INFANT AND ADULT MORTALITY IN EGYPT: 1947-1980

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INTRODUCTION

Several attempts to asses Egyptian mortality data are available in the literature, these attempts clearly illustrate that Egyptian data suffer from inadequacies but they only provide preliminary estimates as to the true level of mortality in Egypt. The recent advances in the methodology of mortality estimation as well as the availability of new sources of information provide the opportunity for a more conclusive and in depth analysis of Egyptian data.

Three large and recent studies have attempted to provide such a thorough examination:Committee on Populatione and Demography (1982),El Tawila(1981) and Rashad(1981). Each study is quite detailed and comprehensive on its own, a fair description of the methodology and procedures used in each is too lengthy to be considered. A critical comparative analysis of the estimates of these studies is quite valuable. The sources of differences need to be specified and the agreements highlighted. Similar estimates of mortality measures using different procedures provide a solid reference set. Discrepancies between obtained measures point out to areas requiring further analysis.

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It is the purpose of this paper to critically analyze, combine and compare these estimates and present a full picture of mortality registration in Egypt. The paper is divided into three sections, the first presents the major apparent inconsistencies in Egyptian data, the second discusses the different sources of data and methods of analysis used and the third contains the detailed estimates of mortality and the main findings.

MAJOR APPARENT INCONSISTENCIES IN EGYPTIAN DATA

Both El Tawila (1981) and Rashad (1981) presented lengthy and detailed critical analysis of Egyptian data. The first study concentrated on the period 1962-1976 and the second dealt with the 1947-1976 span. A summary of the main findings is reported here.

In dealing with infant mortality ratse, the general declining trend is characterized by strong fluctuations. The most conspicuous is in the sudden increase between 1961 and 1962 (from 108% to 1345%), such an increase coincides with the start of a new system of administering vital statistics in Egypt reflecting more complete registration of deaths as well as the measles epidemic and the complications of this disease. The fluctuations in the rates are rather timid in areas where registration is expected to be of high quality (Cairo) and quite pronounced in areas with unfavourable characteristics (Upper Egypt).

The relation between post neonatal and neonatal deaths is totally unacceptable in Egypt since it ranges from almost 450% to more than 600% while comparable ratios in other countries[1] range from 50% to 150%. The smaller share of the neonatal component in the infant mortality rate implies a general under-registration of the neonatal deaths or a shift in the registration from the neonatal category to the post neonatal group.

Egyptian data may be further analysed using five different classifications[2]. The first includes the totally urban governerates of Cairo, Alexandria, Port Said and Suez. Lower Egypt. the area lying

between Cairo and Meditereanean and encompassing delta of Nile is divided into its two rural and urban components. Upper Egypt, mainly desert apart from a narrow strip of land surrounding the Nile, is similarly divided into rural and urban components. In terms of health, social services and general indices of civilization, the four totally urban governerates rank first, succeeded by the lower region and the least advanced is the upper region.

Contrary to expectations,the infant mortality rate is always lower in rural areas than urban areas; but the difference is slowly decreasing in time. Also, While the rates for Upper Egypt conform to normal expectation in that they are higher than the corresponding rates for lower Egypt; both lower and upper region rates are lower than those for Cairo and Alexandria. The neonatal rates for rural areas are less than half the rates for urban areas. The post neonatal rates for rural areas are again lower than the corresponding rates for urban areas but the magni tude of the difference is more reasonable. The obvious implication is that deaths of infants less than one month are grossly under-registered in rural areas, also deaths between one and twelve months are similarly under-registered but on a smaller scale. A detailed classification of deaths, within the first year, by age-days, weeks & months- is again unaceptable and supports the previous conclusion.

Inspecting the sex differentials in the infant mortality rates, we note that the usual picture of higher male than female infant mortality rates exists up to 1952, starting which female

infant mortality rates have consistently remained higher than male rates. This is true in all geographic classifications considered. This difference is higher in rural lower Egypt and Upper Egypt than Cairo and Urban Lower Egypt. Males and Female differentials in the infant mortality rate is almost of the same magnitude in both rural and urban Upper Egypt.

