Continuing these series, we find for 16,353 cases a number of 798 cases between 1 A.M. to

2 A.M.=4.8, or .6 more than 1/24 of total, and 593 cases cases from 5 P.M. to 6 P.M.=3.6 or .6 less than 1/24 of total.

GREATEST AND LEAST NUMBER OF BIRTHS AT ONE HOUR

Observer	Total No. of Cases of Series	Greatest No. Between	Per Cent of Total	Least No. Between	Per Cent of Total
Veit	14,036	1 to 2 A.M.	4.9	5 to 6 P.M.	3.6
Berlinski	809	4 to 5 A.M. 1 to 2 P.M.	4.9	7 to 8 A.M. 8 to 9 P.M.	3.33
Lynch	1,508	8 to 9 A.M.	5.4	1 to 2 P.M.	3.11

There is, however, a fairly constant per cent of increased birth rate during the night hours of 7 P.M. and 7 A.M. Thus we find the rate to be:

	Cases	Per Cent	Born Between
Veit	14,036	52.6	7 P.M. and 7 A.M.
Berlinski	809	51.4	7 P.M. and 7 A.M.
Lynch	1,508	51	7 P.M. and 7 A.M.
White	4,000	50.5	8 P.M. and 8 A.M.

Recasting these 20,353 cases to conform to White's period of 8 P.M. and 8 A.M., we find 2 per cent more than 50 per cent were born during the 12 hours which include the night (10,653 to 9,700).

We find in the literature records of nearly 23,000 labors classified roughly according to the hour of birth.

TABLE SHOWING HOURS OF BIRTH IN 22,837 CASES

	A.M.				P.M.				
	12–3	3–6	6–9	9–12	12–3	3–6	6–9	9–12	
Veit and Berlinski	2,164	1,956	1,925	1,744	1,709	1,668	1,713	1,966	14,845
Quetelet	445	353	299	315	279	295	351	343	2,680
Buck	159	131	141	90	101	76	101	138	931
Ranken	137	129	119	85	97	88	117	118	890
West	266	302	277	267	218	185	231	273	2,019
Lynch	203	202	221	184	165	178	177	187	1,508
	3,374	3,073	2,982	2,684	2,369	2,484	2,690	3,025	22,873

All combinations have been attempted with these figures, and the result obtained shows that from 1.5 per cent to 3.5 per cent more than half of the cases were born during any 12 hours which contain the night hours.

The following conclusions may be drawn from the above tables:

1. That the birth rate per hour is fairly uniform in a large series of cases.

2. The extreme variations between the birth rate per hour for any 2 hours is 1.2 per cent of total.

3. That in 12 of the 24 hours the extreme variation is less than ½ of 1 per cent.

4. That more births occur in the total hours of the night than any equal number of hours of the day, but the extreme variations in any such combination is less than 7 per cent.

5. Four per cent more births occurred between 7 P.M. and 7 A.M. than in the other 12 hours in 16,353 collected cases. The same variation occurs in 20,353 cases between 8 P.M. and 8 A.M., and 8 A.M. and 8 P.M.

6. That the statements made on this subject in many text-books are incomplete and erroneous.

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Buck. Quoted from Veit.

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