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ARTICLES

Pre-tsunami and Post-tsunami Mortality in Galle District

MANORI KALUTHANTIRI

Introduction

The main objective of this study is to examine the mortality implications after the tsunami disaster in Galle District in Sri Lanka. The study examines what changes can be observed in relation to mortality behavior among tsunami affected population in the district when compared to pre-tsunami situation in the district. Although Sri Lanka has been experiencing gradual changes in mortality and fertility as predicted by the demographic transition theory, this natural disaster may have produced some imbalances with regard to both levels and patterns of fertility and mortality in the affected areas.

In Sri Lanka, the District of Galle was amongst the worst affected districts by the tsunami disaster. The official records indicate that 1142 villages in 13 districts were affected by the tsunami disaster on 26th December 2004. This was the major natural disaster experienced by the country in its recent past. Although natural disasters like cyclones, floods and earthquakes had occurred earlier, they were not as dangerous as this one. Therefore, people of Sri Lanka were shocked and the Government also was unable to bear such a big disaster on the spur of the moment. Several people died, injured and also their resources were destroyed. Most of the resources such as buildings, infrastructure, houses etc, were damaged due to the disaster. This has affected mainly the coastal areas of the island. (Table 1)

Table 1: Impact of Tsunami Disaster 26th December 2004

District	No. of Families Affected	No. of Families Displaced	Number Displaced			No. of Deaths	No. Injured	No. Missing
			In Camps	With Friends & Relatives	Total			
Jaffna	13,485	10,640	11,360	28,760	40,120	2,640	1,647	540
Mullaitivu	2,295	318	305	1,298	1,603	560	670	1
Kilinochchi	n.a.	6,007	11,993	10,564	22,557	3,000	2,590	552
Trincomalee	30,130	27,746	19,915	62,084	81,559	1,078	n.a.	337
Batticaloa	63,717	12,494	26,889	35,957	62,846	2,840	2,375	1,033
Ampara	38,624	n.a.	73,324	n.a.	73,324	10,436	120	876
Hambantota	16,991	3,394	574	17,168	17,742	4,500	361	963
Matara	20,675	2,904	3,202	8,996	12,198	1,342	6,652	613
Galle	23,174	1,472	4,507	123,247	127,754	4,216	313	554
Kalutara	6,905	6,905	3,261	24,452	27,713	256	400	155
Colombo	9,647	5,290	5,812	25,885	31,693	79	64	12
Gampaha	6,827	308	876	573	1,449	6	3	5
Puttalam	232	18	66	n.a.	66	4	1	3
	232,677	**79,431**	**161,684**	**333,984**	**500,666**	**30,959**	**15,196**	**5,644**