Some researchers have attributed this difference to male supremacy in the Egyptian culture which results in males enjoying better living conditions than females. Fergany(1976) have accepted that the previous justification may explain the sex differentials in adult mortality in some regions of Egypt; nevertheless he stated that"....since children in rural areas are breast fed for no less than a year and are subject to about the same environmental hazards. Hence, there is not much room for sex-determined differentiation in nutrition or health care.... In other words, that culture determined sex differential does not appear until different sex roles and life patterns evolve and become distinct". On the other hand a recent study in a rural area in Bangladesh have demonstrated a higher male mortality rates during the neonatal period, consistent with the evidence of higher male biological risk of death. This differential is reversed during the post neonatal period with female mortality exceeding that of males by as much as 50 percent. The latter relation was maintained through the childbearing ages.

In Egypt, the sex ratios of neonatal mortality rates are always higher than one implying a sex ratio of post neonatal rate considerably lower than one.

If higher female than male infant mortality is not accepted as a real feature of mortality in Egypt; what possible justification could explain the previous differential? The demographically accepted rule of the higher underregistration of female deaths than male deaths would result in lower female infant mortality rate. If under-registration of female births are higher than the corresponding males, and if such under-registration of births are not strongly connected with births that later died, this may result in the previous phenomenon; The sex ratio of registered births for total Egypt does not give strong support to the latter hypothesis as it is slightly higher than the accepted ratio. Neverthless, the sex ratio for Upper Egypt is consistent with the proposed explanation. The rural area in Upper Egypt gives unacceptable values for the sex ratio at birth and generally the rural region as a whole has consistently higher sex ratios than urban areas.

In studying the crude death rates and non infant mortality we note note that the sex and place differentials of non infant deaths portray a more plausible pattern which implies a much better registration of non infant deaths.

An attempt to choose the most appropriate pattern of registered mortality from the regional model life tables was not successful. If no under-registration or if equal under-registration of mortality exists, it is possible that the south model is appropriate, but the suitable level within this model moves between two extreme levels and implies a very low mortality for 1976 (higher than level 17) which is not very plausible. In addition, if we keep in mind that infant mortality is more likely underregistered than the mortality of the remaining age groups, one is more confused about the best age pattern of mortality.

DATA AND METHODS OF ANALYSIS

a- Estimation of Infant Mortality.

The latest three national censuses have been conducted in Egypt in 1947, 1960 and 1976. The 1947 census provides information on children ever born and surviving classified according to the age and marriage duration of the mother, this information permits the indirect estimation of infant mortality. Unfortunately, similar data are not published for the 1960 census. For the 1976 census, the relevant information classified by age have not been published but were available by special permission from the central agency of public Mobilization and Statistics.

The three studies used these two sources of information and applied modified versions of estimation of the basic procedure proposed by Brass(U.N.1967). The two modified versions proposed by Sullivan and Trussell(Committee on Population and Demography,1981) were used. The different estimates of infant mortality in these studies result from the fact that two studies resorted to the use of the age model of Trussell's version of the calculation procedure, While the third opted for the use of the average implied level of mortality of the Trussell and Sullivan versions for both the duration and age model.

In addition to population censuses, use was made of three surveys the first is a small sample survey conducted in 1972 covering three governerates form rural Lower Egypt(RLES 1972), the second is the National Fertility survey conducted in 1974

and 1975 (NFS,1974) which covers a large nationwide sample, the third large survey conducted in 1979 under the auspices of the National Family Planning Board covers a sample of the rural population only[3] (RFS,1979).

Rashad (1981) study makes detailed use of both RLES(72) and RFS (79). After evaluating the basic data and making sure that the error of omission of births pertaining to women in older age groups have not affected the data considerably,this study makes use of a third procedure of mortality estimation proposed by Feeny(Feeney,1980).Feeney's procedure has a built in allowance for changing mortality and permits the estimation of infant mortality corresponding to earlier time periods.Also, RFS(79) contains detailed information on the data of birth and age at death for each child and thus permits the direct calculation of infant rates. The final estimates of infant mortality are presented after scrutinizing all the obtained measures of under-registration and making sure that the estimates follow a plausible trend and shows acceptable internal consistency(in terms of sex or area differentials).

