FOETAL LOSS AND FERTILITY

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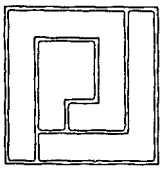

ABSTRACT

The paper investigates the effect of foetal mortality on fertility through the last closed birth interval which occurred in the period 1973-1977 using data from retrospective pregnancy histories of women respondents to the 1978 Republic of the Philippines Fertility Survey (RPFS). The nature of the data limits the scope of the analysis and the generalizations that could be derived from the reported information. Findings point toward an increasing trend in foetal mortality in the Philippines although birth intervals interrupted by foetal loss appear to be a small fraction of all intervals. It is suggested that better methods of data gathering be explored as retrospective pregnancy histories appear inadequate in determining the real levels of foetal mortality especially in the light of response errors like memory bias and concealment of induced abortions.

INTRODUCTION

One of the less explored areas in mortality research covers that segment of deaths occurring in the earliest possible ages referred to in the literature as foetal loss, foetal wastage or foetal deaths. These comprise deaths that occur prior to the complete expulsion or extraction from the mother of the product of conception irrespective of the duration of pregnancy. Foetal deaths are classified according to the length of gestation into early, intermediate and late foetal deaths or according to the manner of termination into the spontaneous and the induced.

The study of foetal mortality is an important component of mortality research since a thorough understanding of this phenomenon is a major step towards the design of mitigating measures to bring down its level of occurrence. Moreover, foetal mortality affects fertility, another major concern of demographic research.

In the analytical framework for fertility analysis developed by Davis and Blake, fertility is affected by a multiplicity of sociological and biological factors classified into three groups corresponding to the three intermediate variables affecting fertility. These are: 1) factors affecting exposure to intercourse, 2) factors affecting exposure to conception, and 3) factors affecting gestation and successful parturition. Foetal mortality falls under the third group of factors.

The specific effect of foetal mortality on fertility has been explored in pioneering analyses on the birth interval by Potter (1963), and Perrin and Sheps (1964), among others. Much of the work along this field consists of the estimation of the time add-

ed by foetal wastage both for the individual birth interval affected and the mean interval of all women. It has been established that foetal death can lengthen the individual birth interval by 10-15 months but the average contribution of foetal loss to the average birth interval is moderate at 2-3 months due to its relatively low level of occurrence.

At the individual level, foetal mortality, particularly the induced type may be used as a means to prolong the birth interval. Given the risks inherent in such a practice, some studies have aimed to investigate the extent to which induced abortion may be used as a fertility control method.

In a study of a sample of Taiwanese women, Jain reported that, "when contraception is used during the interval preceding conception, the risk of foetal wastage was about four times greater than the risk in the absence of contraception. The main reason for this difference is an elevenfold increase in the induced abortion rates after unsuccessful use of contraception" (Jain, 1969).

The relative dearth of exhaustive investigation on the phenomenon of foetal mortality in the Philippines springs from its rather undramatic nature in comparison with other deaths. The determination of the actual level of its occurrence is difficult as it is often so unobtrusive it may not even be detected at all. Furthermore, there is frequently no compelling reason to report its occurrence as no official approval for burial is required; hence, its severe underreporting in vital statistics data. There is also the possibility of deliberate misreporting or outright concealment when the pregnancy was voluntarily terminated.

The use of birth history records to retrieve/obtain information on foetal mortality is often the alternative to vital statistics data. Retrospective pregnancy records reconstruct a woman's past pregnancies by date of termination and pregnancy outcome. Prospective histories consist of the observation of a woman's pregnancies over a specified future time frame. Both types of data yield information on the components of the birth interval including intervening foetal losses. Yet the availability of these records do not necessarily solve all the problems of arriving at accurate estimates of foetal loss levels as there are a number of methodological issues researchers have to contend with in the use of these tools.

Birth histories are subject to errors and biases most common of which are response errors and memory, truncation and selection biases stemming from inaccurate recall of the timing of the events of pregnancy, memory lapse, exclusion of long intervals that extend beyond the observation dates, selection of some groups of women over others, etc.