Source: http://www.cenwor.lk/Tsunamistat.html
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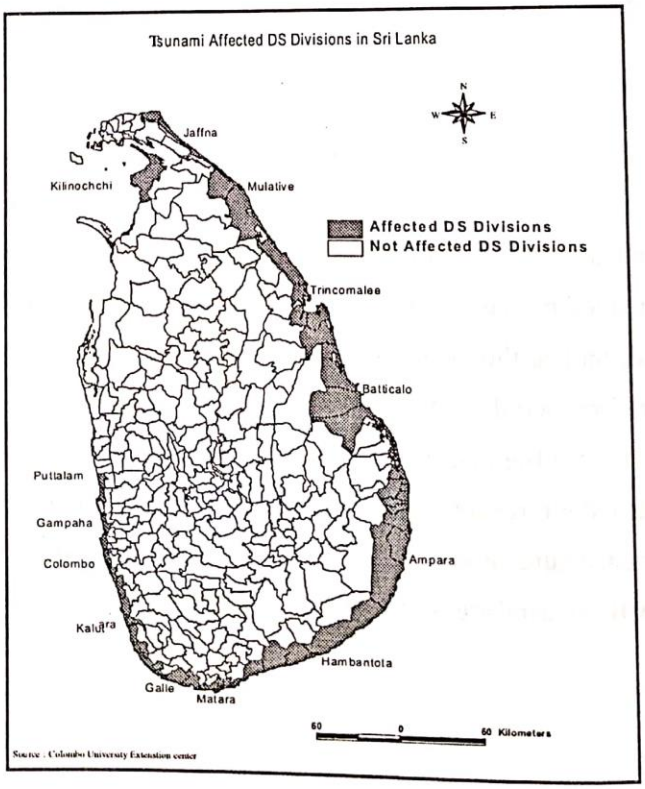
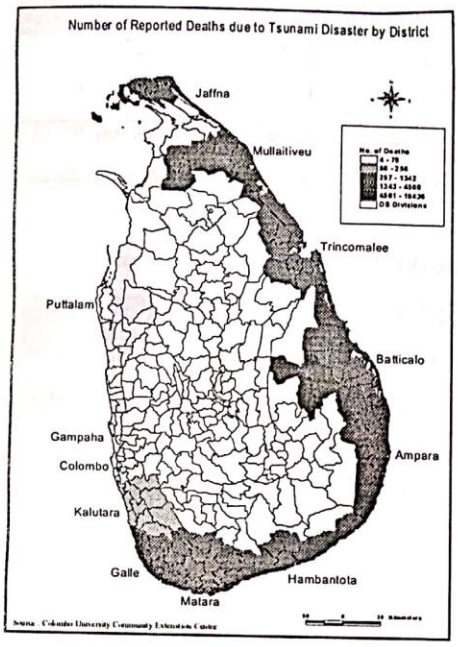
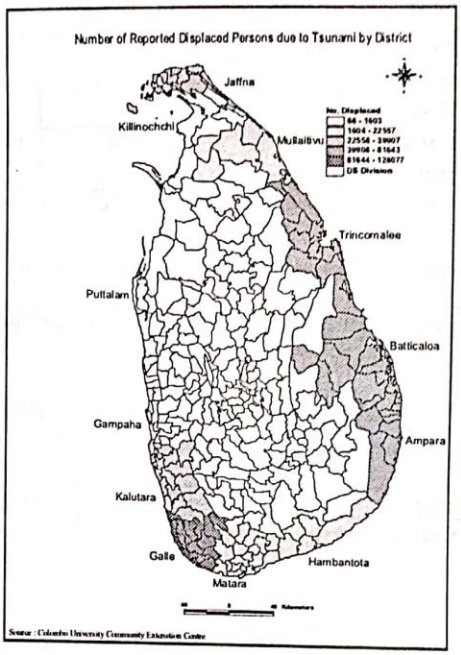
Map: 1







A total of 132 Grama Niladari (GN) divisions out of a total of 363 in six Divisional Secretariat (DS) divisions in Galle district were affected. (Map 1) According to the official statistics, 4,200 died from the tsunami with over 550 missing, almost 130,000 persons displaced and around 13,645 houses were either partially or completely damaged in the district. (Maps 2 & 3) Tables 2 and 3 exhibit the severity of the damages caused in Galle District.

Table 2: Extent of damage by GN Division in Galle District

DS Division	Ambalangoda	Balapitiya	Bentota	Galle Four Gravets	Habaraduwa	Hikkaduwa
Affected GN Divisions	04	21	08	22	28	53
Damaged houses	595	2574	46	2066	2668	5696

Source: Survey by Department of Census and Statistics, 2004/2005

Table 3: Population in the affected Census Blocks before and after tsunami

Number of GN Divisions		Number of Census Blocks		Numbers of persons in affected census blocks		
Total	No. affected	Total	No. affected	Before disaster	Presently within the GN Division	Presently outside the GN Division
363	132	792	488	114,533	89,657	24,992

Source: Survey by Department of Census and Statistics, 2004/2005

Rationale

The number of people affected by natural disasters in the world appears to have increased considerably over the past few decades. There is also evidence that the costs of natural disasters have accelerated in recent years. The fact that rapid demographic and economic growth patterns have disturbed the balance between ecosystems has, in turn, increased the frequency or severity of some natural disasters, such as floods and droughts. Developing countries, especially their most densely populated regions, suffer the brunt of natural disasters. Between 1990 and 1998, 94 percent of the world's 568 major natural disasters and more than 97 percent of all deaths related to natural disasters were in developing countries. In Bangladesh alone, three storms, four floods, one tsunami, and two cyclones

killed more than 400,000 people and affected another 42 million during this period. In southern Africa in 1991-92, Malawi, South Africa, Zambia, and Zimbabwe experienced severe droughts. In Latin America and the Caribbean, major natural disasters associated with El Nino, Hurricane Mitch, Hurricane Georges, and the Quindio earthquake in Colombia claimed thousands of lives and caused billions of dollars of damage between 1995 and 1998. In 1998, severe flooding of the Yangtze River caused devastation in China and a large earthquake occurred in Armenia. Another long series of disasters struck in 1999 – a major earthquake in Turkey, a cyclone in Orissa, India, floods in central Vietnam, torrential rains and catastrophic mudslides in parts of Venezuela and floods in Mozambique. (Sinha, 2006)

The massive impact the Asian tsunami had on people living there and on the environment has been outlined in the first big report on the disaster. The United Nations report on the tsunami disaster states that around 250,000 people died, describing the 26th December tragedy as "among the worst in the history".