Both the committee on Population and Demography(1982) and El Tawila(1981) use data from NFS(74) as a check on their regional estimates of infant mortality.

b- Estimation of Adult Mortality.

The age distributions of persons in different census dates and the number of registered deaths classified by age are the basic data for estimating adult mortality in both the Committee on Population and Demography (1982) and Rashad (1981).

The Committee on Population and Demography (1982) adapted a new procedure developed by Preston and refined by others (Preston et al, 1980). This procedure assumes the stability of the age distribution as well as equal under registration of deathe over a certain age. Their analysis of the required data reveals a severe overstatement of the number of deaths at very advanced ages and they infer that deaths of persons whose age is unknown are reported at the ages above 70. This feature of death registration complicates the estimation procedure and requires a redistribution of reported deaths before applying proeston prodedure. As a result, no satisfactory corrections for completeness of registration on non-infant deaths are obtained by governerates.

Rashad(1981) uses the same basic data and the growth balance method(Brass,1975) to obtain estimates of adult registration for each governerates in 1947,1960 and 1976. For 1976, the application is performed seperately to rural and urban areas in each governerate.

Since both preston and Brass procedures for estimating adult registration are two different formulations of the same idea and requires the same underlying assumptions, one needs some justification why in the second study acceptable estimates of mortality registration are obtained.

The first explanation may be that the two different formulations react differently to various kinds of errors. Indeed while no comparative Study is yet available to indicate the robustness

of the provided measures to deviations from the underlying assumptions; Rashad (1978) provides a detailed investigation of the effect of age errors on the growth balance method and shows that this method is robust to simulated patterns of age misstatement. The second justification lies in the fact that for each application of the growth balance method, three methods of fitting the straight line (whose slope estimates the crude death rate)were used, the minimum implied under-registration was chosen. Whenever the estimated crude death rate was lower than the reported rate this was taken as implying 100% registration.

El Tawila (1981) uses two other methods of estimation. The first method (Fargues and Courbage 1979) uses the age and death distribution and assumes equal under-registration but does not reguire the stability of the age distribution. In principle, the basis of the method is that the knowledge of distribution of deaths by age and of a family of life tables to which this distribution could be related, makes it possible to deduce the true level of mortality from the relation between age structure of deaths and level of mortality. The Fargues & Courbage method was applied to both 1960 and 1976 data and gives very strong support to the hypothesis of misstatement of ages at death.

The second method uses the widowhood technique (Brass,1975 and conversion factors derived from RFS(79) to transform the current widowhood status from the 1976 census to information on the widowhood of first husbands required for applying the widowhood

Table (1)

Estimates of infant mortality rates for different time periods and geographical dessifications and the registered rates for 1947, 1962/63 and 1975.

	1946 - 47			1960 - 61		
	(1)	(3)	registered	(1)	(3) rural	registered rural
Cairo	186.4	186	186	151.0		
Alexandria	189.3	189	189	142.3		
Port-Said						
Suez		194	194			
Lower Egypt	203.6(a)			147.2	170(c)	109(c)
Damietta	134.0	134	134	89.8		
Daqahlia	206.2	123.6	129	149.5		
Sharquia	207.1	193.6	118	131.4		
Kalioubia	244.6	232.3	140	211.4		
Kafr El Sheikh	(b)	(b)	(b)	108.2		
Gharbia	190.1	173.8	114	147.4		
Menoufia	228.7	226.0	151	174.7		
Behera	169.0	161.2	104	124.8		
Ismailia	(b)	(b)	(b)	(b)		
Upper Egypt	259.0			225.0	188(d)	125(d)
Giza	265.8	248.6	156	207.3		
Beni Suef	284.9	269.6	104	263.2		
Fayoum	303.4	289.2	153	196.6		
Menia	287.9	272.9	123	237.9		
Assiyut	259.5	248.6	124	224.4		
Souhag	228.1	208.5	83	219.0		
Quena	237.0	225.8	84	237.8		
Aswan	210.0	190.2	111	204.1		
Egypt	213.4	202.1	134	168.4		
Rural						
Urban						

Cont.

