

10098- Mortality among Former Shipbreaking Workers -- A 13-Year Retrospective Follow-up Study in Taiwan.

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Abstract

Objectives—This study examined the mortality among shipbreaking workers from 1985 to 1997, after the shipbreaking industry was banned in 1985-1986.

Methods—The study cohort consisted of men including 2,850 flame cutters, 871 lifters, 240 odd-jobbers and 225 other workers registered in 1985 at Kaohsiung Shipbreaking Workers Union. Mortality (n=336) data examined were obtained from the Vital Statistics Registry from January 1985 to December 1997. Standardized mortality ratio (SMR) and proportional hazard regression were used to estimate the risk of mortality from neoplasms, injuries and other causes.

Results—Compared to the local reference population, the deaths that were significantly higher than the expected numbers among all workers included deaths from cumulative all-causes (SMR=1.11, 95% confidence interval (CI) =1.00 to 1.23), and deaths from external causes of injury and poisoning (SMR=1.75, 95% CI =1.47 to 2.09). In particular, a higher mortality from accidental falls was found among lifters (SMR=8.85, 95% CI =5.03 to 15.6), and odd-jobbers (SMR=4.32, 95% CI=1.08 to 17.3). Based on hazard ratio, both groups were about six times more likely than flame cutters to die from accidental falls. Age-specific estimates revealed that significant higher mortality from nasopharynx neoplasm was found for the youngest flame cutters, aged 20-39 (SMR=5.2, 95% CI=1.7 to 16.2). We also found that the excess death from pleural neoplasm (SMR=1/0.021= 46.8, 95% CI=6.60 to 332) was contributed by one young flame cutter.

Conclusions—Former shipbreaking workers are more likely to be at higher risk of injuries and the young flame cutters are at higher risk of nasopharynx neoplasm and plural neoplasm.

Key terms: shipbreaking, mortality, retrospective study, accident, cancer, pleura tumors

10267- CAUSES OF DEATH AND SOCIAL CLASSES IN ROMANIA

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Introduction. The special literature shows the existence of the morbidity and mortality differences between social classes in all the European countries. In each country for which data are available, chances of premature death were found to be higher among people with a lower educational level, a lower income or a lower social position. In Romania such studies were difficult to be done until now because there were insufficient information on the occupation.

In this paper we tried to analyse the relations between different social classes and specific causes of death and to evaluate the contribution of these causes in mortality of the different social classes.

Methods. Details from death records and occupations were extracted from the death certificates and working documents of 781 persons who died in the city of Cluj.

Deaths were classified by cause according to the International Classification of Diseases 9th Revision: cancer, ischaemic heart disease, other cardiovascular disease, cerebrovascular disease, accidents (including suicide and injury), gastrointestinal disease, respiratory disease, and other disease.

Occupational classes were defined according to the British Classification of the Social Classes that divide the occupations in 6 different categories: class I - professional, class II - managers/intermediate, class III(N) - non-manual skilled, class III(M) - manual skilled, class IV - partly skilled, class V - partly unskilled. The data were collected in the Microsoft Excel program and were statistically analysed using the SPSS 10 program. We used descriptive statistical methods and Anova and Chi Square tests.

Results. On the first place as causes of deaths were cancers (21%), followed by other cardiovascular diseases (20.9%) and ischaemic heart disease (20.2%). On the last places were the gastrointestinal diseases (0.5%) and the respiratory diseases (4.5%). With quite an equal frequency appeared the accidents (13.3%), other diseases (11.3%) and cerebrovascular diseases (8.3%). The histograms of the death ages for different causes of deaths had a normal distribution. The smallest mean death age was for the accidents and the highest for other cardiovascular diseases. The men died most frequently from ischaemic heart diseases, other cardiovascular diseases and cancers, and the women from cancers. Causes of death and sex were strongly associated ($p < 0.001$) and also the occupations and the causes of death ($p < 0.05$). The lowest socio-economic classes (IV and V) die more frequently from other cardiovascular diseases, ischaemic heart disease and cancers, while the highest socio-economic classes (I and II) die from cancers, ischaemic heart disease, accidents and other cardiovascular diseases.

Conclusions. There were statistically significant differences between the frequencies of cancers and other cardiovascular diseases in rural and urban according to sex ($p < 0.05$) and the frequencies of cancers, ischaemic heart diseases, other cardiovascular diseases and other diseases in connection with occupation and place of living ($p < 0.05$). In the

future we need to enlarge our study for a better understanding of data in connection with sex and for testing the life expectancy.

