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# **Rising Mortality Rate in Andhra Pradesh: Towards a demystification**

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Progress in medical or health care technology and development of health care sector (public and private) along with improving human security over time has resulted in reduced mortality rates and thereby increased the life expectancy in years. The common factors responsible for death include biological aging (senescence), predation, malnutrition, disease, suicide, murder and accidents or trauma resulting in terminal injury, natural calamities and disasters, and catastrophes. Of these, death due to biological aging is age-dependent component of mortality since human life is not immortal. The rest of the factors are age-independent factors of mortality, which could be controlled with the advancement of health care and human security measures. Hence, despite no escape from the age-dependent component of mortality, technology and resources can always influence the age-independent component of mortality which in turn lowers the mortality rates.

Therefore, one usually observes the declining mortality rate in response to socio-economic development. But that doesn't necessarily mean more advanced countries/regions to have mortality rates lower than the less advanced ones. It is so because of the age-dependent component of mortality. Herein one has to note the role of demographic transition which skews the age structure in favour of the old leading to rising mortality rate. One can observe death rates in more advanced countries being relatively higher than that of developing countries – for instance, crude death rate in UK (10.02) and USA (8.38) in 2009 are higher than those of India (7.43) and China (7.06) (CIA World Fact Book, 2009).

With the said pre-text, this is an effort at explaining the reasons and rationale behind the rising mortality rate (CDR) in the South Indian State – Andhra Pradesh. Although the state's performance in socio-economic sphere seems to be not that impressive, its performance in

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demographic transition during the last two decades is undoubtedly distinct, especially among Indian states. In addition, Andhra Pradesh has also been witnessing mushrooming of private medical care centres ranging from tiny clinics to corporate hospitals, especially during last two decades. Most notable ones are the state initiatives of Emergency Medical Service (EMS) – popularly known in the state as ‘108’ services, witnessing evolving pre-hospital care integrated with definite health care and *Rajiv Aarogyasri* (RAS), a health insurance scheme to cover the catastrophic health expenditure of BPL families.

In Andhra Pradesh, as on date, there are about 700 ambulance vehicles with trained technical staff/para-medical staff to provide emergency medical service round the clock, functioning from nook and corner of the state. Under the EMS system during 2010, about 11.33 lakh patients were transported (GoAP, 2012). These EMS definitely had an impact on the access to emergency medical services.

*Rajiv Aarogyasri* (RAS) is a flagship programme/scheme of all health initiatives of the Government of Andhra Pradesh with a mission to provide quality healthcare to the poor. It was initiated during the mid-2000s (on 01.04.2007) and is being implemented by the state Government through Aarogyasri Health Care Trust. After a pilot based implementation it was extended to the entire state in a phased manner to cover total eligible population (BPL) across 23 districts of the state. The scheme is to enable the poor to access health care services which otherwise remained beyond their reach owing to the rising cost of private health care. The RAS scheme was implemented in two streams. One is the Insurance Scheme under which about 8.75 lakh surgeries costing Rs.2554.99 crores cumulatively were done till September, 2011. The other one is Aarogyasri Trust Scheme, which is directly run by Trust itself, under which 3.38 lakh surgeries costing Rs.817.41 crores were done (up to September,2011). Both the schemes provide end-to-end cashless services for identified diseases through a network of hospitals from Government and private sector (GoAP, 2012).