Table (1) Cont.

Estimates of infant mortality rates for different time periods and geographical classifications and the registered rates for 1947, 1962/63 and 1975.

	1975 - 1976				
	(1)	(3)	registered	(2) males	(3) males
Cairo	113.7	114	117		121.0
Alexandria	98.6	100.6	94		108.5
Port-Said		91.2	68		100.8
Suez		128.3	93		136.5
Lower Egypt	98.6				
Damietta	93.9	96.2	71		99.6
Daqahlia	90.8	93.2	69		98.9
Sharquia	105.7	107.3	77		112.6
Kalioubia	123.5	124.1	108		131.1
Kafr El Sheikh	83.1	86.0	51		94.4
Gharbia	92.6	94.9	92		101.2
Menoufia	110.8	108.6	113		113.1
Behera	87.7	90.3	64		99.1
Ismailia	93.3	95.6	79		102.8
Upper Egypt	144.9				
Giza	122.4	123	103		130.1
Beni Suef	156.1	155.5	88		163.1
Fayoum	151.8	151.1	84		149.8
Menia	162.2	74.7	95		74.7
Assiyut	148.6	148.1	92		156.1
Souhag	134.1	134.2	79		140.7
Quena	153.1	152.2	70		165.5
Aswan	148.2	147.6	122		159.7
Egypt	117.5	118.4	89	145.1	125.6
Rural	122.8	123.3	80	153.0	130.7
Urban	111.0	111.4	104	136.2	118.3

Table (1) Cont.

Estimates of infant mortality rates for different time periods and geographical classification and the region rates for 1947, 1962/63 and 1975

	1975 - 76				1977
	(2) females	(3) females	(1) urban	(1) rural	(3) rural
Cairo		106.3	113.7		
Alexandria		92.2	98.6		
Port-Said		81.4			
Suez		119.4			
Lower Egypt			95.0	99.7	113
Damietta		92.2	80.0	96.6	
Daqahlia		86.9	70.8	95.7	
Sharquia		101.5	90.3	109.1	
Kalioubia		116.4	127.9	119.6	
Kafr El Sheikh		77.0	74.0	85.5	
Gharbia		88.1	90.1	93.6	
Menoufia		103.5	94.8	113.6	
Behera		81.0	84.6	88.4	
Ismailia		87.9	104.7	84.2	
Upper Egypt			126.9	152.6	140
Giza		115.3	117.4	127.4	
Beni Suef		146.9	135.0	162.6	
Fayoum		152.6	142.8	154.2	
Menia		74.6	136.5	168.5	
Assiyut		139.4	126.8	154.9	
Souhag		127.1	122.1	137.8	
Quena		138.4	128.4	160.7	
Aswan		134.7	142.4	153.1	
Egypt	123.2	110.4	111.0	122.8	125
Rural	129.9	115.1	-	-	
Urban	115.6	103.9	-	-	

(1) Source : Committee on Population and Demography (1983)
(2) Source : El Tawila (1981)
(3) Source : Rashad (1981)
(a) Damietta was not included in Lower Egypt in 1946-47
(b) Not a separate governorate at that date
(c) refere to 1962
(d) refers to 1963

Table (2)

Other Estimates of infant mortality rates corresponding to rural Egypt for different years.

	1956	1959	1962	1963	1965	1967	1968	1969	1970	1971	1972	1972 1973	1975	1977
rural Egypt									151			137	123	125
males									138			135		131
females									165			136		120
rural Lower Egypt	168	177	170		151	141	149	137		124		108		113
males									98			99		118
females									144			118		108
rural Upper Egypt				188		160		186				166		140
males				244		161		182				177		146
females				185		160		191				155		134

Source : Rashad (1981)

technique. We should point out that the basic ideas underlying the widowhood technique are quite different from those introduced in the three afore mentioned procedures for estimating adult mortality. Also no use is made of the age distribution of deaths which is affected by severe age misstatements.

