

## FETAL DEATHS IN THE DISTRICT OF SÃO PAULO, BRAZIL<sup>1</sup>

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*A study has been made of fetal deaths registered in São Paulo, Brazil, for the period 1 June 1968 through 31 May 1970. This article reports some of the findings of that study. Among other things, the findings revealed a higher incidence of male deaths than female deaths, high rates of fetal death associated with multiple pregnancy, a relatively low risk of stillbirth in certain maternal age groups, and an association between congenital anomalies and increasing maternal age.*

### Introduction

The term "fetal death" means "death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy; the death is indicated by the fact that after such separation the fetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles." (16).

On the other hand, the term "live birth" is defined as "the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached." (16).

These definitions, established by the World Health Organization, clearly show that the duration of pregnancy is not taken

into account in either case. This, however, does not present any obstacle to establishing a system of fetal death classification based on duration of pregnancy. Thus, in the present instance we have classified fetal deaths as being "early," "intermediate," or "late"—early when the pregnancy lasted less than 20 weeks, intermediate when it lasted between 20 and 27 full weeks, and late when it lasted 28 weeks or more. Although usually any birth product born dead is referred to as "stillborn," the scientific use of this term is restricted to dead birth products resulting from pregnancies lasting 28 weeks or more (17).

The statistical definition of stillbirth is traditionally based on two criteria: one to distinguish stillbirths from live births and another to differentiate them from what are known as abortions. The first criterion, which differentiates between a stillbirth and a live birth, is the already-mentioned presence of some vital sign. At the other extreme is the second criterion, which distinguishes between stillbirth and abortion; this criterion depends on the concept of physical viability. Physical viability, in turn, is defined in terms of pregnancy, minimum height, minimum weight, or the human appearance presented by the product of conception (18).

Brazilian civil law (2) calls for the mandatory registration of live births,

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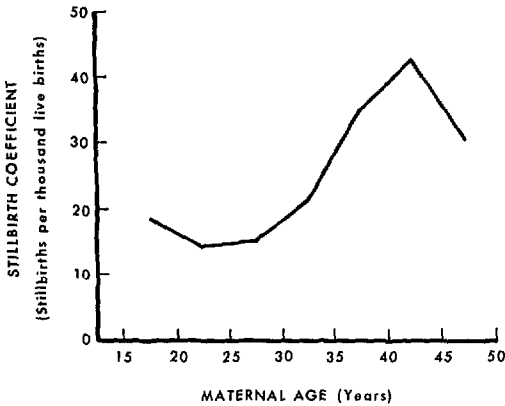


Figure 1. Variations in the stillbirth coefficient with changing maternal age.

stillbirths, and all deaths occurring in the national territory. This registration must always be performed in the locality where the event occurred. The law also requires (3) that tabular compilations of these registrations be forwarded to the General Office of Statistics, accompanied in the case of deaths and stillbirths by the statements of the attending physicians.

### Objectives

The purpose of the research described herein was to study fetal deaths in terms of variables cited in these statements, grouping the results to permit analysis of the statements from a formal, medical-statistical, and social point of view. On the basis of the full report of that research, this article seeks to describe certain selected features of fetal death in the District of São Paulo. These features are as follows:

- 1) Legitimate versus illegitimate products of conception;
- 2) The sex ratio of birth products and the sex ratio of fetal deaths;
- 3) The type of delivery and the care provided the mother;
- 4) Multiple pregnancies;
- 5) Maternal age;
- 6) Causes of death.

### Materials and Methods

The forementioned statements—required for stillbirths and recommended for purposes of compilation and registration in the case of abortion—constituted the source material for this study. Events covered by the study included all registered fetal deaths pertaining to mothers residing in the District of São Paulo that occurred between 1 June 1968 and 31 May 1970. The total number of statements found was 7,570, which corresponded to 81.31 per cent of all fetal deaths registered in the *Município* of São Paulo.<sup>3</sup>

A system was developed for coding the reported information on IBM cards so that each variable shown on the statements could be conveniently analyzed in turn. The cards were then punched and classified electronically.