The present study aims to investigate foetal mortality in the Philippines and its effect on fertility through the birth interval using data from retrospective pregnancy histories of a nationally representative sample of ever-married women 15-49 years old interviewed in the 1978 RPFS.

METHODS AND DATA LIMITATIONS

To minimize the effect of memory bias, analysis concentrates only on recent experience relative to foetal loss and the birth interval. At the same time, the competing risk of truncation bias stemming from a short period of observation is taken into account in choosing the appropriate time frame for the study. Following the lead of Page (1980) as cited by Brass (1980), a period of five years before the survey was chosen as the reference period as this seems to yield the best results, being neither too short nor, referring to events, too distant from interview date. Selection bias is minimized by concentrating analysis on pregnancies rather than women. Specifically, the unit of analysis is the last closed birth interval (LCBI) which began and ended within the period 1973 to 1977.

In the SRO5[1] version of the 1978 RPFS used in the analysis, the postpartum variables of postpartum amenorrhea (PPA) and menstruating interval (MI) are given for the LCBI only if the last and next-to-last pregnancies were both live births, thus coinciding with the boundary events of the birth interval. Otherwise, no PPA and MI information are collected. Moreover, gestation lengths of pregnancies ending in foetal loss was not determined in the survey. Differentiation of foetal deaths into types could not, therefore, be subjected to independent verification. The study had to rely solely on the woman's own reporting. The absence of data on gestation length also led to the classification of foetal loss into the broad categories of: 1) lost before full term (to include early and intermediate foetal deaths), and 2) born dead (late foetal deaths or stillbirths).

In all, there were a total of 2,667 LCBIs reported in the period 1973-1977. Table 1 shows a distribution of the duration of LCBIs in the RPFS regardless of date of occurrence and LCBIs caught in the time frame of the study.

LCBIs in the time frame of the study constituted 29.8 percent of all LCBIs. Intervals lasting 48 or more

Table 1. Percent Distribution of LCBIs By Duration, All LCBIs and LCBI in the Period 1973-1977

Interval Duration (Months)	All LCBIs		LCBIs in 1973-1977		LCBIs in 1973-1977 as Percent of Total LCBIs
	Percent	N	Percent	N	
0–12	6.2	560	5.5	148	1.6
13–23	31.0	2784	37.6	1003	11.2
24–35	38.8	2852	41.2	1099	12.3
36–40	13.5	1208	12.4	332	3.7
40 +	17.4	1560	3.2	85	1.0
Total	100.0	8964	100.0	2667	29.8
Median Interval			25.33		

months were most affected by truncation as these were the least represented. Consequently, the median length of the LCBIs in the period 1973-1977 was lower at 25.33 months than the median for all intervals (27.89 months). All other intervals were represented in the subsample in more or less equal proportions as in total LCBIs.

RESULTS

Foetal Mortality in the Philippines

Estimation of the extent of foetal wastage vary with the type of population under study (e.g. developed vs. developing) and the methods used for estimation. Life table analyses point to an estimated 40 percent of all fertilized ova perishing prior to full term delivery (James, 1970; French and Bierman, 1962). Studies utilizing other techniques estimate foetal loss to be between 10 to 15 percent of all pregnancies in developed countries (Potter, 1965: Leridon, 1976; Gray, 1977) and higher proportions in less developed ones. The UN reports estimates that range from 20 to 70 percent of all conceptions.

In the Philippines, vital statistics reports give estimates of foetal mortality on an annual basis but these are known to be severe underestimations of actual levels. For example, in the period 1963-1967, vital statistics reports yielded an estimate of 12.2 to 18.2 foetal deaths per thousand live births as against 57.5 to 97.5 foetal deaths per thousand live births in the same time period culled from the retrospective pregnancy histories of ever-married women interviewed in the 1973 National Demographic Survey (NDS) (Zablan, 1977). This points to the importance of survey data as an alternative to inaccurate official records.