In Sri Lanka, about 31,000 people who died from the tsunami disaster which affected 13 districts. Although natural disasters happen in various ways, ultimately it directly affects the livelihood of people. Therefore, it is very important to study the implications of such natural disasters. Such a study will unearth some important reasons behind demographic implications, which will have a great bearing on the affected people. It will also be very useful to policy makers to reduce the disaster effects and uplift the lives of the affected population in various ways.

Study Area

The focus of this study is Galle District, located in the wet zone of the southern part of Sri Lanka. This is one of the three districts in Southern Province in Sri Lanka. It has 18 DS divisions and 895 GN Divisions. A total of around one million people reside in an area of approximately 164,000 hectares, with a coastline of 73 kilometers making it ideal for supporting a thriving tourism industry. The Galle District has received its name from

the historical port town of Galle which is located on the southern coastal tip of Sri Lanka, 116 km (72 miles) south of the capital, Colombo.

According to the census of population conducted in 2001, the total population enumerated for Galle district was 990,487. The ratio of the sexes was 94.7 females to 100 males. The people, by and large have lived in the district and this is attributed to its close proximity to the district of Colombo.

Theoretical Perspective

An increase of death rates in unpredictable situations can be seen everywhere in the world at any moment of time either due to natural or man-made disasters. According to Cox (1993), mortality will differ according to environmental factors such as climate and whether and due to political conditions which can lead to a war situation. Environment factors influence individual mortality and it will then influence the normal death rate in a country. In developed countries, mortality is low and they are maintaining a low stationery level. Although death rates are stationing at a low level, natural disasters can still have a great influence to increase the death rate.

Malthus (1978) described two categories of checks on population. They are;

1. Positive checks: related to cause of death and an increased death rate. These include poverty, disease, epidemics, famine and war
2. Preventive checks: on birth rate. These include 'improper arts' such as abortion

Although the Malthusian theory dropped from favour during the 19th century, interest has revived in recent years because of the relationship between population growth in developing countries, the wastage of natural resources and concern over food supply. In fact, sudden deaths occurring due to disasters like tsunami disaster in December 2004 lead us to revisit the Malthusian theory since he has made an emphasis on how natural disasters can act as a check on population growth in a country.

Sri Lanka's pattern of mortality before 1945 exemplifies the Age of Pestilence and Famine. Many of the peaks and high plateaus of mortality observed were due to the epidemics, which recurred periodically throughout this period. (Dissanayake, 2003) He has explained this situation with the use of Omran's theory of epidemiological transition. This provides a unique opportunity to understand mortality and epidemiological situation during a disaster period which is characterized by peaks in mortality levels.

