

INFANT AND CHILDHOOD MORTALITY RESEARCH IN THE PHILIPPINES: REVIEW AND AGENDA

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Introduction

Philippine demographers have long been aware of the few studies on mortality patterns in the country. This is particularly highlighted when placed against the wealth of data dealing with fertility, family planning, migration, and the spatial distribution of the country's population. As such, any attempt to review the literature on mortality trends and differentials could have been decidedly premature a decade ago.

But in the early eighties, several sectors became increasingly concerned about mortality and health issues, both in the Philippines and abroad. A number of new studies started to get published and more are now being proposed. It would then be timely at this point to attempt a more general survey of the field, both as a means of pointing out emerging uniformities in study results and as a way of indicating those areas where further work is still needed.

So far, the great bulk of mortality research in the country has focused on the health problems of infants and children. Most studies, too, have been confined to micro-level investigations of the problem. I have therefore consciously chosen to ignore ecological-type studies and analyses of adult mortality in this review. Our concern will be strictly with analyses of differentials in mortality and morbidity; no attempt will be made to discuss levels or trend data pertaining to these phenomena. Also, no systematic attempt will be made to rank these studies according to either the quality of their data sets or their methodological sophistica-

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This study was supported by a grant from the Area Research and Training Center (ARTC), Xavier University. The ARTC is funded by the United Nations Fund for Population Activities through the Population and Development Planning and Research Project of the National Economic Development Authority, Republic of the Philippines. All opinions expressed herein are the author's and should not be attributed to any of the above-named agencies.

tion, although occasional comments will be given on this issue, e.g., when study findings appear to differ.

The literature review proper is subdivided into two sections. The first deals with the impact of social and economic variables upon infant and childhood mortality/morbidity, while the second reviews analyses of the "proximate" (Mosley and Chen 1984) mortality factors. These variables may be considered as having a more direct impact upon child survivorship than do the social and economic factors. They comprise five major categories: maternal factors; environmental contamination; nutrient deficiency; accidents/injuries; and personal illness control, both preventive and curative. A basic assumption of this approach is that all social and economic factors must operate through one or more of the proximate variables in order to affect an infant's health status. Thus, if infant mortality rates are higher among lower class families, this could be attributed to inadequate nutritional levels, lack of modern health services, unhygienic environmental conditions, and the like.

Social and Economic Factors

Residence

There are a number of reasons for hypothesizing that place of residence should be linked closely with infant/childhood mortality. Within the Philippine context, some regions - Metro Manila, Southern Tagalog, Central Luzon - are more economically advanced than others. Many studies have shown that this factor exert a negative influence upon infant mortality rates. This pattern is also observed in the country, as a whole. Using provincial-level data as of 1970, Flieger, Abenoja, and Lim (1984) found bivariate correlation coefficients of .51, .73, .54, and .47 between life expectancy and such development indicators as, respectively, urbanization, electrification, educational attainment, and manufacturing. In addition, region of residence is a proxy for ethnicity which may also exert some influence upon levels of infant mortality. In general, areas populated by tribal and non-Christian groups may be expected to exhibit higher rates of infant mortality, due to their depressed living conditions and their decreased exposure to modern medical practices.

Much the same could be said about contrasts between urban and rural communities. In general, urbanites enjoy higher living standards than do persons living in rural areas. City dwellers also have more ready access to modern health facilities than do the people of the barrio. If these factors were controlled, however, some contrary trends might appear in evidence. Population density is much greater in urban areas than in the countryside; this increases the population's exposure to

contagious diseases and may also contribute more to stress-related health impairments. Cities are also characterized by higher levels of air pollution, and city dwellers run a greater risk of infection from contaminated water or inadequate sewage facilities, especially those living in burgeoning slum and squatter neighborhoods.