Table 2 presents levels of foetal loss as obtained from the results of the 1978 RPFS, showing annual levels

Table 2. Trends in Foetal Death Rates in the Philippines Based on the 1978 Republic of the Philippines Fertility Survey, 1968-1977

Year	Foetal Death Rates*			5-Year Moving Average		
	All Foetal Deaths	Lost before full term	Born Dead	All foetal Deaths	Lost before full term	Born Dead
1968	9.72	8.5	1.17			
1969	6.49	5.95	.54			
1970	7.05	6.21	.84	7.78	6.91	.87
1971	7.77	6.94	.83	7.85	7.04	.81
1972	7.87	6.92	.95	8.60	7.69	.91
1973	10.07	9.18	.89	9.25	8.41	.84
1974	10.25	9.22	1.03	9.99	9.08	.91
1975	10.29	9.79	.50	10.86	9.91	.95
1976	11.48	10.27	1.21			
1977	12.20	11.02	1.18			

*Foetal deaths per hundred pregnancies.

for the period 1968-1977 and five-year moving averages, the latter intended to smooth out annual fluctuations in the data, such fluctuations being part of the expected pattern and stem from the stochastic nature of births.

The table shows an increasing trend in foetal mortality in the period 1968-1977 due mainly to an increasing trend in the occurrence of pregnancies lost before full term. To investigate the possibility that the increase is due to the effect of memory bias affecting the reporting of pregnancies farther away from the survey date, Table 3 shows comparative levels of foetal loss and its components from two retrospective surveys, the 1973 NDS and the 1978 RPFS, at identical time periods.

The data show a striking similarity in total foetal deaths between the two surveys but with sizable differences in the component rates. This suggests that the effect of memory bias for events away from the survey may not be as significant as expected as attested by the total rates but that within each survey, there are possible response errors that account for disparities in the component rates. One possible cause of response errors is the inherent ambiguity in the questions used in the surveys (see Appendix) to elicit information on the type of foetal loss experienced which leaves much room for concealment of induced abortions and possible inadvertent misclassification of stillbirths into the lost before full term category. Nonetheless, within each data set, the trend points toward increasing levels of occurrence in total foetal death rates due mainly to the increase in pregnancies lost before full term.

Foetal Mortality and the Birth Interval

A birth interval refers to the time period bounded by two live births. It has several components: 1) post-partum amenorrhea (PPA) or the absence of menstruation following the birth at the beginning of the interval;

Table 3. Comparative Estimates of Foetal Deaths and its Components from Two Retrospective Surveys, 1963-1972

Period/Data Source	Foetal Death	Rate Per Hundred Pregnancies Lost Before Full Term		Born Dead
		Induced	Spontaneous	
1963-1967				
NDS	6.81	.75	4.95	1.10
RPFS	6.94	.33	5.86	.74
1968-1972				
NDS	7.72	.74	5.68	1.30
RPFS	7.73	.39	6.48	.85

2) menstruating interval (MI) marked by the return of menstrual flow; and 3) gestation ending in the birth that closes the interval. Breastfeeding normally extends the period of PPA to some appreciable extent and, in non-contracepting populations, serves as the main factor in prolonging the birth interval. The MI is prolonged by the use of contraception. When the birth interval contains a foetal loss, its duration is lengthened by the addition of several components: the gestation period which ended in a foetal death, followed by a short period of PPA and a second menstruating interval. Potter estimates that among Western women, the average length of the birth interval in the absence of lactation and contraception is 18 months. An abortion (either spontaneous or induced) prolongs the interval by nine months while a stillbirth contributes an additional 16 months (Potter, 1963).

An aggregate increase in the level of foetal mortality means an over-all increase in the number of birth intervals prolonged by a foetal death if foetal mortality does not occur repeatedly to the same woman or the same interval. The following discussion presents the results of the analysis of the birth interval with specific reference to the effect brought about by foetal death.