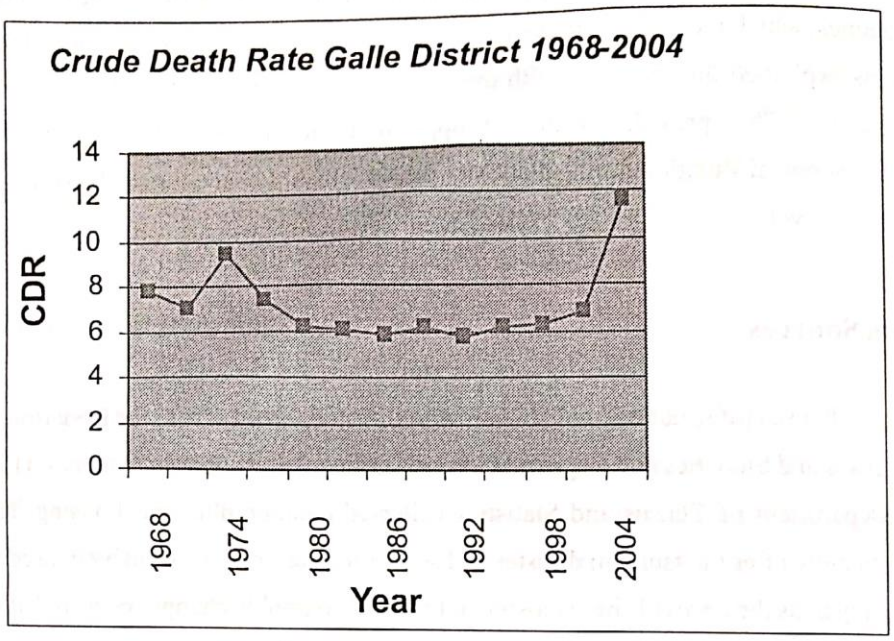
Data Sources

This study uses information available on mortality and fertility from the Department of Census and Statistics and Registrar Generals Office. It is important to mention that the Department of Census and Statistics collected demographic and housing data immediately after the tsunami disaster and such information was extensively used in the analysis as they provide better insight into the demographic changes occurred after the disaster. Although there are many sources which provide information on demographic patterns, it was decided to use data available from the above sources as the Department of Census and Statistics and Registrar Generals Department so far have proved they possess reliable information on population characteristics.

Mortality from 1968-2004

Figure 1 shows how the tsunami disaster affected the mortality situation in Galle district. This provides a unique opportunity to understand the severity of the disaster and also its implications on the mortality level. It shows the number of deaths in Galle District from 1968 to 2004. Crude Death Rate in Galle district was oscillating around 6 deaths per 1000 population from 1980 onwards, a trend very similar to the national level of mortality. The figure shows how the tsunami disaster affected the mortality level in the district. It is clearly visible that the crude death rate increased in an unpredictable manner with the tsunami disaster. In fact, mortality has increased more than any level observed during the past 25 years.

Figure 1: Mortality with the tsunami disaster in Galle District



Age specific mortality in the district before the tsunami disaster

It is quite interesting to observe the age specific mortality rates before the tsunami disaster since it provides a unique opportunity to compare that with the post-tsunami mortality and see how much impact this natural disaster has had on the mortality pattern in the district. The age-specific mortality among infants and older people is comparatively high. However, there is a clear differentiation by gender, especially at young ages. In general, the mortality of males is higher than that of the females in all age groups. Figures 2 and 3 show the male and female age specific mortality rates in the absence of tsunami disaster, depicting that it follows the usual pattern in any low mortality community in the world.

Figure 3 : Age - specific mortality rates for males, Galle District, 1981, 1991 & 2001

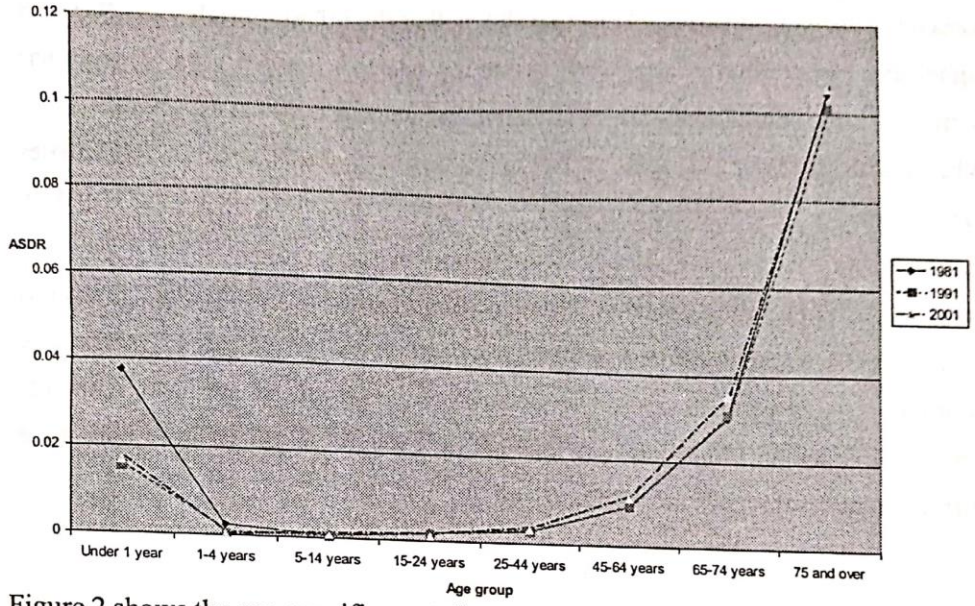


Figure 2 shows the age-specific mortality rates for males in Galle district from 1981-2001, a trend during a 20 year time period. It clearly shows that age specific mortality rate is high for infants and then gradually it has decreased. However, with the ageing effects observed in the Sri Lankan population, there is a slight increase in adult mortality in the year 2001.

