Years of Potential Life Lost (YPLL) before Age 65 in Italy

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Abstract: The Italian death rates and years of potential life lost (YPLL) for all causes and for 12 selected aggregations of causes are reported for 1979 and 1983, with the latter compared to United States data. Cancer is the leading cause of YPLL in Italy (23.8 per cent of total YPLL), followed by unintentional injuries (16.3 per cent) and heart disease (11.2 per cent). Rates of YPLL for all causes decreased 12.0 per cent from 1979 to 1983, the strongest declines in absolute terms being observed for prematurity and unintentional injuries, and in percentage decline for pneumonia and influenza, and infectious diseases; during the same period, YPLL for diabetes increased. The rates of YPLL are higher for males than for females (rate ratio = 1.9) especially for causes related to lifestyle factors. Premature mortality is lower in Italy than in the USA, because of the striking difference in mortality from injuries and heart diseases. (*Am J Public Health* 1988; 78:1202–1205.)

Introduction

Crude or age-adjusted mortality rates are strongly influenced by the deaths occurring in older age groups. To emphasize the role of processes underlying premature mortality,[1,2] years of potential life lost (YPLL) has recently been popularized by the United States Centers for Disease Control,[3] although controversies still remain about the best way of defining and calculating it.[4–6]

Changes in YPLL over time and differences among subpopulations may give health planners added criteria to establish priorities as well as to implement and evaluate programs for the prevention of premature mortality.[7,8] However, few international comparisons are currently available.

In this paper, data on YPLL in Italy in 1983 are reported. In the last decade Italy experienced a major reorganization of the health system, brought about by the Health Reform Act of 1978; it allowed the coverage of the whole population by a National Health Service, through the institution of Local Health Units. During the same period, a complete reform of psychiatric services took place, whose main contribution was an extended outpatient support service.

Methods

In this paper YPLL is defined as the number of years of life lost by persons who die before reaching age 65; the method of calculating YPLL for a particular cause or group of causes consists of the sum of the number of deaths (birth–65) occurring in each five year age group (with the exception of deaths under 1 year, and deaths from 1 to 4 years which are treated separately), multiplied by the difference between 65 and the midpoint of the given age range.

Total sex-specific YPLL, rates of YPLL (per 1,000 persons less than 65 years) and all ages death rates (per 100,000 residents) have been calculated for the year 1983, using cause-specific mortality data for that year supplied by the Central Institute of Statistics (ISTAT) and the corresponding population data[9]; the same computations for the year 1979 were done from published Italian mortality data[10] and population data.[11]

Throughout the study period (1979–83), the ninth Revision of the International Classification of Diseases (ICD 9) was used to classify and code the underlying causes of death. The aggregations of ICD codes currently used in describing premature mortality by the United States Centers for Disease Control (CDC)[6] were adopted, in order to allow meaningful international comparisons; because of the continuing importance of infectious diseases as a cause of premature mortality, and on the basis of the analytical data available, a category was added corresponding to the ICD 9 codes 1–139, infectious diseases.

The age structure of the Italian population changed considerably in the period under study, because of the continuing decrease in birth rates and increase in life expectancy. Therefore, mortality rates and YPLL rates for the year 1983, when compared with the 1979 rates, were age-adjusted[4] using as standard the 1979 Italian population. For the same reason—differences in age structure between compared populations—in the comparison between Italy and US, data were age-adjusted using as standard the US population data for 1983.[12]

Results

Malignant neoplasms, which account for 23.8 per cent of the total YPLL, are the major cause of premature mortality in Italy for 1983 (Table 1), followed by unintentional injuries (16.3 per cent) and by heart diseases (11.2 per cent). Congenital malformations and prematurity rank fourth and fifth, jointly representing 13.3 per cent of total YPLL, although their overall contribution to crude mortality is less than 1.0 per cent.

YPLL from all causes combined decreased considerably in Italy from 1979 to 1983 (Figure 1); this decrease (−6.2 YPLL per 1,000 persons <65, a relative age-adjusted change of −12.0 per cent), is larger than the all ages mortality decline in the same period (−3.0 per cent).

