TDRI Quarterly Review
Published in *TDRI Quarterly Review*
Vol. 5 No. 4 December 1990, pp. 20-25
Editor: Nancy Conklin

Morbidity—What Are the Determinants and What Are the Prospects?

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Morbidity reduces the quality of life and, in extreme forms, ends life itself. Morbidity may also have adverse effects on productivity in work or at school, both by reducing energy and effort and by causing absenteeism. These effects may either directly affect the person afflicted by the morbidity or indirectly affect other household members because providing care for those afflicted cuts into time normally spent on other activities. Consequently, the Thai government has a vested interest in limiting morbidity. This article summarizes the research to date on the determinants of Thai morbidity and on the prospects for Thai morbidity. This research is based on the 1985 Thai Morbidity Survey of 7,314 households (36,611 individuals), which is summarized in Prasartkul et al. (1988).

BASIC MORBIDITY PATTERNS ACCORDING TO THE 1985 SURVEY

At least one episode of illness in the month before the survey was reported by 15.4 percent of the respondents. The incidence was somewhat higher in rural (16.1 percent) than in urban (13.5 percent) areas. The reported morbidity was strongly dependent on age, with the highest incidence for adults over 60 and for infants and children under 5. There are also some suggestions of differences in morbidity incidence during the childbearing years for women aged 15-44. Therefore, this study considers five age categories: 0-4, 5-14, 15-44, 45-60, and over 60. While there are other differences in morbidity incidence by sex, urbanization, region, and education, none are as substantial as age.

Table 1 gives the incidence of illness by disease type and by age group. For children aged 0-4, almost a quarter (24.8 percent) were ill, the second highest proportion among our five age groups. For those who were ill, infectious diseases accounted for almost three-fifths of the total (58 percent) and diseases of the respiratory system accounted for most of the remainder (29 percent). For children aged 5-14, less than half as high a percentage (11.3 percent) were ill, the lowest proportion among our five groups. Among those who were ill, infectious diseases (39 percent) and diseases of the respiratory system (27 percent) also were the two most significant disease categories, though the former was relatively less dominant for children aged 0-4 and there was more diversification among the five other disease categories. For prime-age adults aged 15-44, the proportion who were ill was 11.5 percent, basically the same as that for children aged 5-14. The diseases were more spread across type categories for prime-age adults than for children (see Table 1), with the percentages of those ill among the seven disease categories as follows: other 30 percent, infectious diseases 23 percent, diseases of the digestive system 18 percent, diseases of the respiratory system 15 percent, and diseases of the circulatory system 8 percent. For adults aged 45-60, the proportion who were ill was 22.5 percent, about twice as high as that for the 5-14 age group. The disease types were spread across categories even more for those aged 45-60 as follows: other 30 percent, infectious diseases 20 percent, diseases of the digestive system 17 percent, diseases of the circulatory system 13 percent, diseases of the respiratory system 11 percent, and endocrine disturbances 5 percent. Almost a third of those aged over 60 reported sick (31.4 percent). Of those sick, the distribution among the leading diseases was: other 38 percent, infectious diseases 18 percent, diseases of the respiratory system 14 percent, diseases of the circulatory system 13 percent, and endocrine disturbances 6 percent. Thus, across the age categories there is the expected U-shaped pattern of total incidence of morbidity, with a relatively high incidence reported for those under five years of age and those aged over 44. With increasing

age, among those sick, there is an increasing diversification of diseases. For both child age groups, infectious diseases and diseases of the respiratory system alone accounted for over two-thirds of the total, but these two diseases accounted for a decreasing share of the total in adults aged 15-60 and accounted in only about a third of the total for elders aged over 60.

The mean ages in the five age groups reflect the changing age pyramid of the Thai population. For the three middle age groups, the within group means are significantly below the midpoint of the range, reflecting an increasing population growth rate during the period when these people were born. For children aged 0-4, in contrast, the mean is above the midpoint of the range, reflecting the recent deceleration in population growth, together with the ongoing relatively high infant and child mortality rate. Across the age groups, there is a steady increase in the number of females in the population, with the exception of the youngest age group. The mean education of adults across the age groups reflects the secular trend in Thai education, so it is inversely associated with age. For children, of course, the mean education shows that many children have not yet completed their education.

Over five out of every six Thais (84.6 percent) in the sample lived in intact households. The remaining 15.4 percent live in single-headed households; 10.9 percent with female heads and 4.6 percent with males. The average education of head and spouse in an intact household was 4.6 and 3.9 years, respectively. The average education of household heads in male and female single-headed households were slightly less, at 4.5 and 3.1 years, respectively. About 60 percent of the sample households reported having sanitary toilet facilities. The average wealth in terms of durables for the three adult age groups was in the range of Baht30-40,000, with some suggestion of a life-cycle financial pattern increasing to a peak for the 45-60 age group and then declining slightly with age (though the latter decline also might reflect the secular growth in per capita income over time). The means both for having sanitary toilet facilities and for wealth are lower for the two age groups of children than for adults. This pattern reflects that there is some tendency for poorer households to have more children, so the average child lives in a poorer household than does the average adult. About three quarters of the Thai population live in rural areas. For village residents, the average time required to travel to the nearest town is about 30 minutes. About 12 percent of sample villagers live in areas where public health facilities are available in the community, and about 10 percent live in areas where private health outlets are available in the community.