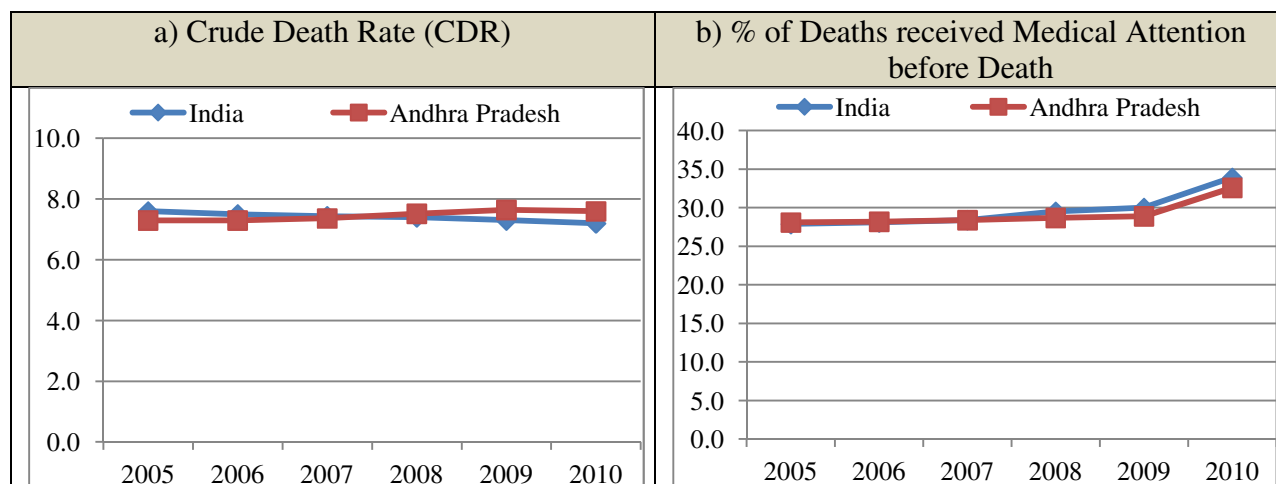
One would think that these initiatives might have reduced both the morbidity otherwise not attended leading to mortality and likely mortality of those cases with medical urgency otherwise not received any medical attention.

## Rising Mortality rate

Despite all these developments taking place in the state, it is alarming to note that the mortality rate – i.e. crude death rate (CDR), of the general population in the state witnessed a rise during the last half-a-decade period (between 2005 and 2010) as against declining trend at the national level. Although both the rise of CDR in Andhra Pradesh (AP) and decline at national average is marginal, AP trend otherwise below the national average, is rising above it in the recent past (Figure 1a). Moreover, Andhra Pradesh is having sixth highest death rate (CDR) among 21 major Indian states – next to Odisha, MP, Assam, UP and Chattisgarh. This again is with a distinction of the rise in the percentage of deaths that received medical attention before death in the state as well as at the national level (Figure 1b).

Official sources claim that the initiatives of EMS ‘108’ services and RAS have reduced the mortality and morbidity rate in the state. Such claims lead to apprehension and dismissal of the estimates of SRS for the state especially in case of infant mortality rate (IMR).

**Figure 1: Death Rate and Percentage of Deaths received Medical Attention before Death in Andhra Pradesh and India**



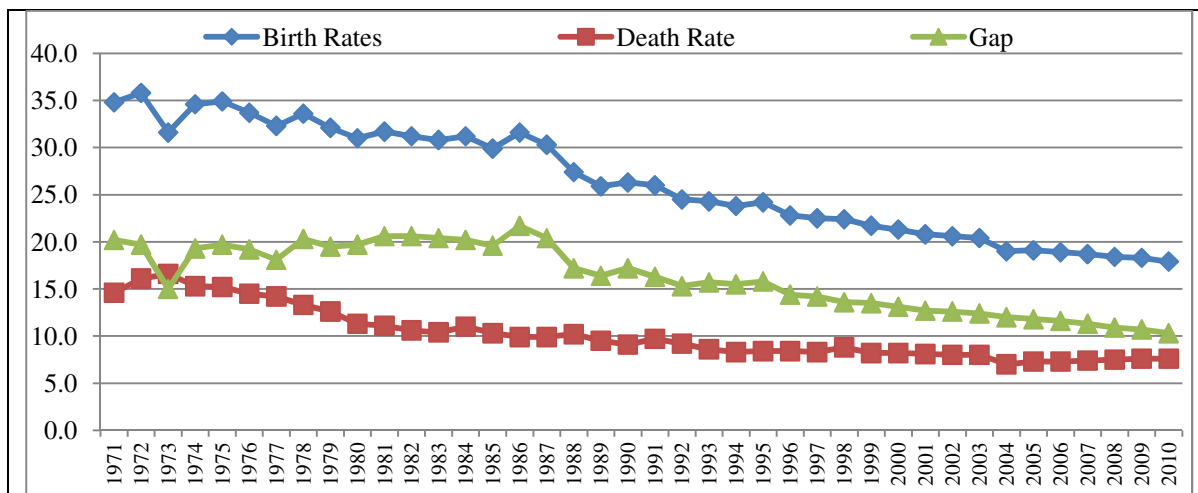
**Note:** 1. CDR – deaths for 1000 population in a year; 2. Medical attention including private and public medical care units.