Findings on these questions show some apparent contradictions, depending on the data set and the mode of analysis being employed. On the one hand, Zablan's (1978) estimates of regional differences in life expectancy reveal that persons living in Metro Manila, Ilocos, and Central Luzon can expect to live longer than those in other areas of the country, particularly in comparison with Northern Mindanao, the Eastern Visayas, and the Cagayan Valley. Recent analyses by Flieger, Abenoja and Lim (1981), de Guzman (n.d.), and Madigan (1985a) show broadly similar patterns as based data from respectively, the 1970 Census, the 1978 Republic of the Philippines Fertility Survey (RPFS), and the 1983 National Demographic Survey (NDS). All of these analyses point to Mindanao as a high mortality region, with the Flieger *et al* study showing some very substantial differences in this regard.¹

A noteworthy exception to this general pattern is contained in a study by Martin *et al* (1983), which found that region of residence is not a strong predictor of infant mortality once other social and economic factors have been controlled statistically. Since most of the studies cited above were based on a bivariate analysis of regional mortality differentials, greater emphasis should perhaps be given to the findings of Martin *et al*.

Only one study (Flieger, Abenoja and Lim, 1981) has so far been able to obtain provincial-level estimates of infant mortality. The results of this analysis indicate that there is even greater variation among provinces than can be seen at the regional level. Particularly noteworthy is the fact that the five provinces with the highest infant mortality levels (Lanao del Sur, Lanao de Norte, Sulu, Mountain Province, and Ifugao) are all characterized by high proportions of non-Christian residents. This finding provides evidence that there are significant linkages between ethnicity or culture and mortality.

As for the comparison between rural and urban communities, a number of bivariate tabulations have shown infant mortality rates to be higher in rural areas than in cities. This is true for data from the 1973 NDS (Alcantara 1975, Conception and Smith 1977), the 1978 RPFS (Engracia 1983), and the 1983 NDS (Madigan 1985a). Some evidence

¹This study produced estimates of infant mortality rates which were about 70 percent higher in Northern and Western Mindanao than in the Southern Tagalog and Central Visayan regions.

to the contrary, however, has also been published. Data for the 1979 Area Fertility Studies of Central Luzon and Metro Manila, for example, do not show clearly that urbanization in this setting is associated with lower rates of infant mortality (Mortezo 1981); similar results were also obtained in Madigan and Herrin's (1977) dual record study of infant mortality patterns in Misamis Oriental province.

Martin *et al's* (1983) multivariate analysis of the 1980 RPFS data is again instructive. While bivariate tabulations from this survey showed infant mortality rates to be higher in rural areas than in cities, the opposite was true for the study's multivariate findings. This may be taken to indicate support for the argument made earlier, i.e., that the direct effect of urbanization *per se* upon infant mortality may be in some ways detrimental, although the higher standards of living and greater access to medical facilities found among urbanites tend to mask this relationship.

Social Class

The inverse relationship which generally exists between social class and infant mortality could well qualify as one of the few "laws" produced by social science research. On a worldwide basis, this pattern has been obtained by a large number of studies including some published over a century ago. Several intervening factors could be listed to account for this. Chief among these are the less adequate nutritional standards experienced by poor children, their greater exposure to environmental contamination (e.g., impure water sources) and accidents, the less frequent and less prompt resort to modern medical practitioners, and the deficiencies in parental knowledge about preventive health practices which they must exercise.

Various indicators of social class position have been used, including father's occupation, family (or household) income levels, and various socio-economic scales which seek to combine information about housing materials, consumer goods ownership, income, education, and the like. All of these measures appear to be closely related to infant mortality in the Philippine context. Data from the 1973 National Demographic Survey, for example, have shown mortality rates to be highest among the children of farmers and blue collar workers, and lowest in the professional classes (Alcantara 1975); compatible results have also been reported for the Bohol Maternal and Child Health program (Williamson 1982). These correlations, however, are bivariate in nature and for this reason could be spurious. Evidence that such is the case is available from Engracia's (1983) analysis of the 1978 RPFS data. This study, too, found an initial (bivariate) relationship between father's occupation and infant mortality, but this was reduced towards statistical insignificance

once maternal education was controlled.