DETERMINANTS OF OVERALL MORBIDITY AND OF PARTICULAR DISEASES

We investigated both the overall morbidity determinants and the determinants of the major disease types by age group for four groups of determinants. Binomial and multinomial logit estimates of these determinants suggest the following:

Household Wealth: The overall morbidity estimates suggest that there is an inverse effect of wealth only for the youngest and the oldest of the five age groups. The disaggregated estimates indicate a significant effect only for other diseases for adults aged over 60, but suggest a weaker effect for circulatory and perhaps respiratory diseases for such adults and for infectious and perhaps respiratory diseases for children aged 0-4. These results imply little relationship between the distribution of wealth and reported morbidity for the middle three age groups, so income/wealth redistribution and economic growth alone would not have much effect on their reported morbidity.

Individual Characteristics:

- **Age:** Age has an important effect that is captured primarily by the disaggregation among the five age groups. In the overall estimates, in addition, there are within-group age effects for the youngest and the oldest age groups. For children aged 0-4 the disaggregated estimates indicate that the older the child, the lower the incidence of infectious disease. For adults over 60 the within-group age effect on total morbidity is estimated to be dominated by increasing incidence of both infectious disease and the other disease category with age. There also is some evidence of positive effects of age on the within-group incidence of digestive diseases for adults aged 15-44.
- **Sex:** The overall morbidity results indicate a higher incidence for males in the 0-4 age range and for

females in the 15-44 age group. We speculate that the former is due to differences in inherent robustness and the latter due to differences associated with childbearing and infant and young child care, though there might also be some effects of differential economic rewards to health investment according to gender and differential reporting according to gender. The disaggregated results suggest that for children aged 0-4 the effect is basically on the incidence of infectious diseases. For adults 15-44 these results indicate that the effect is primarily on the other disease category (which is consistent with our conjecture, since morbidity associated with childbearing is included in that category) and (more surprising to us) circulatory diseases. Also, males in the 45-60 age group have less reported morbidity of endocrine and circulatory diseases than do females. The combination of the results across the three adult age groups implies decreasing strength in the higher incidence of reported morbidity with age, with no effect for those over age 60. This pattern suggests that biased reporting associated with gender is not the dominant factor since, if it were, it is not clear why it would decline across older age groups and become irrelevant for those over age 60. On the other hand, that the effects are strongest during the childbearing years suggests that there is a real impact on female morbidity associated with childbearing and feeding and care of infants and small children. That a somewhat weaker effect persists for the 45-60 age range suggests that part of the explanation for gender differentials in reported morbidity may be because of lesser incentives for investing in adult female health than adult male health because of lesser returns in terms of fairly immediate economic productivity during the prime work years (but not for the over age 60 or under age 15 groups).

- **Own education:** Own education has strong effects in the aggregate estimates for two age groups—negative for adults 15-44 and positive for adults over age 60. The disaggregated estimates suggest that for adults aged 15-44 the negative effect is primarily in the other disease category and secondarily on diseases of the digestive system. The disaggregate estimates suggest that for adults aged over 60 the positive effects are associated with diseases of the circulatory system, respiratory system, and the other disease category. If stress from work increases the morbidity probability for diseases related to the circulatory system, then it may be that the nature of work undertaken by more-educated persons causes higher probability of circulatory problems when such individuals are aged over 60. But for prime-age adults such negative factors apparently are out weighed by the positive effects of education on health care, though in part these associations with education may reflect greater ability and motivation, good health-care habits, and better genetic endowments.
- **Education of Head or Spouse:** We find no evidence of an impact on these variables even in the health of children. This surprising result is in contrast to frequent conjectures about the importance of women's education in improving the health of other household members.
- **General Household and Community Environments:** The availability of decent toilet facilities, representing household sanitation, does not have much effect. Nor does local availability of governmental or private health facilities. The aggregate results indicate that travel time to the nearest town positively affects reported morbidity for adults. Thus there may be improvements in the morbidity experience for adults from transportation improvements that make the health facilities of municipalities more available to villagers. The disaggregated estimates suggest that these effects are concentrated by disease categories: respiratory diseases for adults aged 15-44, infectious and the other disease category for adults aged 45-60, and infectious diseases for adults aged over 60. For children, however, there is no evidence that travel time affects reported morbidity. In the aggregate estimates, living in a municipality is associated only with morbidity for children aged 0-4. The disaggregated estimates suggest that this effect is a little more robust for infectious and respiratory diseases than other diseases, which suggests a better health and health-care environment for infants and small children in municipalities than in villages. However, for adults the disaggregated estimates indicate higher incidences of reported morbidity in those living in municipal areas as follows: for respiratory diseases in adults aged 15-44, for endocrine and circulatory diseases (though lower for infectious diseases) in adults aged 45-60, and for endocrine disorders in adults over aged 60. A possible explanation is that adults, particularly in their occupations (since such effects do not seem to dominate for children), are more exposed in municipalities than in villages to causes of these specific types of morbidity.