Of the 9,268 women interviewed in the RPFS, 3,030 (32.7 percent) had both last and next-to-last pregnancies occurring within the period 1973-1977. Some 80.2 percent of these women also had an LCBI characterized by two successive live births corresponding to the last and next-to-last pregnancies. The remaining 18.8 percent reported at least one foetal loss in their last two pregnancies with a small minority of women (1.6 percent) experiencing two successive foetal losses.

Reconstructing the birth history of the women reporting at least one foetal loss, 2.8 percent had a birth interval with two successive live births while 5.1 percent had an LCBI interrupted by a foetal loss.

Birth Intervals Free From Foetal Wastage

When a birth interval contains no foetal loss, variations in its length stems from differentials in the postpartum variables of postpartum amenorrhea and the menstruating interval. These are further modified by the practice of breastfeeding, the use of contraception and exposure to intercourse and, to some extent, the woman's fecundity. The length of the interval is, therefore, determined by the specific mix of these variables resulting in long or short durations.

In the subsample of 2,667 LCBIs, 2,514 were uninterrupted by foetal loss (live birth-live birth or LB-LB interval), 2,430 of these were bounded by the last and next-to-last pregnancies for which data on the postpartum variables are given in the RPFS.

The mean length of the LB-LB interval is 25.64 months, consisting of a mean PPA of 8.16 months, MI of 8.78 months and nine months of gestation.

Postpartum Amenorrhea (PPA)

Normally, after a birth, a woman does not immediately return to the fecund stage but passes through an amenorrheic, non-fecund period. This period of infecundity is affected by the practice of breastfeeding. Generally, the frequency and duration of lactation prolongs PPA although not to unlimited levels. Thus, even without contraception, the birth interval may be lengthened to some appreciable extent by breastfeeding.

In the subsample of the study, Table 4 shows that breastfeeding prolonged lactation is practiced by a high 75.8 percent of the women such that the resulting mean duration of PPA is also relatively high at 8.16 months.

The Menstruating Interval (MI)

Upon resumption of menstruation following PPA, the woman moves to the next component of the birth interval – the menstruating interval. This period is normally composed of two segments: a very short period of anovulatory cycles, usually the first two menstrual period and a longer period of ovulatory cycles which marks the fecundable period. The figures in Table 5 under the heading menstruating interval represent the sum of these two components.

The menstruating interval can be prolonged indefinitely by the use of contraception. In the case of the intervals under study, only a low proportion of intervals were additionally prolonged by family planning methods such that the over-all mean MI is relatively low at 8.78 months.

The LB-LB intervals appear to be characterized by longer durations of breastfeeding but low proportions of contraceptive use.

Intervals Interrupted by Foetal Wastage: LB-FL-LB

Of the 2,667 LCBIs in the subsample, 154 (5.8 percent) were interrupted by a foetal death. These intervals were lengthened by the additional components of postabortion/stillbirth amenorrhea, a second menstruating interval and the gestation months culminating in the foetal death. Intervals interrupted by stillbirth last longer than those interrupted by pregnan-

Table 4. Mean Length of PPA for LB-LB Intervals By Duration of Breastfeeding

Duration of Breastfeeding (In Months)	Mean Duration of PPA (In Months)	N	Percent
Less than 1	3.17	100	4.12
1-3	43.40	159	6.54
4-6	5.50	106	4.32
7-9	6.18	224	9.22
10+	8.77	1842	75.80
All	8.16	2430	100.00

Table 5. Mean Length of the Menstruating Interval by Use of Contraception in the LCBI.

Menstruating Interval Use of Contraception	Mean Length (In Months)	N	Percent
Did not use	7.49	1526	62.8
Used inefficient	9.87	544	22.4
Used efficient	12.62	359	14.8
All	8.78	2430	100.0

cies lost before term because the additional components are generally longer too. As can be seen in Table 6, in the presence of stillbirths, the mean interval length is 38.36 months as against 33.63 months average duration in the presence of spontaneous foetal loss. The relatively high reported duration of intervals interrupted by induced abortion may point to the use of contraception somewhere in the interval but the small number of cases (n = 7) seriously hampers any inferences derived from the data as the reported figure may also be due to sampling errors.