**Source:** Sample Registration System, Registrar General of India, New Delhi.

One has to note that there are two components of mortality rate: Age-dependent and age-independent. Age-dependent component of mortality rate increases with the increasing old age (say 60 + age) population. On the other hand, age-independent component of mortality rate is shaped by a host of factors such as access to health care, nutrition etc. Thus, the crude death rate

as defined above and computed for the general population sometimes may offer misleading impression. The crude death rate depends on the age (and gender) specific mortality rates and the age (and gender) distribution of the population. For instance, the number of deaths per 1000 people can be higher for developed nations than in less-developed countries, despite life expectancy being higher in developed countries due to standards of health being better. This is because of age structure/distribution wherein developed countries typically have a completely different population age distribution, with a much higher proportion of older people, due to both lower recent birth rates and lower mortality rates.

**Figure : Trend in Birth and Deaths in Andhra Pradesh**



**Note:** 1. Both/Deaths rates are per 1000 population; 2. Gap is points of difference between birth and death rates (Gap = CBR-CDR).

**Source:** SRS, RGI, New Delhi.

Demographic transition process has four stages involving an initial stage represented by high birth rate and high death rate which moves to a second stage wherein the death rate declines without any response in the birth rate. The decline in death rate is faster than that of birth rate resulting in an increasing gap between the two. In the third stage while the response in the birth rate is seen with decline in both and later they reach a kind of convergence wherein the growth of population gets stabilized. This phenomenon has its resultant observed in the age structure of the population which transforms itself from a larger base population Pyramid to Cylindrical or a reversed Pyramid widening on the top. In the fourth stage, gap between birth and deaths rate gets closed and death rate would tend to rise over the birth rate.

In this transition model, Andhra Pradesh appears to be in third stage. The demographic transition witnessed in the state during the last two decades with the declining fertility rate (TFR) below replacement level (1.8) stand for the case. Therefore, the rise in death rate in the state in the recent past could either be attributed to the pace and pattern of demographic transition or one has to look for state-specific factors responsible for the rise in mortality rate.

### Rise in Aging Population

The increase in size and proportion of old-age in the total population of the state also indicate such a change. The declining fertility rate leading to low rate of growth of population resulted in changing age structure/distribution of the state population. Consequently it has led to faster growth of old age population especially during the last decade (Table 1). Greater share of old-age population, with death rates higher than other age-groups, owing to age-dependent factors of mortality tend to increase overall death rate (CDR).

**Table 1: Size and Growth of Old age (60+) Population**

Year	All-India			Andhra Pradesh			
	Population	Growth	% in TP	Population	% in India	Growth	% in TP
1981	43.2 M	2.8	6.3	3.5 M	8.2		6.6
1991	56.7 M	2.8	6.7	4.5 M	8.0	2.4	6.8
2001	70.7 M	2.2	6.9	5.5 M	7.7	1.9	7.2
2011*	98.5 M	3.4	8.3	7.7 M	7.8	3.5	9.1