### Results and Discussion

#### *Legitimacy*

With respect to the legitimacy, it was found that parenthood was legitimate in 73.55 per cent of the known cases and illegitimate in the remaining 26.45 per cent.

It had been expected, even before beginning the study, that illegitimacy would be more prevalent with regard to early and intermediate fetal deaths than it would in the case of late fetal deaths. This assumption was based on the fact that the former groups presumably included many cases of induced abortion. Logically, a higher frequency of such abortions should be expected among pregnant women who are single or else not legally married; and since their birth products are illegitimate by

<sup>3</sup>The District of São Paulo, which had a population of 4,979,740 as of 1 June 1969, is one of eight districts in the *Município* of São Paulo, capital of São Paulo State. This one district contains 56 per cent of the territory in the *município*.

Table 1. Fetal losses, by legitimacy status and duration of pregnancy.

	Legitimate birth products (%)	Illegitimate birth products (%)	Total
Early losses	56.60	43.40	100.00
Intermediate losses	70.75	29.25	100.00
Late losses (stillbirths)	75.52	24.48	100.00
Total fetal losses	73.55	26.45	100.00

definition, this results in a higher prevalence of illegitimate early and intermediate fetal deaths. The findings, shown in Table 1, supported these initial expectations.

Early fetal deaths of legitimate parentage (56.60 per cent of the total) did not greatly exceed ones of illegitimate parentage (43.40 per cent) in those cases where legitimacy status was known. On the other hand, there was a much higher percentage of legitimacy (70.75 and 75.52 per cent, respectively) among the intermediate and late fetal deaths.

It should also be noted that the true number of illegitimate deaths is presumably understated by the available data, since it may be supposed that in many such cases the women involved did not become hospital patients.

### Sex of Birth Products

It is known, from data gathered in many parts of the world, that male live births generally exceed female live births by somewhere between 5 and 6 per cent, but that subsequent mortality takes a higher toll of males, by a factor of 4 to 5 per cent.

Interestingly, this same trend was observed with regard to fetal deaths. That is, just as more males than females were live-born, so more males than females were found among registered fetal deaths. In all, the fetal deaths studied—in cases where sex was recorded—included 4,120 male products as compared to 3,280 female products.

It was also observed that this imbalance existed during each of the three stages of pregnancy studied, but that the relative proportion of male deaths was highest in pregnancies terminating early, lower in intermediate pregnancies, and lowest in pregnancies lasting 28 weeks or more.

In order to establish a correlation between the number of male and female deaths, a male ratio was calculated. This ratio, expressed as the number of male deaths per thousand female deaths at each stage of pregnancy, is shown in Table 3. It appears that in the case of early losses there were 2,165 male deaths per 1,000 female deaths, but that the ratio declined to 1,338 in the case of intermediate losses and to 1,190 in the case of late losses.

Table 2. Fetal losses, by sex of fetus and duration of pregnancy.

	Male fetuses		Female fetuses		Sex unknown (No.)	Total	
	No.	%	No.	%		No.	%
Early losses	288	68.41	133	31.59	106	527	100.00
Intermediate losses	871	57.23	651	42.77	31	1,553	100.00
Late losses (stillbirths)	2,954	54.34	2,482	45.66	31	5,467	100.00
Duration of pregnancy unknown	7	33.33	14	66.67	2	23	100.00
Total fetal losses	4,120	55.68	3,280	44.32	170	7,570	100.00

Table 3. Rate of male deaths per 1,000 female deaths, by duration of pregnancy.

Early losses	2,165
Intermediate losses	1,338
Late losses (stillbirths)	1,190
Total fetal losses	1,256

One conclusion that can be drawn from this is that men are conceived far more often than women; for even though more male fetuses die at each stage of pregnancy, the number of males born alive still exceeds the number of females.<sup>4</sup> Possible causes underlying this phenomenon are being studied by various specialists (7), but its explanation is outside the scope of this study.