Socio-economic scales have been used by both Mortezo (1981) and Madigan (1972). The former analyst studied infant mortality data from Metro Manila and Central Luzon, while the latter was concerned with the investigation of vital events in Cagayan de Oro. Both studies found the expected inverse relationship. Madigan's study also obtained a similar pattern for family income levels, with this finding being repeated in his analysis of the 1983 National Demographic Survey data (Madigan 1985b).

Women's Roles and Status

Studies conducted in various locales worldwide have consistently shown that children born to better educated mothers have a higher probability of surviving their early years. Proximate factors which might account for this include the mother's superior knowledge of preventive health techniques, her greater reliance upon modern curative systems, superior nutritional practices, longer birth intervals, and increased female power in family decision-making that might result in greater family expenditures on the health care of young children.

At least ten Philippine studies focused on this relationship. These have been conducted at both the national level (Alcantara 1975, Engracia 1983, de Guzman n.d., Martin *et al.* 1983, Madigan 1985b), as well as for such diverse locales as Metro Manila and Central Luzon (Mortezo 1981), Northern Mindanao (Madigan 1981a), Misamis Oriental province (Costello 1977), the city of Cagayan de Oro (Madigan 1972), and Bohol province (Williamson 1982). Various statistical techniques and mortality indicators have been used. Despite these differences, every single one of these studies found an inverse relationship between maternal education and infant mortality. In many cases, this relationship was quite strong even in those multivariate analyses wherein other social and economic factors were controlled statistically. There can be little doubt, therefore, that this factor plays a key role in affecting the survival chances of infants. In general, however, very little has been empirically established so far about the intervening variables which can account for this pattern. This is clearly an area in which further work is needed.²

²Two studies which touch briefly on this topic may be mentioned, however. Magallanes (1984) has found parental educational levels to be positively associated with the nutritional status of their children, while Cabaraban and Madigan (1987) found the use of traditional medical practitioners for childhood illnesses to be more common among poorly educated mothers.

The relationship between maternal employment and infant/child mortality appears to be complex and poorly understood. On the one hand, the additional income available in households with working mothers could have a positive impact upon child survivorship by improving dietary standards and bringing modern medicines and health care practitioners within easier reach. Conversely, maternal absence from home could mean that their children will suffer from less competent or concerned care or that (in the case of new-born infants) they will be deprived of the nutritional advantages inherent in the traditional practice of breast-feeding (Popkin 1980). Further confusing the issue is the possibility that highly variable relations may exist according to both employment type and age of the child. Thus, Zablan's (1983) analysis of data from the 1973 NDS found that infant mortality rates among mothers employed in professional, administrative, and white collar jobs were lower than those reported by housewives and blue collar workers, whereas extremely high rates of infant mortality were in evidence among mothers employed as farm workers.

That the infant feeding practices followed by Filipino mothers are intimately related to both their labor force status and their type of employment seems clear. At least three recent studies have been conducted on this topic (Costello and Palabrica-Costello 1984, Mejia-Raymundo 1985, Simpson-Hebert and Makil-1985), each of which found breast-feeding prevalence to be significantly lower among employed mothers. This appears to be particularly true for women working outside the home (Mejia-Raymundo, 1985) and for those employed in formal work settings such as large factories (Costello and Palabrica-Costello 1984).

A final factor of relevance for the issue of female roles and status relates to the sex of the child. Where women are accorded low social status and where sons are strongly desired, the survival chances of female offspring may be somewhat lower than those of males. This, however, seems not to be the case in the Philippines. In general, local studies have shown either statistically insignificant infant mortality differences between the two sexes (Johnson and Nelson 1984) or higher levels of infant mortality for males than for females (Mortezo 1981, Madigan and Herrin 1977, Williamson 1982).