Figure 3 : Age -specific mortality rates for females, Galle District, 1981, 1991 & 2001

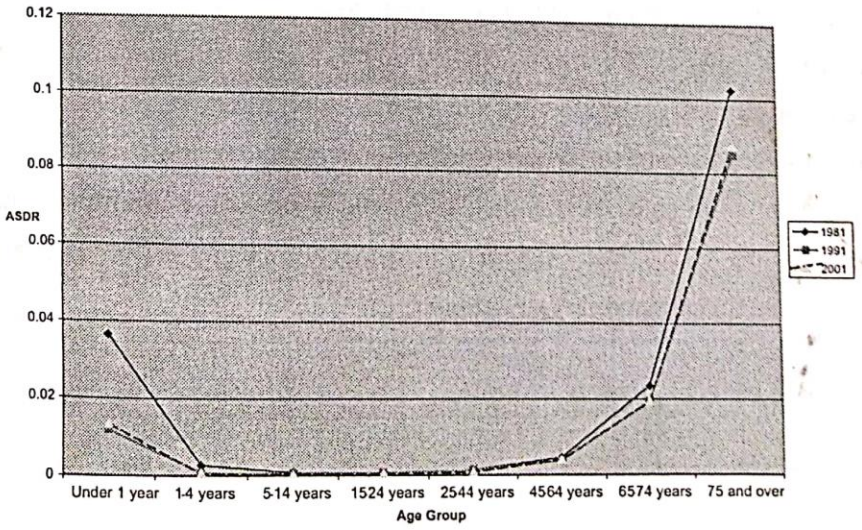


Figure 3 shows the age specific mortality rates for females in Galle district in the absence of tsunami disaster. This also shows that the infant mortality in 1981 was higher and had gradually decreased. Mortality rates for females after 65 years has decreased in the subsequent years compared to the value in 1981.

When we compare both men and women, it can be seen that life expectancy of females has increased more than that of males. Under current conditions, the typical female in industrialized countries may look forward to several years of widowhood even if she marries a husband of her own age. Some demographers have pointed out that a girl marrying at the age of 18 years would be forced to marry a boy of only 12 years of age in order to assure that she would not spend time as a widow. (Ray, 2006) Although females have longer life expectancy than males, a natural disaster can influence the normal situation of female mortality.

Comparison of age specific mortality before and after the tsunami disaster

When we analyze the age specific mortality after the tsunami disaster, it is very much interesting to observe new issues. This section attempts to analyze how mortality after tsunami has deviated from the pre-tsunami pattern. Figure 4 shows the pre-tsunami situation with regard to mortality and it is quite clear that the pattern is a normal pattern where infant mortality is at a low level in the case of both males and females and then female morality becomes less compared to male mortality at all ages but the gap widens at the adult ages. This is the usual pattern in a low mortality community. Therefore, Galle district does not deviate from that normal pattern, and also it clearly shows a low stationary mortality situation.