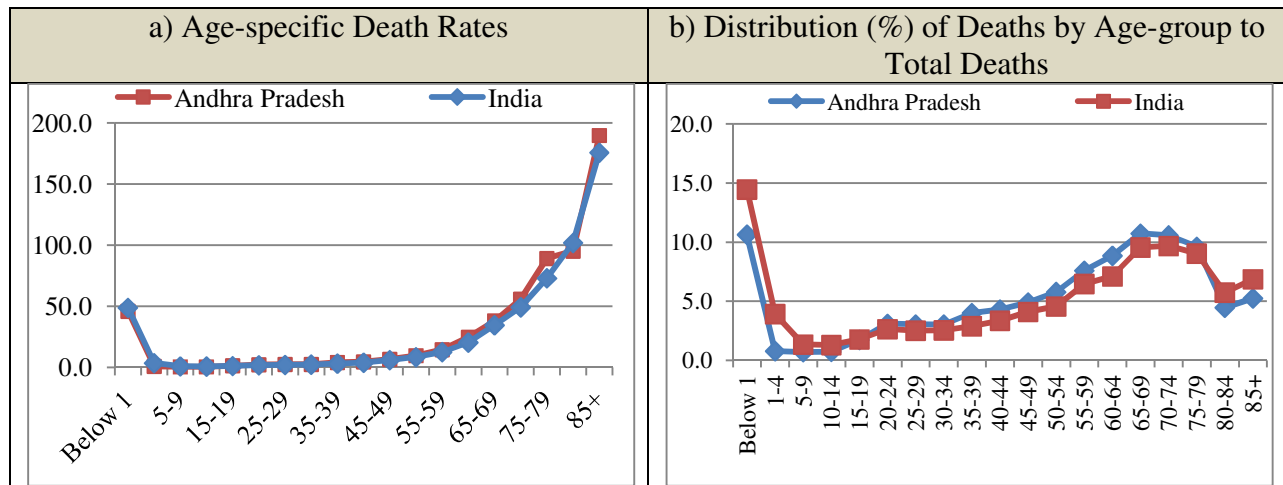
**Note:** \* Projections; **M** - Population in millions; **Growth** is compound annual growth rate (CAGR); **TP** – Total Population; **% in India** – Percent of aged (60+) population in AP to the total aged population in India.

**Source:** Census of India.

The age-specific death rates indicate that for Andhra Pradesh it is relatively higher among the old-age groups when compared to that of national average (Figure 2a). Also, the age distribution of deaths in the state indicates the contribution of younger age groups in Andhra Pradesh is lower than that of all-India average, whereas among adults and old-age groups it is other way round - the contribution of these age-groups in the state is higher than that of national average.

It can also be observed that there is increasing contribution of adult deaths to the total deaths in the state. While the percentage of deaths in the younger age groups (below 20 years) has declined during the last decade (between 1999 and 210), the contribution of adults (between 20 and 60 years) as well as that of old ages (60 and above years) has increased (Figure 3).

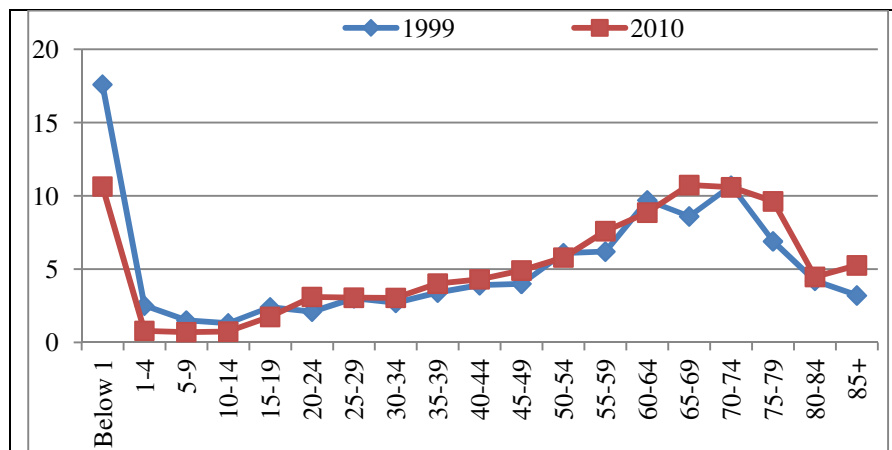
**Figure 2: Age-specific Death Rates and Distribution (%) of Deaths by Age groups in Andhra Pradesh and India, 2010**