Proximate Variables

Maternal Factors

Maternal factors which may affect infant mortality include the mother's age, her parity, and the amount of time elapsed since the previous birth. Babies born to older and high-parity mothers, as well as those which

closely follow an earlier birth, have generally been found to suffer from higher rates of infant mortality. These conditions tend to be associated with poor maternal health, premature births, reduced ability to lactate and, possibly, impaired ability to care for the baby after its birth due to maternal fatigue or illness. Large numbers of children ever born may also be linked negatively with *per capita* expenditures on food and health care, and positively with exposure to infection.

Empirical evidence on the role played by these factors in the Philippine context is spotty at best. In their multivariate analysis of the 1978 RDFS data, Martin *et al.* (1983) found that higher-order births and infants born to very young mothers were significantly more likely to die before their first birthday. The role played by these factors is further supported by findings of higher infant mortality among mothers who had married or given birth to their first child at an early age (Williamson 1982, Madigan 1985a, de Guzman n.d.) or who had already given birth to a large number of children (Williamson 1982, Madigan 1985a, Ballweg and Pagtulon-an 1986). At least one study, too, has concluded that shorter birth intervals are related positively to subsequent patterns of infant mortality (de Guzman n.d.). It seems clear, therefore, that the conditions which make for frequent childbearing and large family size are linked strongly to the risk of infant death. As such, policies which serve to reduce or delay child-bearing - whether through the postponement of marriage or *via* the promotion of family planning among married couples - should also prove efficacious for the goal of reducing infant mortality levels.

Family size has been linked empirically with a number of the other proximate factors. Thus, Magallanes (1984) found a strong inverse relationship between this factor and *per capita* nutritional levels within the household, even with controls for socio-economic status and residence (see also Battad 1978, Paqueo 1977). Large family size also appears to result in a higher probability that infants and children will contract an infectious disease (Layo 1977).

Environmental Variables

These variables operate chiefly through their impact upon the infant's exposure to infection. They include type of water supply, sanitation and toilet facilities, and housing quality. We may also list household electrification as an environmental variable, since this factor can work to reduce food spoilage in cases where a refrigerator is owned. The general picture in this case would appear to be that the children of more disadvantaged groups in the Philippines - urban squatters and slum dwellers, rural folk, cultural and religious minorities - are exposed to a

more hostile set of environmental conditions than are those who grow up under more fortuitous circumstances.

To date, the adverse impact which these factors may have upon infant and childhood health conditions has been examined by only a small number of researchers. Martin *et al.* (1983) found the presence of both electricity and adequate toilet facilities to be related positively to infant and child survival levels. However, Engracia's (1983) analysis of the same data set, as based upon a somewhat different mortality measure and an alternate statistical technique, concluded that these factors were of little utility for reducing the probability of infant death.³

The importance of piped water in reducing infant/child mortality is theoretically plausible, but as yet unproven empirically. Martin *et al.*'s analysis of the 1978 RPFS data failed to show any statistically significant relationship along these lines. Perhaps a better measure of this factor - e.g. one which actually tests for the presence of infectious agents in the household's water source - is needed.

At least one study (Johnson and Nelson 1984) has found a significant positive relationship, in a study which was set in rural Iloilo, between housing quality and child survivorship. The housing index used in this analysis was based upon survey items relating to the construction materials used for walls, doors, windows, and floors, along with the type of toilet facilities present. The relationship remained statistically significant even when controls were instituted for a number of "social-demographic risk factors" (e.g., income, parity). Somewhat similar results have also been reported in an earlier study of morbidity determinants (Layo 1977).⁴

The methodological difficulties brought on by studies of this type are formidable. Two issues which may be noted in particular relate to the problem of establishing temporal priority on the part of the independent variable (all studies cited in this review were based upon environmental measures which pertain to the survey data), as well as to possibly spurious correlations. The latter problem could occur, for example, if a variable such as the health consciousness of the couple causes them not only to spend more on safeguarding their child from environmental contamination but also to act in other ways so as to improve the survivorship probabilities of their offspring. In addition, such studies leave

³Two other studies which found evidence that rural electrification helps to reduce death rates are those which have been authored by Madigan (1981b) and Zablan (1983).