#### *Duration of Pregnancy*

The procedure adopted, as recommended by the World Health Organization, was to divide the period of pregnancy into weeks. Thus, as previously noted, deaths occurring during the first period (under 20 weeks) were considered early losses; those in the second period (20 to 27 full weeks) were classed as intermediate losses, and those in the third period (28 or more weeks) were considered late losses. The three types of losses constituted 6.98 per cent, 20.58 per cent, and 74.44 per cent, respectively, of the registered fetal deaths.

The 2,080 recorded abortions—representing both early and intermediate losses—constituted only 27.56 per cent of all fetal deaths. This figure appears very low for a city the size of São Paulo, which in the same period had 247,191 live births.<sup>5</sup>

<sup>4</sup>The ratio of male births (per 1,000 female births) in the *Município* of São Paulo was 1,044 in 1967 and 1,053 in 1968, according to data provided by the Department of Statistics of the State Ministry of Economics and Planning.

<sup>5</sup>Data from the Inter-American Investigation of Mortality in Childhood.

Furthermore, Milanese (8) estimated the number of São Paulo District abortions in 1965 alone at 13,730. Thus, it is logical to conclude that the forementioned registration of early and intermediate losses is incomplete.

At present there is no legal provision making the registration of abortions mandatory. It is true that The Statistics Department of the State of São Paulo publishes a notice in the upper right-hand corner of the form for reporting stillbirths that urges use of the same form for reporting abortions. Nevertheless, in view of the data submitted it is hard to believe that this recommendation is being consistently followed.

#### *Medical Care and Place of Delivery*

It was considered important to determine where the fetal deaths had occurred—whether in a hospital, at home, or elsewhere. For practical purposes, deliveries at all health facilities providing professional care were regarded as equivalent to hospital deliveries, since in such cases the delivery was attended by qualified personnel. Overall, on the basis of the registrations studied, it was found that 85.96 per cent of the deliveries occurred in hospitals, 13.08 per cent occurred at home, and 0.96 per cent occurred at other places.

For the same period, it was confirmed by means of the live birth sample used in the Inter-American Study of Mortality in Childhood that 7.58 per cent of the deliveries occurred at home. Nevertheless, when the group working on this Investigation studied birth registration tables sent to the Statistics Department by the civil registries, they obtained a much higher figure for home deliveries, equivalent to 36.09 per cent of the total.

This sharp discrepancy has been traced to the following fact: As already noted, registration must take place at the district or sub-district office serving the place

where the event occurred. This procedure, however, is not always followed. What happens is this: Since the time limit for requesting registration of a birth is fifteen days, and since the mother only spends about three days at the maternity clinic, she will stay at home during most of the fifteen-day period. Therefore, it will be easier for her husband to reach an office near his residence or his place of work than it will to reach the sub-district office of the maternity clinic.

Moreover, an office asked to register a birth does not wish to forego the related registration fee—even if the birth occurred in another sub-district and is therefore within the legal jurisdiction of another office. Therefore, the birth is registered in an illegal fashion; but in order not to disclose this fact the registering office does not cite the actual place of birth. Instead it states that the birth occurred “at home” or “in this sub-district,” or provides other answers which for purposes of computation produce the same result. Unfortunately, this apparently harmless practice grossly increases the apparent percentage of home deliveries; and this, as can easily be imagined, has serious implications for health planning.

If health statistics are to be improved in this regard, it will be necessary to change the existing situation. It is therefore suggested that registration of births be permitted at any office—that serving the place of birth, the mother’s area of residence, or any other locale (12, 13). In all cases, however, the entry stating the “place where the event occurred” must be filled in properly, indicating the name of the hospital or the address of the place of delivery. These data should then be processed by the statistical offices according to both the place of birth and the mother’s place of residence.

#### *Type of Delivery*

Of the total fetal deaths studied during

the two-year period, 85.81 per cent were delivered normally, 9.07 per cent were delivered by Cesarean section, 2.3 per cent were delivered by methods requiring the use of forceps, and 1.64 per cent were delivered by other methods.

By comparison, a 1970 survey conducted at 50 hospitals and maternity clinics in the *Município* of São Paulo obtained data on 123,268 deliveries. These data showed that 92,279 (74.87 per cent) of the deliveries were normal, 20,946 (16.99 per cent) were by Cesarean section, and 10,025 (8.13 per cent) involved the use of forceps.