The overall decrease in premature mortality in Italy is due mainly to the reduction of number of deaths for prematurity (−1.14 YPLL per 1,000 persons, −25.8 per cent), unintentional injuries (−0.91, −11.3 per cent), diseases of the heart (−0.75, −13.6 per cent), and pneumonia and influenza (−0.73, −42.9 per cent). The only substantial increase in YPLL observed in the study period is for diabetes mellitus (+0.07, +20.2 per cent).

The peculiar pattern of the deaths attributed to malignant neoplasms is worth noting: the standardized death rate increased 3.1 per cent in Italy during the study period, mainly because of the rising incidence of lung cancer, while the standardized YPLL rate decreased (−3.9 per cent). To investigate the question, age-specific (10 years age groups)

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TABLE 1—Years of Potential Life Lost (YPLL) before Age 65, YPLL Rates and Mortality Rates, Selected Causes, Italy 1983

Cause of Mortality (Ninth Revision ICD)	YPLL (% of total) for Persons Who Died in 1983	Rates of YPLL per 1,000 for Persons Less than 65 Years	Mortality Rates per 100,000 (% of total)
All Causes (Total)	2,189,236 (100.0)	44.23	989.7 (100.0)
Malignant neoplasms (140–208)*	521,659 (23.8)	10.54	228.9 (23.1)
Unintentional injuries (E800–E949)	357,035 (16.3)	7.21	40.7 (4.1)
Diseases of the heart (390–398, 402, 404–429)	244,859 (11.2)	4.95	281.7 (28.5)
Congenital anomalies (740–759)	148,712 (6.8)	3.00	4.7 (0.5)
Prematurity (765,769)	142,091 (6.5)	2.87	3.9 (0.4)
Chronic liver disease and cirrhosis (571)	105,084 (4.8)	2.12	33.3 (3.4)
Cerebrovascular disease (430–438)	85,924 (3.9)	1.74	136.8 (13.8)
Suicide and homicide (E950–E978)	85,262 (3.9)	1.72	9.5 (1.0)
Pneumonia and influenza (480–487)	44,726 (2.0)	0.90	22.1 (2.2)
Infectious diseases (1–139)	30,221 (1.4)	0.61	5.4 (0.5)
Diabetes mellitus (250)	23,417 (1.1)	0.47	35.3 (3.6)
Chronic obstructive pulmonary diseases (490–496)	22,359 (1.0)	0.45	37.9 (3.8)

*ICD Codes

cancer mortality rates were computed (Table 2) for the years 1979 and 1983.

The strong increase in cancer death certification among the elderly is not balanced, in absolute terms, by the concurrent mortality decrease in younger age groups, where the disease is much less frequent; in percentage decline, however, the negative changes are more evident than the positive ones.

A higher risk of premature death among males than among females has been shown in other countries[4,5]; in Italy, a male to female rate ratio (RR) for all causes of 1.89 (Table 3) has been calculated on the basis of 1983 data.

All the 12 cause-specific rate ratios are greater than 1. The highest are those for unintentional (RR = 3.95) and intentional (RR = 3.39) injuries, heart disease (RR = 3.0), and liver cirrhosis (RR = 2.81).