ESTIMATES OF MORTALITY

a- Infant Mortality.

Tables (1) and (2) provide estimates of infant mortality rates for different time periods and geographical classifications from different sources along with the registered rates for 1947, 1962/63 and 1975.

As pointed out before the detailed estimates for 1946-47 are based on the same sources of data and a similar methodology. The fact that some of the differences between the estimates of two studies are not trivial should not cause any alarm, simply because the degree of under-registration in infant mortality implied by either study is too strong to make those differences appreciable. The reported infant mortality rates for the totally urban governerates are accepted as correct, those in Lower Egypt imply around 65% completeness of registration while those in Upper regions (except for Giza, Fayoum and Aswan) show less than 50% registration. It is reassuring that the estimated infant mortality rates for governerates in Upper Egypt are almost always higher than those in Lower governerates. The same remark applies to those in Lower Egypt as compared to urban governerates.

For 1960-61, the estimated rates for rural Lower Egypt based on different surveys,are consistent with the estimates provided using census data. The decline in infant mortality rates between 1947 and 1960 from 213.4 to 168.4 and also the regional differentials portrayed by the estimates seem plausible.

The agreements of the estimates provided using different sources of information and methodologies is most apparent in the 1970's. The estimated rate for rural Egypt in 1977 and 1975 is 125 and 123 respectively. These estimates are obtained using RFS (79). The corresponding estimates using 1976 census are 122.8 and 123.3. A similar agreement is portrayed for rural Lower and Rural Upper Egypt. The rates summarized in table (2), especially the second row referring to rural Lower Egypt are obtained using two different sources of data RFS(79)and RLES (72), a fact that is hardly noticeable considering the smooth declining trend from 1950 to 1977. The estimated rates show higher rural than urban mortality, a high infant mortality rate for Upper Egypt which is comparable to the rates in Lower Egypt fifteen years earlier. The rates for Lower Egypt are slightly lower than those in Cairo.

The decline in the infant mortality rates from 1946-47 to 1975-76 is appreciable. The improvement in registration for Egypt is from around 66% to 75%. The implied average registration for Lower and Urban governerates is over 80% in 1976,but the upper region enjoys only 68% average registration.

The relation between male and female mortality is still controversial. The implications of the 1976 census results for a higher male than female mortality,but the results summarized in table (2) do not back this conclusion. It may be true that female mortality exceeded male mortality in earlier time periods and that this excess mortality is vanishing.

- Adult Mortality

The Committee on Population and Demography (1982) concluded that: "from 1936 to 1944, male deaths above age 10 were under-registered by about 5 percent, and female deaths by about 10 percent. From 1947 until 1960, death registration deteriorated, with completeness in the mid 1950's falling below 60 percent for males, and below 50 percent for females but recovering after 1960 to about 100 percent for males, and 85 percent for females."

Rashad(1981) presented estimates of adult mortality registration for seperate governerates in 1947,1960 and 1976. For 1947 the average implied male adult registration for Cairo and Alexandria is 79% and is equal to 92% and 74% for Lower and Upper Egypt respectively. The corresponding registration for females are 97%,93% and 62%. The overall implied under-registration is 26.5%. For 1960,the registration of both female and male mortality is complete in both urban governerates and Lower Egypt and suffers 6% under-registration in Lower Egypt. For 1976 both male and female adult data reflects complete registration.

El Tawila (1981) concludes that there is a complete registration of male adult mortality in 1976.

Thus, while the degree of adult mortality under-registration in 1947 has not been confirmed and there is a disagreement between Rashad (1981) and the Committee on Population and Demography (1982) on wether female adult registration is still incomplete. The three studies clearly demonstrate that male adult restration is currently complete in Egypt.

NOTES

1- Based on data from 18 Countries which took part in the World Fertility Survey.

2- The Frontiers classification is not included.

3- Data from the most recent Fertility Survey Conducted in 1980 in collaboration with the World Fertility SUrvey have not been available for this analysis.

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