When the fetal deaths analyzed in the present study were grouped according to type of delivery on the one hand and duration of pregnancy on the other, the results presented in Table 4 were obtained. From the data shown, it appears that the percentage of normal deliveries was higher for stillbirths than for the live births reported in the 1970 survey. Despite this, however, the figures for fetal deaths involving Cesarean sections still appear to be rather high, accounting respectively for 1.96, 3.43, and 10.58 per cent of the total deaths associated with early, intermediate, and late deliveries.

#### *Multiple Pregnancies*

Of the total pregnancies studied, 94.60 per cent were simple pregnancies, 5.25 per cent were twin pregnancies, and 0.15 per cent were triplet pregnancies. The overall multiple pregnancy ratio was therefore one multiple pregnancy for every 18 simple pregnancies, and the ratio of twin pregnancies to total pregnancies was one to 19.

With regard to live births, data obtained from the Inter-American Investigation of Mortality in Childhood indicate that twin pregnancies accounted for 0.94 per cent of the total, yielding a ratio of one twin pregnancy to every 106 pregnancies.

By comparing these ratios of twin pregnancies to total pregnancies for fetal

**Table 4. Percentages of fetal deaths relating to different types of delivery, by duration of pregnancy.**

	% of fetal deaths related to specific types of delivery				Total
	Normal deliveries	Forceps deliveries	Cesarean sections	Others	
Early losses	96.08	—	1.96	1.96	100.00
Intermediate losses	94.28	—	3.43	2.29	100.00
Late losses	84.72	2.96	10.58	1.74	100.00
Total	86.91	2.38	9.07	1.64	100.00

deaths (1:19) and live births (1:106), it can be seen that these data are in accord with normal obstetric practice—which assumes that a twin pregnancy constitutes a relatively greater risk for the product of conception.

Along this same line, Gedda states on the basis of several studies that the proportion of stillbirths among twin pregnancies is higher than the proportion among simple pregnancies.

Data further underlining the seriousness of the risk posed by multiple pregnancy were obtained by studying the total number of pregnancies—both simple and multiple—resulting in live births and stillbirths in the District of São Paulo during the period June 1968-May 1970. As shown in Table 5, 98.42 per cent of all the simple pregnancies were found to have resulted in live births and 1.58 per cent in stillbirths. However, these proportions changed drastically in the case of multiple pregnancies, which yielded 92.34 per cent live births and 7.66 per cent stillbirths.

The high proportion of stillbirths result-

ing from multiple pregnancies is equivalent to one stillbirth for every 13.05 multiple pregnancies. This figure contrasts sharply with the lower percentage of stillbirths resulting from simple pregnancies which is equivalent to one stillbirth for every 63.46 simple pregnancies.

#### *Maternal Age*

Several studies have demonstrated a correlation between neonatal mortality and maternal age, such that an increase in age yields an increase in neonatal mortality, especially during the first seven days of life (4, 5, 10). In addition, the findings of the Inter-American Investigation of Mortality in Childhood (10) have revealed a consistent relationship between neonatal mortality from perinatal causes and maternal age—high rates of mortality being experienced by those born to mothers below twenty years of age. The mortality rates were lowest among those born to mothers 20-24 and 25-29 years of age, but from then on

**Table 5. Live births and stillbirths resulting from known simple and multiple pregnancies.**

Type of pregnancy	Live births		Stillbirths		Total births	
	No.	%	No.	%	No.	%
Simple	244,866	98.42	3,920	1.58	248,786	100.00
Multiple	2,325	92.34	193	7.66	2,518	100.00
Total	247,191	—	4,113	—	251,304	—

these mortality rates increased significantly with increasing maternal age.

Little is yet known about the effects of maternal age on fetal deaths. Of the total dead birth products studied here, 25.35 and 25.44 per cent, respectively, were delivered by mothers in the relatively large 20-24 year and 25-29 year age groups. The remaining 49.20 per cent of the dead products were delivered by mothers in other age groups. Table 6 summarizes the results obtained by classifying fetal losses in terms of the duration of pregnancy and maternal age group.