**Note:** Age-specific death rate is no of deaths per 1000 population in the specific age group.

**Source:** Sample Registration System, Registrar General of India, New Delhi.

**Figure 3: Changing Distribution of Deaths in Andhra Pradesh during 1999-2010**



**Note:** Distribution of Age-specific deaths to total deaths.

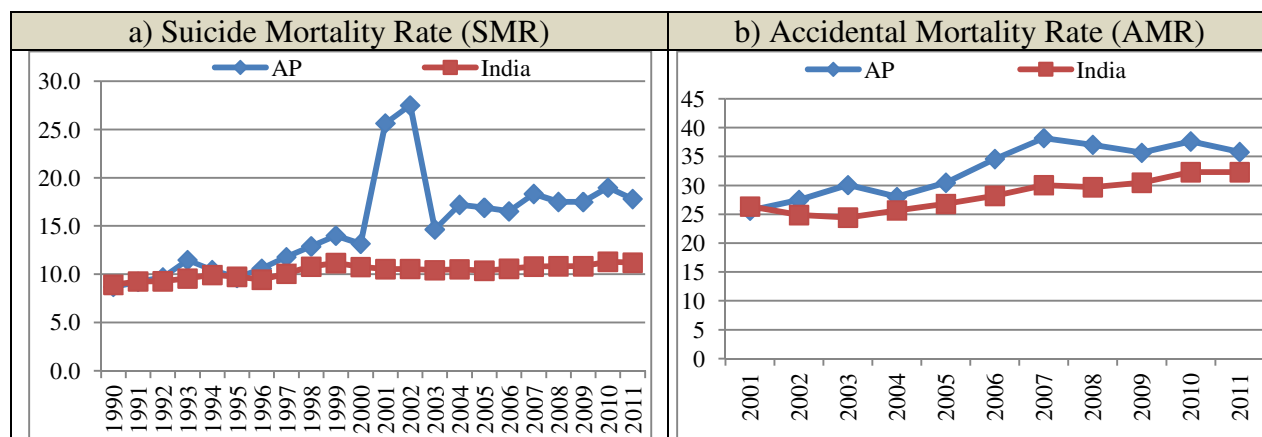
**Source:** SRS.

Along with the age-dependent factor, there are many other age-independent factors that affect the mortality rate. For instance, infant or child mortality rate tend to decline over time depending on the level of overall development of a country/state/region and the access to medical care and nutritional levels of mother and child. Similar could be the case of adult as well, but increasing share of adult deaths in the total deaths is something to ponder over.

## Rise in Suicide and Accidental Mortality Rate

Among the age-independent factors of mortality suicidal deaths could never respond to improved health care scene rather than being a reflection of unstable socio-economic conditions. Similar is the case of accidental mortality rate but accidental deaths are associated with the emergency medical care, on the spot and transit to definite care. Both the suicide and accidental mortality rates (SMR/AMR) in Andhra Pradesh as well as at All-India level are increasing. But this rate of increase in Andhra Pradesh is higher than that of national average (Figure 4a and 4b). Also, it has to be noted that the share of suicidal and accidental deaths to the total deaths in the state as well as at the national level is rising. While suicidal deaths contribute to 2.5% of total deaths in the state, the contribution of accidental deaths is around 5% in 2010.

**Figure 4: Suicide and Accidental Mortality Rate (SMR&AMR) in Andhra Pradesh and India**



**Note:** Suicide/Accidental Mortality rate – No of Suicide/Accidental deaths per lakh population.

**Source:** Computed based on National Crime Bureau Records (NCRB - <http://ncrb.nic.in/adsj/main.htm>) and Census of India and Sample Registration System (SRS) of RGI.

Suicidal deaths include those of farmers and those incidents occurring in the context of Telangana agitation. These are the two state-specific factors that might have magnified the SMR in the state. Especially episodes of farmers' suicides relates to the context of agrarian crisis associated with the new economic policy regime since mid-1990s. The spike in SMR during early 2000s clearly indicates the context. Suicidal mortality is a, age-independent factor and therefore has no bearing with the improved health care rather than the adverse socio-economic milieu prompting individual to choose untimely death.



A plateau observed during the last few years, with respect to accidental mortality rate in the state could be because of the increasing emergency medical services (EMS) through round the clock '108' ambulance with one or two paramedical staff.

