

Typhoid Fever in Italy, 2000-2006

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Abstract

Background: Typhoid fever remains endemic in the Apulia region of southern Italy. Here we investigate why this occurs despite increasing levels of environmental public health measures.

Method: We collected morbidity data for typhoid fever in the Puglia region of Italy in the years 2000 to 2006 from the national mandatory surveillance system for infectious disease.

Results: In the last six years the rate of notified cases reduced substantially from approximately 1.1 per 100,000 in 2000 to 0.4 per 100,000 in 2006. Higher rates were observed in the Puglia region when compared to the national rates.

Discussion: A reduction in the number of cases and chronic carriers occurred alongside improvements in environmental and public health measures. In particular, in recent years, the improvement in the depuration of raw fish and the elimination of sewage discharge into the sea seem to have led to a sharp decline in the incidence of typhoid fever in southern Italy.

Key Words: Typhoid fever, Italy, *Salmonella* Typhi

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Introduction

Typhoid and paratyphoid fevers are systemic diseases caused by the bacteria *Salmonella* Typhi and *Salmonella* Paratyphi (types A, B or C) [1]. Humans are the only reservoir for *Salmonella* Typhi and Paratyphi A, whereas *Salmonella* Paratyphi types B and C have been isolated from animal reservoirs. Humans can be either acute or chronic enteric carriers of such bacteria, which are then transmitted via the faecal-oral route either directly or via food or water contamination. Following an incubation period averaging 1–2 weeks, disease characterised by high fever, malaise, cough, exanthemas, splenomegaly and pancytopenia develops. Diarrhoea may be present at some stage [2]. When *Salmonella* Typhi is the cause, intestinal perforation and haemorrhage may occur and is the most common cause of death in typhoid fever. *Salmonella* Typhi bacteraemia can also generate septic foci in all organs [1]. Antibiotic therapy has radically changed the prognosis of typhoid fever, which, if untreated, can have a 10% case fatality rate [3,4]. Preventive measures include good personal and food hygiene; vaccines are

also available [5,6]. Typhoid fever, caused by *Salmonella* Typhi, is a major health problem in developing countries [1,2], particularly on the Indian subcontinent and in southeast Asia [5]. However, cases in returning travellers, immigrants, and refugees in developed countries are not uncommon [7]. In Europe in the last 10 years, the overall rate of typhoid and paratyphoid fever has been declining [8]. Between 1995 and 2004, the highest proportion (31%) of all European cases was in Italy [8].

In Italy, especially in the south, typhoid fever remains endemic despite increasing environmental public health measures.

In order to describe the trend of typhoid fever in a European endemic setting, we analyzed national and regional surveillance data ranging from 2000 to 2006.

Methods

In Italy, typhoid fever cases are reported to the mandatory surveillance system for infectious diseases. Only laboratory-confirmed cases are reported to the surveillance system. [Available at:

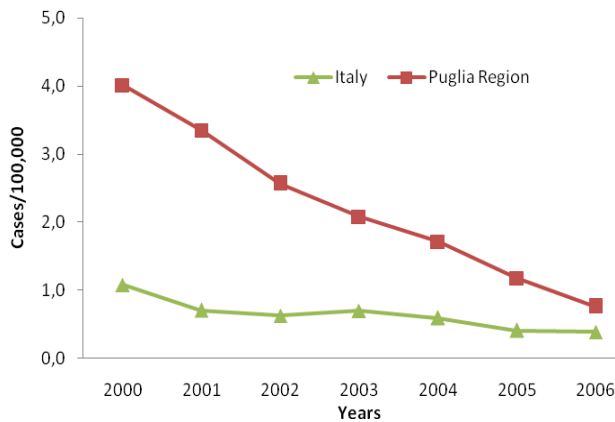
http://www.ministerosalute.it/malattieInfettive/paginaInternaMenuMalattieInfettive.jsp?id=812&menu=strumen_tieservizi].

We collected provisional data regarding typhoid fever for the years 2000 to 2006, nationally and from the Puglia region, from the Italian mandatory surveillance system. Data were analyzed using the Microsoft Excel 2000 statistical package.

Results

The data showed a constant decreasing trend of typhoid fever in Italy, starting from approximately 1.1 per 100,000 in 2000 to 0.4 per 100,000 in 2006 (provisional data). The Puglia region showed higher rates compared to national rates during the entire study period (Figure 1).

Figure 1. Morbidity rates per 100,000 of typhoid fever cases in Italy and the Puglia region, 2000-2006.