Figure 4: Distribution of deaths, pre tsunami disaster

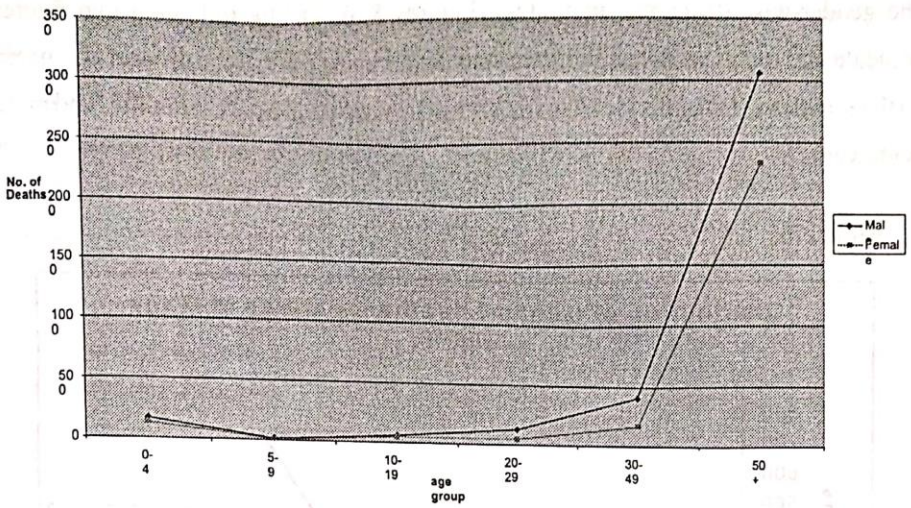
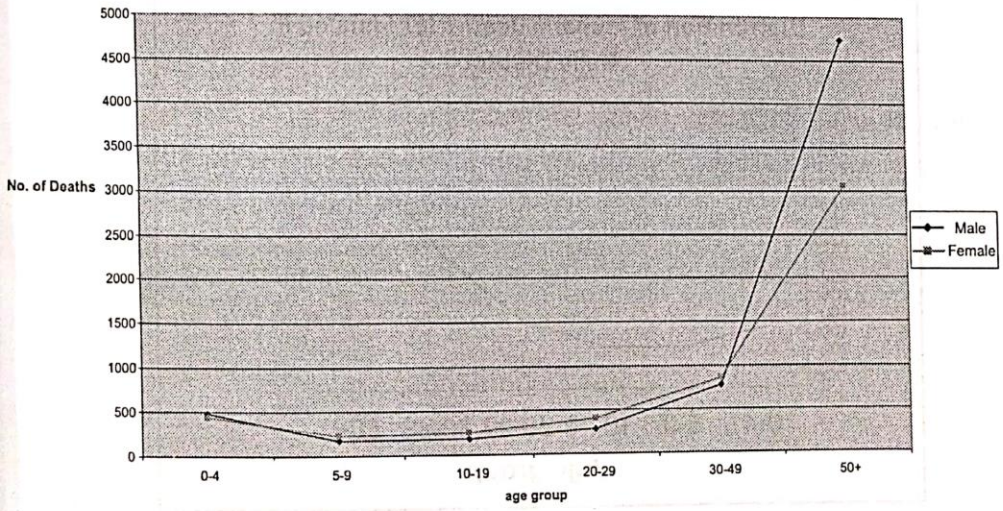


Figure 5 exhibits the post-tsunami mortality pattern in Galle district. It is clearly visible from the figure that tsunami disaster has made a great impact in increasing mortality level in all the age groups. The increase has become very much noticeable after the age of 30 years. Therefore, the mortality effects of tsunami were much greater in the adult age groups.

Figure 5: Distribution of deaths including tsunami deaths by age group



One of the most interesting features observed in the mortality pattern after tsunami is the gender-wise difference in deaths. (Figures 5, 6, 7) The following two figures indicate that males were less vulnerable to deaths at the time of the disaster compared to the females in Galle district. This can result in more single-parent families and more widowers.