### **Disease burden and mortality**

Apart from this rare form of suicidal and accidental deaths, the role of morbidity/disease burden on rising mortality rates cannot be overlooked despite the recent advances in provisioning of health care in the state. Although most of the devastating epidemic of communicable diseases has literally disappeared with the advancement of health care technology and public health care, emergence of new forms of communicable diseases are posing challenge to health in general and public health in particular. About thirty new infectious diseases have been reported over the last two decades worldwide. Amongst them HIV/AIDS is prominent (Gupte et al, 2001). Several infectious diseases once eradicated have re-emerged and become major public health problems. Significant among them are tuberculosis, malaria and diarrheal diseases (Ibid). Among the communicable diseases (CD), most prevalent are acute respiratory infections, acute diarrheal diseases, tuberculosis, malaria etc. Tuberculosis is the most prevalent with greater fatality. Tuberculosis has been endemic to India for centuries and continues to pose a major public health problem. Even today India bears nearly 25% of the global burden of tuberculosis (Ibid). In Andhra Pradesh there are 1.2 lakh cases already registered (for DOTS) prior to 2009 and 0.5 lakh new cases of tuberculosis are found in 2009. There are about 6 thousand deaths due to tuberculosis. Andhra Pradesh contributes around 10% of total TB cases in India (See National Health Profile 2010).

The prevalence of HIV/AIDS in the state is such that it was second largest in number of cases/people affected with HIV/AIDS. Moreover, according to NFHS III in 2005-06, Andhra Pradesh has the highest prevalence rate, 0.97% of 15-49 age groups (0.75% and 1.22% for females and males respectively) among Indian states, next to Manipur (APHDR, 2008). Recent NACO estimates for the year 2009 shows that in Andhra Pradesh there are around 5 lakh HIV/AIDS cases and 36 thousand deaths that are related to the disease, each comprising 21% of such cases at all India level (See NACO, 2012).

Further, non-communicable diseases (NCDs) are taking precedence over communicable diseases. Prevalence of non-communicable diseases associated with changing life-styles, is also widespread. Most prevalent among NCDs are Rheumatic/coronary heart/cardiovascular diseases, diabetes, trauma, hypertension, cancer etc. Heart disease, hyper tension and diabetes cases are increasingly over time. According to Integrated Disease Surveillance Project (IDSP) survey in 2007-08, there are about 7.5% of respondents diagnosed with hypertension and 2.2% diagnosed with raised sugar levels (Diabetics) (see IDSP, 2009). Along with these cancer too is a leading cause of mortality. About 12% of all deaths in the world are attributed to cancers of various forms (Gupte et al, 2001). Most of these non-communicable diseases have fatality implications depending upon the availability, affordability and accessibility to health care.

### **Concluding Remarks**

The rising overall mortality rate (CDR) in the context of declining infant and child mortality rates and advancements in health care sector in general alongside the state initiatives in health care in the form of EMS and RAS in particular offers a puzzle to be resolved. While this may be premature to attribute it to population aging, the alternative explanation could be rise in adult mortality. This is somewhat validated by the age-specific share of deaths in the state which dominates the national pattern across the adult ages. The supposed response of improved health care provisioning in the state might have a lagged response if any and may not necessarily reflect in immediate terms

In sum, the typical pace and pattern of demographic transition witnessed in the state could perhaps be responsible for this scene of rising mortality levels in the state. The pace of demographic transition in the state of Andhra Pradesh is undoubtedly fast and leaves very little breather for other dynamics to respond to it from within. This could therefore be shown as an adverse instance of undue pace of demographic transition which has umpteen connotations for ill-being apart from survivorship. Besides, the rising suicidal and accidental mortality rate (SMR/AMR) is alarming and its contribution to the rising overall mortality is considerable. It might also be, partly, contributing for rising mortality rate in the state. At the same time, one cannot overlook the role of disease burden - morbidity causing mortality, in this respect. Although most devastating epidemics have disappeared, some of the fatal disease often re-emerges. Besides, new forms of communicable/infectious diseases such as HIV/AIDS are posing

a challenge to public health care and contributing to adult mortality. Moreover, increasing incidence and prevalence of cases with fatal non-communicable (NCD) diseases such as those related to heart, hypertension, diabetes, cancer etc. is witnessed in the state. Indeed the state is representing greater vulnerability when compared with the national level in numerous aspects detailed above. Therefore, one cannot rule out the role of increasing disease burden on rising mortality rate in the state.

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