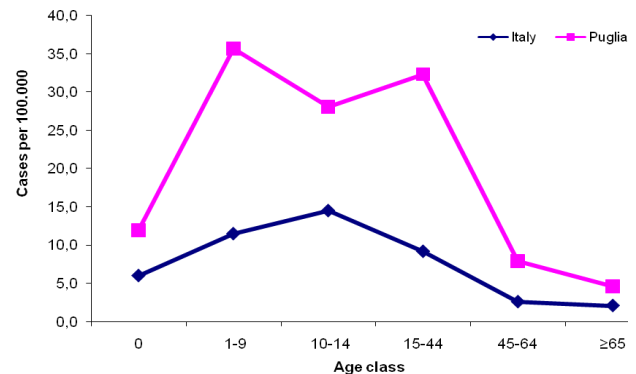


In the Puglia region, the highest incidence was observed in the age group 1 to 9 years (35.6 per 100,000), followed by the age groups 15 to 44 years (32.3 per 100,000), and 10 to 14 years (28.0 per 100,000). This age distribution is slightly different from the distribution observed at the national level (Table 1 and Figure 2).

Table 1. Age group distribution of typhoid fever cases and rates per 100,000, Italy and the Puglia region, 2000-2006.

Age group (years)	Italy		Puglia	
	N.	Cases/100,000	N.	Cases/100,000
0	32	6.0	5	11.9
1-9	552	11.5	141	35.6
10-14	404	14.5	68	28.0
15-44	973	9.2	292	32.3
45-64	311	2.6	82	7.9
≥65	284	2.1	52	4.6

Figure 2. Distribution of typhoid fever cases by age-class, Italy and the Puglia region, 2000-2006.



Only 3.6% of the Italian cases and approximately 1% of the Puglia region cases contracted the disease abroad. Both in Italy and in the Puglia region, most cases (98% and 96% respectively) were reported as sporadic cases and most were hospitalized (82% and 81%) respectively.

Discussion

Our provisional data show a clear decreasing trend for typhoid fever in Italy and the Puglia region from 2000 to 2006. Our results confirm the decreasing trend observed in the last thirty years in Italy [9] and in Europe [8]. In fact, from 1970 to 2000, the number of typhoid fever cases reported to the Italian surveillance system has been substantially reduced, starting from 13,000 cases (24.1 per 100,000) in 1970, to 5,000 (8.9) in 1980, 2,000 (3.4) in 1990 and 615 (1.1) in 2000 [9].

Starting from 2000 in Italy, the vaccination strategy against typhoid fever in food handlers ended and the vaccine was only recommended for people travelling to endemic areas with an incidence rate higher than 5 per 100,000 [10].

The decreasing trend of typhoid fever in Italy is therefore most likely to be related to the improved environmental conditions in Italy. As humans are the only source of infection, the way to prevent the transmission of typhoid fever is to interrupt the faecal-oral transmission of the microorganisms [9]. The activities most likely to be responsible for the gradual reduction of the typhoid morbidity rate in the Puglia region are depuration of raw seafood and the elimination of sewage discharge into the sea. These measures were introduced after the last cholera outbreak in 1994 [9,11].

The declining trend in Italy, and in the Puglia region in particular, lags behind that observed in the rest of Europe. In fact, the overall incidence rate of typhoid/paratyphoid fever has been steadily declining in Europe since 1995; in 2005 the overall incidence rate was 0.03 per 100,000 [8]. In Italy, the incidence rate in 2005 was 0.4 per 100,000 and as high as 1.2 per 100,000 in the Puglia region.

Differences were also evident in the age-group distribution of cases; in Europe the highest incidence of 0.61 per 100,000 was reported in the group aged less than 4 years followed by the group aged 5 to 14 years (0.40 per 100 000) [8]. Similar trends were also observed in Italy where the highest incidence rates were reported in children younger than 14 years of age, while in the Puglia region the group aged 15 to 44 years also presented high rates compared to those in the rest of Italy and Europe [8].

When comparing these rates to developing countries where typhoid fever is common in children under 5 years of age [12,13], we confirmed the different age-pattern of typhoid fever between developing and developed countries [12].

There is very little evidence of high numbers of cases of imported enteric fever in Italy, so the prolonged presence of new cases suggests the presence of chronic carriers and confirms an environmental contamination resulting in the indirect transmission of *Salmonella* Typhi through food. This hypothesis is also confirmed by our results that show approximately 2% and 4% of cases in Italy and the Puglia region respectively were reported as clusters, probably due to the consumption of food contaminated by carriers.

The prevention of typhoid fever in Italy, where modern vaccines are not recommended, is therefore best achieved by reducing the number of cases and carriers by preventing the spread of the bacterial pathogen in the environment. A more detailed study on the source of infection in the Puglia region would be needed in order to inform regional health authorities of the possible reasons for the presence of typhoid carriers in the general population.

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