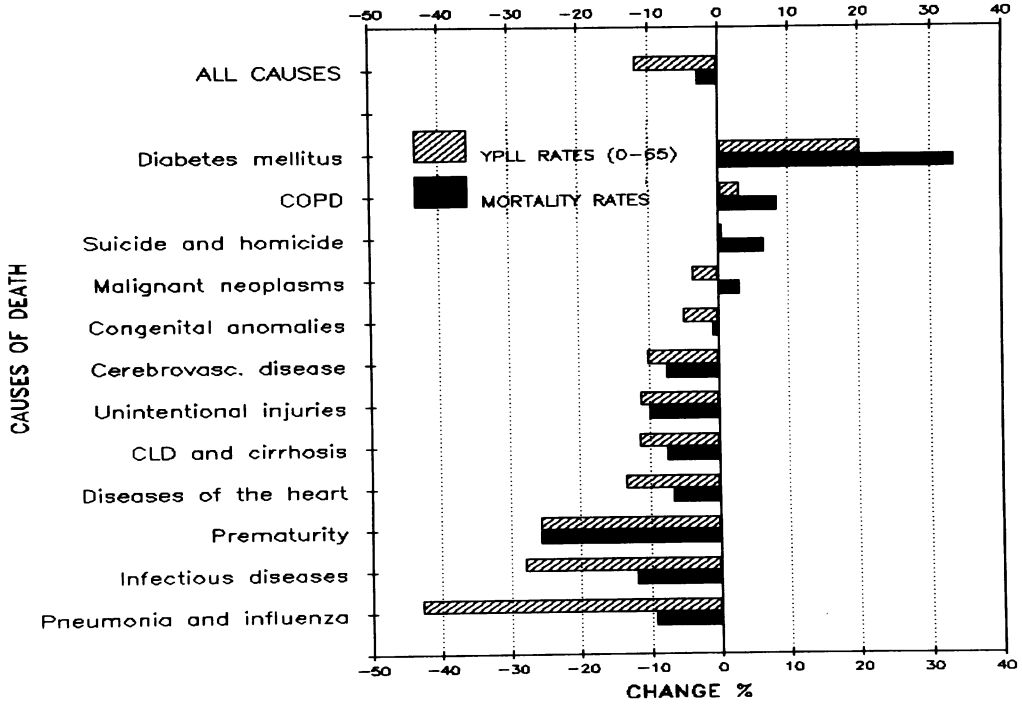

FIGURE 1—Per Cent Changes in Rates of YPLL before Age 65 and in Mortality Rates, Selected Causes, Italy 1979–83. Rates for 1983 were age-adjusted using as standard the 1979 Italian population.

TABLE 2—Changes in Age-specific Mortality Rates (per 100,000) for Malignant Neoplasms, Italy 1979–83

Year	Age Groups (years) 0–14	15–24	25–34	35–44	45–54	55–64	65–74	75–84	>84	TOTAL
1979	6.55	7.48	16.88	54.4	186.5	434.6	843	1341	1565	211.5
1983	5.81	6.82	14.11	52.6	181.7	453.3	895	1422	1744	228.9
Rate Difference (per 100,000)	−0.74	−0.66	−2.77	−1.8	−4.9	+18.7	+52	+81	+179	+17.4
Per Cent Change (+ or −)	−11.3	−8.8	−16.4	−3.3	−2.6	+4.3	+6.2	+6.0	+11.4	+8.2

When the age-adjusted data for Italy and the US are compared, a substantial negative difference in the YPLL rates for all causes is apparent.

This is due mainly to the lower number of Italians who die prematurely from suicide and homicide, heart diseases, and unintentional injuries. On the other hand, noteworthy positive differences are present in other categories, mainly prematurity, chronic liver diseases, pneumonia, and influenza.

Discussion

YPLL data highlight the relative importance of those causes of death that currently subtract several potential years of life from individuals (injuries, prematurity, and congenital anomalies) in comparison to the more common causes of death at older ages. It has to be emphasized, however, that "potential" is not the same as "active" and "productive"; the assumption that the years of potential life lost, if saved, would have been active and productive is hardly tenable. In that respect, years of life gained by prevention are more likely to be fully productive than years of life gained through medical care and therapy.

The Italian trends in YPLL rates are similar to those described for the US over the period 1979–84.[6] For 11 of the 12 considered aggregations of causes, the relative change over the study period is "more favorable" for the rate of YPLL than for mortality rate, i.e., YPLL shows higher decreases and lower increases; the obvious exception is prematurity, for which the two data coincide.

Considering that different factors, such as changes in incidence, recovery and survivorship rates, and current diagnostic procedures, should be taken into account in the interpretation of cause-specific mortality trends, some peculiarities of the Italian situation may be pointed out.

In Italy, cancer mortality accounts for most of the years of potential life lost, although for males, the burden of unintentional injuries is almost equally heavy.