The presence of contraception in the interval creates a bias in the data because it, too, can prolong the interval over and above the effect of foetal wastage; hence, contraceptive use has to be controlled for if the effect of foetal wastage alone is to be properly isolated. This is done in Table 7. Unlike in the LB–LB interval, contraceptive use apparently has little prolonging effect in addition to the number of months contributed by the foetal death as can be seen in the small difference in durations between intervals with and without contraception. This can mean one of two things: 1) LB-FL-LB intervals caught in the time frame of the study are biased toward brevity; or 2) there is some link between foetal wastage and contraceptive use that leads to shorter birth intervals particularly when the foetal death was involuntarily terminated.

Table 6. Mean Length of the LB-FL-LB Interval by Type of Intervening Foetal Loss.

Type of Foetal Loss	Mean Length of the Interval (In Months)	N	Percent
Lost before full term	33.63	140	90.0
Spontaneous	33.45	133	86.4
Induced	37.00	7	4.5
Born Dead	38.36	14	9.1
All	34.04	154	100.0

Table 7. Mean Length of LCBIs by Presence/Absence of Intervening Foetal Loss and Use of Contraception in the LCBI

Type of Interval/ Use of Contraception	Mean Length of the Interval (In Months)	N
LB-LB	25.94	2430
Did not use	24.40	1526
Used inefficient	22.41	544
Used efficient	30.26	359
LB-FL-LB	33.94	154
Lost Before Full Term	33.63	140
Did not use	33.79	87
Used inefficient	33.48	27
Used efficient	34.12	26
Born Dead	38.36	14
Did not use	36.57	7
Used inefficient	30.67	4
Used efficient	39.00	3

In the absence of contraception, foetal loss prolongs the birth interval by 9.61 months, 9.39 months for pregnancies lost before full term and 12.17 months for stillbirths.

Analysis of the PPA and MI components of the LB-FL-LB intervals would reveal the specific months of contribution of the foetal death as well as indicate whether there may be significant differences in these components between LB-FL-LB and LB-LB intervals but the SRO5 version of the RPFS contains no information on PPA and MI for LB-FL-LB intervals (available data refers to the closed and open pregnancy intervals only). Furthermore, because of the small number of reported cases of stillbirths and induced abortions, differences in the three types of foetal loss (lost before term-spontaneous, lost before term-induced and born dead) cannot be investigated.

DISCUSSION

The levels of foetal mortality in the Philippines as gleaned from the retrospective pregnancy histories of the respondents to the 1978 RPFS generally fell below the levels expected of a developing country. This reflected the presence of underreporting of events even when analysis concentrated on most recent events of pregnancy. Nevertheless, the trend manifested an increasing foetal wastage levels over the 10-year observation period, with pregnancies lost before full-term manifesting the greater magnitude of increase and stillbirths showing very minimal increase.

In the light of recent mortality declines at other ages, a steadily increasing rate of pregnancies lost before

term merits concern as this could mean that the benefits accruing to the population by way of improved mortality conditions do not reach the earliest possible ages.

Foetal mortality is, in a way, a unique phenomenon in that it often has a sizable and, if not accepted, at least recognized volitional component. Seen in this context, the rise in pregnancies lost at the early and intermediate stages of gestation may be indicative of an increasing incidence of induced abortions, such that the higher rates of foetal mortality do not necessarily indicate adverse conditions.

The introduction of family planning in the Philippines in the early 1970s should have ideally reduced the need for induced abortion as a fertility regulating method. However, data from the National Acceptor Survey indicate that, whereas there was an increase in the level of acceptors, the quality of contraception left much to be desired. For instance, 30 percent of acceptors stopped contraception because of accidental pregnancies, suggesting that the quantity of acceptors did not necessarily translate into improvement in the quality of use. The rate of accidental pregnancy was high among users of inefficient methods but the rates were also relatively high among pill acceptors (Laing, 1977). Should abortion be used as a back-up method for contraceptive failure, there may be a relationship between the increasing number of acceptors and the increasing trend in foetal mortality. Unfortunately, these inferences are, at this point, conjectural owing to the nature of the data used in the study. Retrospective reports with no independent verification of the events reported are subject to "screening" by the respondent. Whether inadvertent because of memory lapse or deliberate because the information is sensitive (as in induced abortion), the accuracy of information received is suspect.