⁴Layo found morbidity levels to be higher in homes with inadequate drainage and ventilation.

unanswered the question as to whether government programs in such areas as housing, public health, and infrastructural development could serve to alter environmental conditions that could reduce infant and child mortality levels. Additional evaluative-type studies of the health impacts of such programs are sorely needed.

Accidents and Injuries

To this author's knowledge, no specific analysis of the determinants of childhood accidents and injuries has been made in the Philippines. This is perhaps a tolerable gap in the literature, insofar as this cause of death seems to play a relatively unimportant role in influencing infant and childhood mortality levels (Zablan 1983, Table 5.11).

Nutrition

Again, only a few studies have sought to establish an empirical connection between nutritional status and infant and child health levels. At least two analyses have been devoted to investigating the correlation between breastfeeding and child survivorship (Johnson and Nelson 1984, Cresencio and Simpson-Hebert 1985). Despite frequent references in the literature to the beneficial health impacts of breast-feeding, however, neither of these studies was able to establish much of an empirical linkage in this regard. The study by Cresencio and Simpson-Hebert, however, did point to some possibly positive implications of breast-feeding for the health of *subsequent* children, insofar as this practice tends to bring about more widely-spaced pregnancies.

That breast-fed babies are not substantially more likely to survive until their first birthday would also appear to be implied by those studies which have investigated social and economic differentials in infant feeding practices. In general, better educated, urban, and higher status Philippine women have been least likely to breast-feed their babies (National Census and Statistics Office, *et al.* 1979, Costello and Palabrica-Costello 1984; Mejia-Raymundo 1985). As we have seen, however, mortality rates are generally lower among children born to women with these characteristics.

In a study conducted by Barba, Guthrie, and Guthrie (1982) a matched sample of 24 pairs of infants was drawn, with one group then being given food supplements while the other was not. This study failed to show any statistically significant differences between the two groups at the onset of illness, with the exception that the children given food supplements experienced *more* coughs and colds. This group, however,

did experience significantly greater weight gains, which could help to eventually increase survivorship probabilities.

Illness Control

This group of health-related variables may be subdivided into preventive and curative practices, as well as modern and traditional healing approaches. There are thus at least four further sub-sets of health care activities (traditional-preventive, traditional-curative, modern-preventive, modern-curative) which bear empirical investigation.

Most of the few Philippine studies concerned with this topic have been based on an implicit assumption of the superiority of modern medical practices in comparison to those of a more traditional orientation. Investigators have thus sought to determine if proximity to a professional health station (Engracia 1983) or access to modern medical practitioners as birth attendants (Madigan 1985b) can be linked empirically to reduced rates of infant mortality. For the most part, these factors do appear to play a significant role in this regard. Engracia's analysis, for example, was able to show that access to a midwife, a hospital, a primary health care center or a pharmacy was linked inversely with neonatal infant mortality rates, while access to a health worker and, again, a hospital, had a similar impact upon rates of post-neonatal mortality. Of some interest in this regard is the finding that access to neither a traditional birth attendant nor a physician was found to have a similar effect. This would seem to point towards an "intermediate technology" approach, in which the training and dispersion over the countryside of midwives and primary health care clinics should receive top priority.

Madigan's analysis of the linkages between type of birth attendant and infant survival status was made separately for the 13 geographic regions of the country. Among urban respondents, use of a *hilot* (rather than a doctor or a midwife) was associated with the highest level of infant mortality in 11 of these regions. There was also some tendency for death rates to be lower among infants born to medical doctors than for those with only a midwife in attendance. Note, however, that these tabulations were bi-variate in nature, thus opening up the possibility that they are reflective of some sort of spurious correlation. (In particular, if it may be assumed that the clients of *hilots* are disproportionately drawn from the poorer classes it could be this factor which is the real cause of infant death, and not the type of birth attendant.) For the rural respondents, only 11 regional comparisons between doctors and midwives were made. Of these, it is interesting to note that a slight majority of these comparisons were in favor of the midwives. Again, both doctors and midwives were consistently superior to traditional *hilots*, who were in turn

more helpful in reducing infant mortality than were unassisted family members.