It should be pointed out that these data refer only to birth products whose mothers were known (7,449). Aborted fetuses or stillborn products found abandoned (121) were not considered in these calculations. This accounts for the difference between the total birth products cited in Table 2 and the total included here.

To compare the incidence of stillbirths in different maternal age groups, it is necessary to use the stillbirth coefficient, which is defined by the World Health Organization (18) as follows:

No. of late fetal deaths occurring  
in the population

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No. of live births occurring in the  
same population over the same pe-  
riod of time

Deriving this coefficient for different maternal age groups (see Figure 1), it was confirmed that the risk of stillbirths was greater among women under 20 (18.1 per thousand live births) than among those in the 20-24 and 25-29 age groups (14.0 and 15.2 per thousand live births, respectively). Thereafter the incidence increased with age, rising considerably after age 35 (where the incidence was 34.4 per thousand live births) and reaching a maximum of 42.5 per thousand live births in the 40-44 year group. These trends do not differ significantly from those observed by Shapiro (11),

Morrison (9), and other previously mentioned authors (4, 5, 10).

#### *Causes of Death*

The so-called "cause of death" in the event of a fetal death should be understood to mean the cause of that event; and whenever possible, the criterion that should be adopted to facilitate classification is that of the "underlying cause"—this being defined as "the disease or injury which initiated the train of morbid events leading directly to death." (10).

It should be pointed out, however, that the Stillbirth Report referred to earlier does not follow the recommended international model for certification of causes of death. Only two lines are reserved for specifying the cause of death, and its correct determination and description are left entirely to the discretion of the physician. In the majority of cases studied only one cause was mentioned, so this was the only cause coded.

The coding was performed in accord with the *International Classification of Diseases* (Eighth Revision). For convenience, however, some general categories of causes were grouped together. The results of this work are summarized in Table 7.

Estimating only late losses for the categories listed, it was found that category 776 (anoxic conditions) accounted for the largest percentage (65.08 per cent) of late losses. This fact clearly reveals that with respect to causes of death the quality of reporting was not good. Anoxia, by itself, only constitutes a terminal cause of death, so the high percentages attributed to it prevent that acquisition of knowledge about the true underlying causes of fetal death which is so essential for effective accomplishment of preventive action.

Conditions of the placenta and umbilical cord (categories 770 and 771) played an important role in late fetal deaths. Reports citing these causes accounted for 13.31 per cent of the total, yielding a stillbirth

Table 6. Fetal losses, by duration of pregnancy and maternal age.

Maternal age (years)	Early losses		Intermediate losses		Late losses		Duration of pregnancy unknown (No.)*	Total losses	
	No.	%	No.	%	No.	%		No.	%
Under 20	39	12.54	119	10.42	359	7.83	1	518	8.55
20 to 24	97	31.19	330	28.90	1,104	24.08	4	1,535	25.35
25 to 29	99	31.83	298	26.09	1,140	24.87	4	1,541	25.44
30 to 34	40	12.87	207	18.13	921	20.09	5	1,173	19.37
35 to 39	27	8.68	144	12.61	726	15.84	5	902	14.89
40 to 44	7	2.25	41	3.59	297	6.48	—	345	5.70
45 to 49	1	0.32	3	0.26	37	0.81	—	41	0.68
50 to 54	—	—	—	—	—	—	—	—	—
55 to 59	1	0.32	—	—	—	—	—	1	0.02
Unknown	189	—	377	—	824	—	3	1,393	—
Total	500	100.00	1,519	100.00	5,408	100.00	22	7,449	100.00

\*The percentages in this table have not been calculated to reflect losses where the duration of pregnancy was unknown, since these are of relatively minor interest.

coefficient of 295.32 per 100,000 live births.

Late fetal deaths whose causes were unknown, or ones termed "stillbirths" without any further description (category 779), were reported in 515 cases. This figure represented 9.42 per cent of the total, the resulting stillbirth coefficient being 208.34 per 100,000 live births.

Immaturity (category 777) was only regarded as the basic cause of death in cases where no other diagnosis was reported, in accord with the international rules of classification (10). Nevertheless, this cause still accounted for 2.94 per cent of all stillbirths—yielding a stillbirth coefficient of 65.13 per 100,000 live births.