The effect of foetal mortality on fertility is felt mainly in the lengthening of the birth interval. Long birth intervals mean low fertility in the long run. In general, the results of the analysis confirm this. LCBIs with a foetal loss are longer by 9.61 months than the average birth interval uninterrupted by a foetal death. The small number of reported cases of stillbirths and induced abortions prevented further analysis of the differences in the length of LCBIs by type of foetal loss experienced. But it is interesting to note that among women whose LCBIs contained no foetal loss, contraceptive use had a considerable effect in prolonging the interval (24.4 months average duration for non-users as against 30.26 months average duration for users of effective methods) but that among women who experienced a foetal loss, contraceptive use in the LCBI had a minimal effect in prolonging the interval (33.79 months for non-users with lost before term pregnancies as against 34.12 months for users of efficient methods with the same type of foetal loss). Because the effect of truncation bias cannot be totally ruled out, this may be investigated further using a longer time frame. If the lack of difference is real and not due to truncation, does this mean that a spontaneous foetal loss

leads to some behavioral change like the conscious shortening of the birth interval following a foetal death? Is the long mean duration of intervals interrupted by induced abortion artifactual or characteristic of all intervals with such type of foetal loss? Is there a link between contraception and induced abortion in the Philippines as in Taiwan where induced abortion is used as a back-up for unsuccessful contraception?

POLICY IMPLICATIONS

A rising trend in foetal mortality does not augur well, one way or the other, whether the increase is due to voluntary or involuntary causes. A rise in spontaneous foetal deaths means that the conditions in the population are so adverse that the effects are felt even by those not yet born, through the mother. A rise in induced abortions particularly in the presence of a fully functioning family planning program and in the light of normative prohibitions of the practice points to the need for improvement of program efforts not only to motivate women to use contraception but to use them properly. Program efforts should also be aimed at information campaigns on the hazards of induced abortion especially as practiced outside of medical supervision. Furthermore, efforts to improve reporting of foetal deaths should be exerted not only through the Vital Registration System but by enlisting the help of community-based outreach workers who can rely on informal channels of information to gather data on the occurrence of foetal wastage. These informal channels may likewise be tapped in ferreting out data on the incidence of induced abortion to help improve understanding of its real level of occurrence. It should be made clear to women that induced abortion as a birth averting method is neither an effective, nor an efficient practice as the problem can very quickly recur. Induced abortion, because it is often practiced in the early stages of gestation, contributes only a few months to the birth interval. Contraception, if used successfully, adds considerably more to the interval without the accompanying risks the woman goes through in voluntarily terminating a pregnancy.

NOTE

[1]The SRO5 is the fifth Standard Recode Version of the 1978 RPFS results.

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APPENDIX

Interviewer's Instructions as to the Distinction between Types of Foetal Loss:

From the 1973 NDS Interviewer's Manual:

G.20. Miscarriage or Stillbirth:
"Indicate in appropriate column whether foetal loss resulted in a miscarriage or a stillbirth. By definition, a miscarriage is the spontaneous expulsion of the product of conception in the form of an embryo or a foetus. A confinement resulting in the birth of a stillborn child is called a stillbirth."

G.21 Abortion:
"A pregnancy may be interrupted by abortion which consists of induoing expulsion of an embryo or foetus. Indicate whether the pregnancy loss was due to abortion."

From the 1978 RPFS Interviewer's Manual:

Q.224. Stilibirth or Miscarriage/Abortion:
"Indicate by checking in the appropriate column whether the pregnancy ended in a deadborn (stillbirth) or was lost before full term (miscarriage/abortion)."

Q.225. Abortion:
"A pregnancy may be interrupted by abortion which means inducing expulsion of an embryo or foetus. Usually, abortion may be induced in the first months of life."