SIMULATION OF FUTURE MORBIDITY PATTERNS

We used the foregoing estimates of morbidity determinants to simulate the number of individuals ill by disease types up to the year 2010. These simulations are partial in the sense that there can be no feedback of morbidity on the wealth, education or other determinants. They also assume that the relationships for 1985 will remain stable for the next 25 years without changes due to new health developments such as, for example, the apparent rapid spread of AIDS. Despite such limitations, the simulations should be of use in deciding the nature of possible future developments. We present two simulations, both based on recent NESDB population projections.

The first simulation is a reference simulation that assumes no change in the morbidity determinants except for the population total and age-sex composition (Table 2). Since the morbidity estimates vary by age and, to a lesser extent, by sex, these demographic changes by themselves imply changes in morbidity patterns. The total population increases from approximately 51.6 million in 1985 to 70.5 million in 2010, with all annual growth rate of 1.3 percent during this period. The number reported ill per month increases from 7.9 to 11.6 million, which implies an annual growth rate of 1.5 percent. The proportion of the population reported ill increases from 15.5 percent to 16.5 percent. The increase in the proportion of population with reported morbidity is primarily a reflection of the growing number of old people with relatively high morbidity, more than offsetting the reduction in the share of high morbidity for infants and children aged 0-4.

The age-sex compositional changes in the reference simulation also imply some changes in the composition of morbidity, in addition to an increase in the total morbidity rate. Not surprisingly, from the discussion of the incidence of diseases by age group above, this involves a shift from the infectious and respiratory diseases that dominate among children toward circulatory, endocrine, digestive and other diseases that have relatively greater incidence with age. The annual percentage growth rates of the numbers reported by disease categories in decreasing order of growth over the 1985-2010 simulation period are endocrine disorders 2.6 percent, diseases of the circulatory system 2.5 percent, diseases of the digestive system 2.0 percent, other disease 1.9 percent, diseases of the respiratory system 1.0 percent and infectious disease 0.9 percent. However, it should be noted that although the proportion of population who report morbidity due to infectious disease is declining over time, this category remains the disease group that afflicts more people than any other single specific disease group (though the residual other disease category overtakes infectious diseases in terms of total numbers after 1995).

The second simulation (Table 3) assumes that the educational attainment of adults increases by 1 percent, the proportion living in municipalities grows by 3 percent, and household wealth grows by 5 percent annually, all in addition to the age-sex changes in the reference simulation. This is a scenario assuming continuing social and economic development. In this case, in comparison with the reference simulation, the proportion of the population that reports morbidity within a one-month period is 14.1 percent in 2010. This rate of overall morbidity is 2.4 percent lower than in the reference simulation. This is equivalent to a reduction in those with reported morbidity of approximately 1.7 million individuals per month as a result of better living standards. This reduction is due primarily to a decline in those who would have suffered because of infectious diseases and the other disease category (each about 0.8 million) and, to a lesser extent, diseases of the digestive and respiratory systems (0.2 million for digestive and 0.1 million for respiratory diseases). But as a projected result of social and economic development, the numbers who suffer from the diseases of the circulatory system and endocrine disturbance are simulated to be slightly higher than in the reference simulation.

POLICY IMPLICATIONS

The policy implications of our study are several. First, unlike human resource investments in education, the pressure on resources for health investments is not likely to be reduced as a result of a lower population growth rate. In fact, the aging population that results from the lower population growth rate is likely to increase the incidence of overall morbidity and change its composition toward diseases that tend to be more difficult to prevent and more costly to contain or cure. Second, there are some determinants of morbidity that seem to have substantial effects at least for some age groups and some diseases that are amenable to direct policy influence. The most important of these policies seem to be increases in education

and reductions in the time cost (and perhaps other costs) of health treatment. Income/wealth increases that reflect indirectly a myriad of policies, in contrast, have fairly limited effects. Third, socioeconomic development broadly defined, nevertheless, apparently can offset the negative impact of the changing age composition on total morbidity and reduce the cost of such morbidity for a large number of individuals. At the same time, such development is likely to lead to gradual shifts in morbidity toward diseases associated with development, such as those of the circulatory system, that are more expensive to cure and more difficult to prevent. This trend seems inevitable, and the strategy to cope with its implications should be developed accordingly. Information about the prevention and detection of such diseases is not likely to be disseminated adequately from a social perspective by private entities, so there probably is an important policy role to facilitate such information dissemination for efficiency reasons. Also, there may be efficiency reasons for policy action of a preventive sort to the extent that the causes of these diseases reflect market failures, such as through pollution externalities (as opposed to individual effects such as stress associated with particular occupational choices). But such market failures are not likely to be as great for most of the diseases that will become of increasing importance as for the currently very widespread infectious diseases that are likely to become of lesser relative importance. Further, there are not likely to be efficiency arguments for public subsidies for curative measures for most of the diseases that are likely to become of increasing relative importance, though there may be distributional arguments that suggest subsidies for health insurance for the poor. Thus the change in the composition of diseases that is likely with aging of the population and with development may call for changes in the nature of a number of dimensions of health policies.

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