A mortality pattern similar to that reported in Table 2 has been observed in the US,[13,14] suggesting the hypothesis of an extended survivorship of cancer patients, and a consequent shift of their mean age at death; moreover, a sharp decline in cancer mortality in US children has been reported[15] and is mainly attributed to improved therapy. However, the interpretation of the observed mortality trend as an evidence of "progress against cancer" is controversial.[16]

No simple explanations are available for the strong increase in mortality and YPLL rates for diabetes. A plausible hypothesis is a change in the frequency with which physicians identify diabetes as the underlying cause of

TABLE 3—Rates of YPLL by Sex, and Males to Females Rate Ratio (RR), Selected Causes, Italy 1983

Cause of Mortality (Ninth Revision ICD)	YPLL Rate Males	YPLL Rate Females	Males to Females Rate Ratio (RR)
All Causes (Total)	57.89	30.67	1.89
Unintentional injuries (E800–E949)*	11.54	2.92	3.95
Suicide and homicide (E950–E978)	2.66	0.79	3.39
Diseases of the heart (390–398, 402, 404–429)	7.44	2.48	3.00
Chronic liver disease and cirrhosis (571)	3.14	1.11	2.82
Chronic obstructive pulmonary diseases (490–496)	0.63	0.27	2.34
Infectious diseases (1–139)	0.78	0.44	1.77
Cerebrovascular disease (430–438)	2.06	1.41	1.46
Malignant neoplasms (140–208)	12.38	8.71	1.42
Pneumonia and influenza (480–487)	1.04	0.76	1.37
Diabetes mellitus (250)	0.54	0.41	1.31
Prematurity (765, 769)	3.24	2.51	1.29
Congenital anomalies (740–759)	3.25	2.76	1.17

*ICD Codes

TABLE 4—Age-adjusted† Comparison between Italy and United States Rates of YPLL for 1983, Selected Causes

Cause of Mortality (Ninth Revision ICD)	Age-adjusted† Rates of YPLL Italy 1983	Rates of YPLL USA 1983	Italy to USA SRR
All Causes (Total)	46.14	56.27	0.82
Prematurity (765, 769)*	4.09	2.19	1.86
Chronic liver disease and cirrhosis (571)	1.83	1.21	1.51
Pneumonia and influenza (480–487)	1.09	0.76	1.43
Cerebrovascular disease (430–438)	1.53	1.13	1.35
Congenital anomalies (740–759)	4.11	3.28	1.25
Malignant neoplasms (140–208)	9.24	8.77	1.05
Diabetes mellitus (250)	0.40	0.56	0.72
Unintentional injuries (E800–E949)	7.60	11.05	0.69
Chronic obstructive pulmonary diseases (490–496)	0.40	0.61	0.66
Diseases of the heart (390–398, 402, 404–429)	4.29	7.79	0.55
Suicide and homicide (E950–E978)	1.80	5.95	0.30

†Italian rates were age-adjusted using the 1983 US population as standard
*ICD Codes

deaths, perhaps previously certified as due to cardiovascular or cerebrovascular disorders.

Italians self-reported diabetes more frequently in the 1983 National Health Interview Survey[17] than the 1980 survey (33.5 per 1,000 vs 28.5 per 1,000; +17.4 per cent). Although an underlying increase in the incidence of diabetes is worth considering, improved access to diagnostic services and having diabetes detected or "labeled" could influence the recording of the underlying cause at death and be an important determinant of the observed trend.

Downward trends in both mortality and YPLL rates for heart diseases and cerebrovascular disorders are consistent with data from other industrialized countries[18] and with the significant decrease in cardiovascular risk factors recently reported in our country.[19]

Although the mortality rate for suicide and homicide is increasing in Italy, it remains far lower than the rate observed in the US[20] and in most of the other European countries,[21] some of which show rising rates.[22] The increase observed in Italy is not reflected in YPLL data, which did not change in the same period: the strong increase in the number of suicides and suicide attempts among young persons (especially males) observed in other countries[23] has not yet occurred in Italy.

A falling incidence of viral unspecified bronchopneumonia during the first year of life, along with a better outcome through supportive therapies, could account, at least partially, for the impressive change in premature mortality from pneumonia and influenza observed in Italy. On the other hand, the decrease in neonatal deaths due to prematurity is better attributed to improvement in neonatal intensive care rather than to a decline in the incidence of the underlying conditions.[24] The persistent high differential between Italian and US data for these two groups of causes, as well as for congenital anomalies, underscores the possibility of further advancements in the prevention and treatment of perinatal morbidity.

Finally, it should be noted that the excess in premature mortality experienced by males in comparison with females is more evident for those causes of death which are closely related to lifestyle factors (violent deaths, alcoholic cirrhosis, heart diseases). The need for programs to prevent avoidable causes of death through substantial changes in the lifestyle behaviors is evident.

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