A large array of maternal conditions capable of causing fetal death were grouped together. These included chronic diseases of the mother's circulatory and urogenital apparatus and other conditions unrelated to pregnancy (categories 760 and 761 respectively), as well as toxemia of pregnancy and other maternal conditions related to pregnancy (categories 762 and 763 respectively). These pairs of categories accounted for 1.65 and 2.01 per cent of the late fetal deaths, respectively, yielding

stillbirth coefficients of 36.41 and 44.50 per 100,000 live births.

Diseases and lesions related to delivery (categories 764-768 and 772) were reported to have caused 1.34 per cent of the late fetal deaths, producing a stillbirth coefficient of 29.53 per 100,000 live births.

With respect to congenital anomalies, data from the Inter-American Investigation of Mortality in Childhood indicate that they accounted for 5.92 per cent of all deaths from birth to the seventh day of life (10). Congenital anomalies reported in the present study were found to account for 2.03 per cent of the cited causes of late fetal deaths.

Although these latter percentages do not seem very large, the group of diseases covered in the *International Classification of Diseases* (Eighth Revision) under the heading "Congenital Anomalies" deserves careful attention. The group includes genetic problems, chromosomal abnormalities, and various conditions relating to the intrauterine environment—such as infections having an impact upon the fetus (15).

Since the number of reported cases (122) was not large, it was not practical to study each type of anomaly separately. There-



Table 7. Causes of fetal death, by category of cause and duration of pregnancy.

Reported causes of death, by category	Early losses		Intermediate losses		Late losses		Duration of pregnancy unknown (No.)*	Total losses	
	No.	%	No.	%	No.	%		No.	%
Maternal conditions unrelated to pregnancy (760-761)	1	0.19	18	1.16	90	1.65	1	110	1.45
Toxemia of pregnancy and maternal ante- and intra-partum infection (762-763)	7	1.33	26	1.67	110	2.01	1	144	1.90
Diseases and lesions due to delivery (764-768 and 782)	1	0.19	2	0.13	73	1.34	—	76	1.00
Other complications of pregnancy and delivery (769)	2	0.38	—	—	28	0.51	—	30	0.40
Conditions of the placenta and umbilical cord (770-771)	16	3.04	147	9.47	730	13.35	6	899	11.88
Termination of pregnancy (773)	70	13.28	115	7.41	43	0.79	2	230	3.04
Hemolytic disease (774-775)	1	0.19	4	0.26	18	0.33	—	23	0.30
Anoxic and hypoxic conditions not elsewhere classified (776)	248	47.05	830	53.43	3,558	65.08	10	4,646	61.38
Immaturity, unqualified (777)	54	10.25	143	9.21	161	2.94	1	359	4.74
Other condition of the fetus (778)	1	0.19	—	—	30	0.55	—	31	0.41
Fetal death of unknown cause (779)	124	23.53	259	16.68	515	9.42	2	900	11.89
Congenital anomalies (740 to 759)	2	0.38	9	0.58	111	2.03	—	122	1.61
Total	527	100.00	1,553	100.00	5,467	100.00	23	7,570	100.00

\*The percentages in this table have not been calculated to reflect losses where the duration of pregnancy was unknown, since these are of relatively minor interest.

fore, all the malformed stillbirths were grouped together for examination in terms of maternal age. This procedure indicated that the risk of malformed stillbirths was lowest in the younger maternal age groups, and that it increased with age as shown in Table 8.

## Conclusions

1) The registration of stillbirths, per-

formed by law according to the place of their occurrence, does not accurately reflect what is happening in each reporting area. Thus certain areas, where hospitals and maternities are concentrated, appear to have the highest stillbirth coefficients.

2) As anticipated, the rate of reported illegitimacy was higher among fetuses lost in the early or intermediate stages of pregnancy than it was among late fetal losses.

Table 8. Stillbirth coefficients for deaths attributed to congenital malformations, by maternal age.