One way in which modern medical practitioners, or the modern medical institutions in which they are employed, might *undermine* the health of the newborn baby is on the choice between breast-feeding and bottle-feeding. The latter type of feeding practice may be perceived by health workers as fitting more easily into hospital routine, or may be seen as more "scientific" and therefore as healthier for the baby (Simpson-Hebert and Makil 1985). Popkin, Yamamoto, and Griffin (1985) have also provided some interesting data on this question, as gathered from a survey of Bicolano health workers. Of particular interest is the fact that traditional birth attendants in this setting were considerably *less* knowledgeable about breast-feeding and *more* likely to hold negative attitudes towards this mode of infant feeding than were physicians, nurses, or midwives. It is thus far from clear as to whether the traditional health care system is more supportive of breastfeeding. At the same time, however, survey data continue to show that modern sector health workers have a number of misconceptions about and little personal experience with this type of infant feeding practice (Simpson-Hebert and Makil 1985; Popkin, Yamamoto, and Griffin 1985).

Policy Considerations

I have noted, in several instances, the all too evident gaps in the infant mortality literature. This might suggest that it is as yet too early to base policy-related decisions upon such a slim empirical foundation. This is most certainly true in the sense that it would be inappropriate to set up a series of very large-scale and expensive programs solely on the basis of such empirical results as are now available. At the same time, however, the social scientist has a responsibility to draw out whatever implications he can from the data at hand, even if these must be hedged about with a series of cautionary notes and qualifying phrases. The following policy considerations, which ought to be considered as very much preliminary in nature, may therefore be suggested:

1. The general proposition that social, cultural, and economic factors play an important role in determining infant survivorship probabilities has clearly been demonstrated by our review. It thus appears evident that a more broadly-based and holistic approach to the problem will be needed, as compared to one which is conceived strictly in medical terms. Other factors - nutrition, health, education, sanitation, and the like - must also come into play. This means that the range of government bureaus to be involved in any effort to upgrade the health status of the nation's

children must extend well beyond the Department of Health, whose programs may exercise little influence on the social and environmental factors which cause the onset of illness in the first place.

2. Any attempt to significantly reduce infant and childhood mortality rates in the country will clearly have to confront the larger problem of social equity. Death rates have uniformly been found to be higher among the more disadvantaged groups - barrio dwellers, the urban poor, non-Christians, and those without access to such basic amenities as decent housing, potable water, and primary health care. Development policies which can boost productivity while at the same time reduce these very blatant inequalities may be expected to help greatly in eliminating the needlessly excessive mortality levels which now exist among the less-privileged sectors.

3. The importance of educational programs, especially directed towards women, is strongly underscored by our review. Indeed, maternal educational attainment appears to be the single most powerful socio-economic predictor of infant survivorship status. Efforts to insure that every Filipino child can receive at least an elementary degree, coupled with a more specific thrust towards improved health education in the schools, will surely be repaid with eventual declines in infant mortality rates once the students of today have become the parents of tomorrow. Short-term campaigns to upgrade maternal literacy and health care competence are also indicated by these findings.

4. The higher rates of infant mortality found in the peripheral regions (Mindanao, Palawan, the Cagayan Valley) point to an important geographic dimension of the problem. It is likely that the health care system is seriously biased towards Metro Manila and its environs (e.g., Concepcion and Smith 1977, pp. 16-17). These disparities should be corrected.

5. The important health care role played by the nation's family planning program must also be emphasized. Patterns of early and excessive child-bearing have been linked strongly to higher probabilities of infant death. As such, the continuation and, indeed, strengthening of efforts to promote delayed marriage and longer birth intervals are very much in order.