Figure 6

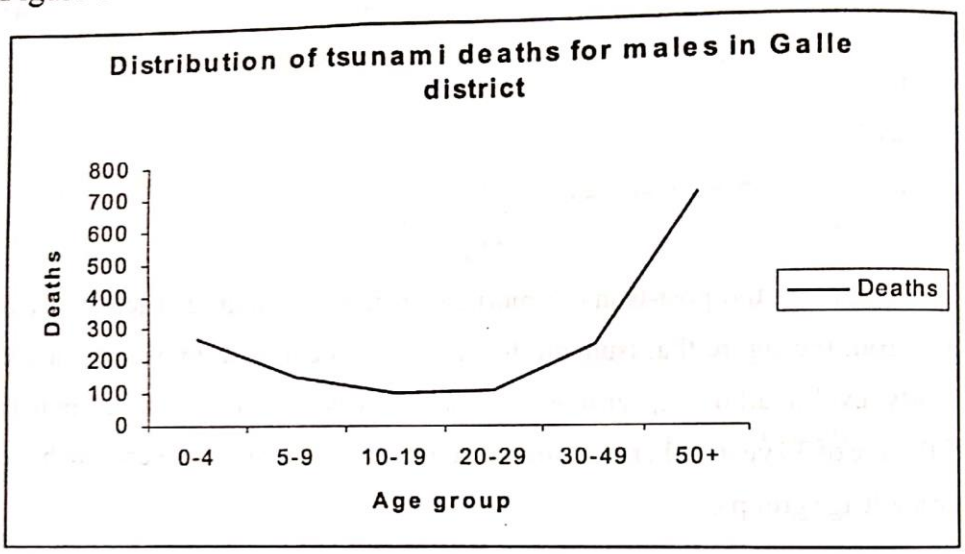


Figure 7

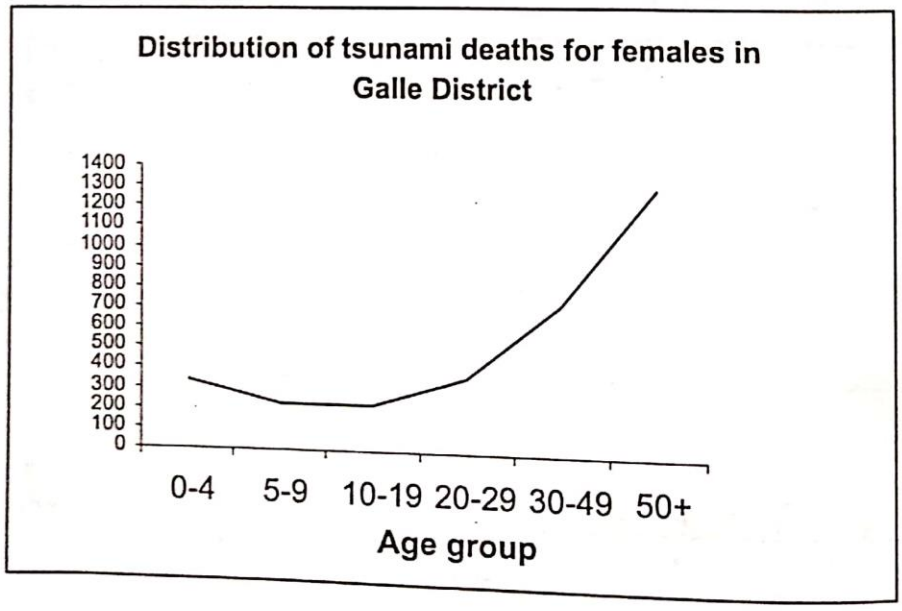
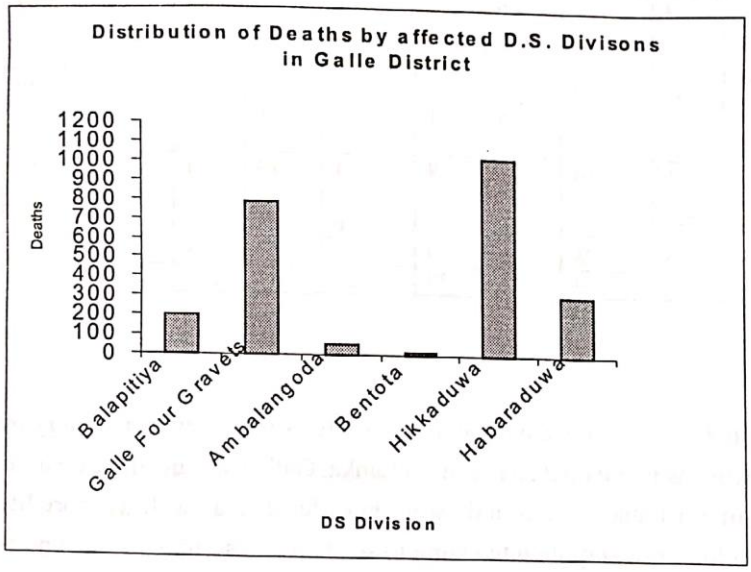


Figure 8 shows the spatial distribution of tsunami mortality. It shows the distribution of deaths by affected DS Divisions. Hikkaduwa DS division is the worst affected area in the district and thus had the highest number of deaths. The least number of deaths were reported in Ambalangoda and Bentota DS divisions and their impact on the mortality in the district was minimal.

Distribution of deaths by affected DS Divisions in Galle District

Figure 8



A clear division of the mortality impact was seen by gender according to their employment states. Male deaths were high in the fisheries and trades sectors while female deaths were high in coir industry.

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