Maternal age (years)	Stillbirths resulting from congenital malformations (No.)	Live births (No.)	Congenitally malformed stillbirths per 100,000 live births
Under 20	7	19,858	35.25
20 to 24	29	78,802	37.76
25 to 29	31	75,193	41.23
30 to 34	15	42,841	35.01
35 to 39	15	21,079	71.16
40 to 44	6	6,981	85.95
45 to 49	2	1,220	163.93
Unknown	6	1,217	—
Total	111	247,191	44.90

3) Male fetal deaths were found to exceed female fetal deaths at all three stages of pregnancy. This observation, together with the fact that male live births exceeded female live births, indicates that far more males than females are actually conceived.

4) Analysis of fetal losses in terms of the duration of pregnancy leads to the supposition that early and intermediate losses were under-represented in the reports studied.

5) Regarding medical care available at delivery, it appears that 85.96 per cent of the fetal losses occurred at hospitals or health facilities providing professional care, 13.08 per cent occurred at home, and 0.96 per cent occurred at other places.

6) As to the delivery itself, 85.15 per cent of the deliveries resulting in fetal deaths were normal, 10.73 per cent involved Cesarean sections, 2.32 per cent required use of forceps, and 1.80 per cent were of some other type.

7) Multiple pregnancies accounted for 5.40 per cent of all reported pregnancies involving fetal losses. Analysis of all live births and stillbirths occurring during the

period in question indicate that stillbirths resulted from 1.58 per cent of the simple pregnancies, but that this figure rose to 7.66 per cent in the case of multiple pregnancies. These findings indicate that a twin pregnancy increases the risk experienced by the product(s) of conception.

8) Stillbirth coefficients for different maternal age groups indicated that the greatest risk of fetal loss was experienced by women in the 40-44 age group, followed by those in the 35-39 and 30-34 year groups. Women under 20 years of age were found to experience the fourth-highest risk, while those in the 20-24 and 25-29 age groups experienced the least risk.

9) With regard to causes of death listed in the *International Classification of Diseases* (Eighth Revision), anoxic and hypoxic conditions (category 776) were found to be the most common, followed by conditions affecting the placenta and cord (categories 770 and 771), unknown causes (category 779), immaturity (category 777), and termination of pregnancy (category 773). Diseases and lesions related to pregnancy, congenital anomalies, conditions of the mother unrelated to pregnancy, and diseases and lesions related to delivery were each cited as causing between 1 and 2 per cent of the total fetal deaths.

10) The high percentage of deaths attributed to anoxic conditions shows that the quality of reporting with respect to causes of death was not good—because anoxia should only appear as the underlying cause of fetal death in a small number of cases.

11) The incidence of stillbirths attributed to congenital anomalies was found to be relatively low in the younger maternal age groups, and to rise progressively with increasing maternal age.

## SUMMARY

The purpose of the research described herein was to study fetal deaths in the District of São Paulo, Brazil, on the basis of existing records

covering the period 1 June 1968 through 31 May 1970. In this particular case the records consisted of the filed statements of attending

physicians—statements which are legally required for stillbirths (products of pregnancies lasting 28 weeks or more) and which are recommended for all fetal deaths.

In each case where the duration of pregnancy was known, the fetal death was classified as "early," "intermediate," or "late"—early when pregnancy lasted under 20 weeks, intermediate when it lasted 20 to 27 full weeks, and late when it lasted 28 weeks or more. These three groups of fetal deaths were then analyzed with regard to certain selected variables, including legitimacy, sex, place of birth, maternal age, and cause of death.

Among other things, the findings revealed a higher incidence of male deaths than female

deaths—suggesting (when considered along with live birth data) that many more males than females were initially conceived. They also indicated a relatively high rate of illegitimacy among dead fetuses in the "early" group, high rates of fetal death associated with multiple pregnancy, a relatively low risk of stillbirth in the 20-24 and 25-29 maternal age groups, and an association between congenital anomalies and increasing maternal age.

In addition, the data appear to reflect reporting difficulties with regard to place of birth, fetal losses in the early and intermediate groups, and causes of death. Some possible ways of overcoming various circumstances contributing to these difficulties have been suggested.

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