6. All indications point to the "intermediate technology" model as being most appropriate for the provision of health care services within the country. A far-ranging network of competently staffed (e.g., by rural

nurses/midwives) medical clinics could bring modern health care practices within the reach of a much larger segment of the country's population than is now the case. This approach would be far less costly than any attempt to provide medical doctors and highly sophisticated equipment to all, while at the same time being only marginally less effective in reducing infant mortality. The contrast between a modernized network of primary health care clinics and the traditional health care system would also appear to favor the former approach, insofar as the studies reviewed here were able to find relatively few benefits (at least as measured in terms of mortality reduction) from the use of *hilots* or *herbolarios*.

Towards a Research Agenda

What, then, remains to be done? More research, certainly, but where is one to start?

Before attempting to answer this question, a few comments on research methodology and design would appear to be in order. The first of these relates to the use - or overuse - of general purpose data sets, such as the various National Demographic Surveys, in most studies of infant mortality which have been conducted to date. Few researches have been set up specifically to test mortality - related hypotheses, thus leading in all too many cases to the non-inclusion of key variables or to the use of imprecise proxies for these. There also appears to be a strong tendency in the literature to rely simply on bivariate tabulations, although a few of the more recent studies have taken a multivariate approach.

A first priority, then, must be for more focused research designs and for the use of more complex causal models. These should be constructed with an eye towards incorporating both the exogenous socio-economic variables normally studied by social demographers and the proximate mortality determinants listed by Mosley and Chen. At present, we know a fair amount about social and economic differentials in infant mortality but next to nothing about the reasons why such differentials exist. This situation is unfortunate, since it leaves government planners with little basis for differentiating among policy options which could operate, on a short-range basis, to reduce excess mortality levels. Is the problem one of poor health practices? Malnutrition? Inadequate water and sanitation facilities? Costly medical inputs? No one really knows for sure, and until these questions are answered, health care planning will remain a mere guessing game in which one planner's pet hypothesis is as good as another's.

Turning now to areas in need of further investigation, we may first note the general lack of studies which attempt to quantify the impact of

community-level factors upon mortality and morbidity patterns. Particularly helpful would be evaluations of the extent to which health programs have been able to meet their objectives, as well as analyses of the impact which more general development policies (e.g., livelihood projects, agrarian reform policies, housing programs) may have upon infant and child health levels.

The dearth of studies dealing with the relationship between Philippine culture and infant mortality is another noteworthy gap in the literature. More studies appear to have been conducted by sociologists, demographers, and economists on the mortality problem than by cultural anthropologists or social psychologists. This is perhaps due to the mistaken preference, on the part of funding agencies, for quantitative analyses, "statistics," and "objective" facts. Whatever the reason, it is apparent that we need more information on perceptions which are held concerning the etiology and treatment of disease states, medical practitioners, nutrition, sanitary practices, and the like (see also Lieban 1966; Arce and Go 1972, Pal and Polson 1973, Ch. 10; Lieban 1976, Guthrie *et al.* 1980, and Burton 1985).

Also lacking are adequate statistics on the causes of death of infants and children in the country. These data are sorely needed in order to determine program priorities for the Department of Health. For example, one major study (Williamson 1982) has speculated that the major cause of infant death in Bophol province is acute respiratory infection which could be reduced by increased (i.e., government-subsidized) access to antibiotics on the part of poor and rural families. This is a highly suggestive research finding which should be investigated for other social and geographic settings of the country.

The apparent tendency for infant death rates to be higher in urban communities than in rural areas of the country, once differences in education, socioeconomic status, and family size have been held constant, calls for further investigation. It would be helpful to know the reason for this finding, given the general trend towards urban residence that is underway in the country. Another factor related to the general trend towards urbanization and industrialization is the increasing employment of married women. The relationship between maternal employment and child survivorship is a research question with obvious policy implications that has received exceedingly little attention to date.

Finally, further investigations of the generally inverse relationship between socioeconomic status and infant mortality could still be warranted, but only to the extent that these are directed towards specifying not only the intervening linkages which can account for this pattern, but also the independent causal effects which are associated with the different dimensions (education, income, father's occupational status) of

the status variable. Such multivariate statistical methods as path analysis and LISREL would appear to be particularly useful tools for studies designed to investigate these types of questions.

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