10369- Epidemiological Mortality Analysis in Small Community

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The complains of the inhabitants of one of blocks of flats in Perm (especially in one porch) for frequent death cases compelled to carry out an epidemiological analysis of the inhabitants' mortality in 1992-1999. The object of the analysis was to determine if the residential area was the factor of increased mortality risk. The number of cases and mortality causes were estimated retrospectively in two populations: all block inhabitants and all city population. Information about inhabitants' mortality was obtained after death certificates analysis; information about city population mortality – from statistic survey data. The calculation of relative mortality risk indices and the statistic epidemiological analysis were carried with EpiInfo Program (Version 5.01). During study period the number of block inhabitants was from 127 to 138 and the number of 4th porch inhabitants – from 33 to 36. Age structure of the block inhabitants was not reliably different from age structure of Perm region population. But age structure of the block inhabitants significantly differed from the average one in towns of the region; the number of over 50 year inhabitants of the 4th porch made 62.18%, of Perm region inhabitants – 22.23%. Analysis of relative mortality risk indices revealed that the block inhabitants' death probability did not reliably differed from the same index of Perm region population (RR=1.31; confident interval 0.88-1.96; $p < 0.01$). Epidemiological analysis using direct standard index resulted in the absence of reliable difference between mortality rates in study samples. Relative risk counting stratum age distribution according to Mantel-Haenszel criterion is correspondingly: 0.45 (confident interval 0.25-0.79; $p < 0.001$) and 0.59 (confident interval 0.32-1/07; $p = 0.03$). Analysis of total mortality rates of over 50 year persons showed less statistic reliability ($p > 0.5$) of the differences between these indices. Thus, age is the main factor of the increased mortality rate in the block and the 4th porch. An important factor of this analysis was the absence of mortality cases in under 50 year inhabitants of this block and entrance. The analysis revealed significant differences between mortality cases distributions of the 4th porch and block inhabitants in comparison with Perm region urban population. In the 4th porch tumors were death causes in 66.7% of cases, in the block – in 35.0% of cases, in Perm region towns – in 12.6% of cases. Analysis of relative mortality risk due to oncology diseases revealed that death probability of the block inhabitants is reliably higher than of urban Perm region population (RR=3.43; confident interval 5.52-23.61; $p < 0.001$). Stratification of the indices, accounting age distribution in strata, is correspondingly 4.95 (confident interval 2.51-9.73; $p < 0.001$) and 2.73 of risk of mortality due to oncology diseases in the block and not more than 56% of risk in the 4th porch can be explained with differences in age structure of the inhabitants. The same analysis of mortality due to circulatory system diseases revealed reliable increase of such mortality rate neither in the 4th porch, nor in the block in general in comparison with the average Perm region rate. Correlation analysis of life duration and mortality relationship did not reveal their reliable correlation. So complains for increased mortality rate due to residential area are ungrounded. More frequent death cases of the block and the 4th porch inhabitants were caused with their older age. Converted structure of mortality causes (oncology diseases prevail) can not be explained with age factor only, but it also does not relate with the residential area.

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THE EFFECT OF THE CHICAGO 1995 HEAT WAVE ON ALL CAUSE AND CAUSE-SPECIFIC MORTALITY

Background: During a heat wave that occurred from July 12 through July 16, 1995, in Chicago, Illinois, unprecedented high temperatures and humidity resulted in a substantial increase of mortality.

Objective. We investigated the effects of the heat wave on all-cause and cause-specific mortality.

Methods: We obtained daily mortality data from Cook County's Bureau of Vital Statistics and weather data from Chicago's O'Hare Airport. A generalized additive Poisson model was used to control for seasonal variation in mortality rates. In addition to smooth functions of time, we also included a smoothing spline function of an indicator variable delineating the period from a week before the heat wave to several weeks after the heat wave.

Results: On the worst day of the heat wave, the relative risk for all-cause mortality was 1.73 (95% confidence interval [CI] 1.63-1.84). There was some evidence of mortality displacement with a slight reduction in deaths the week after the heat wave. Overall, there were an estimated 371 excess deaths (net of the mortality displacement). There was little difference by gender (female deaths relative risk [RR] = 1.73, 95% CI 1.58-1.86) or education (less than high school RR = 1.75, 95% CI 1.63-1.87). However, large differences were seen by cause of death. For all cardiovascular deaths, the relative risk was 3.0 (95% CI 2.76-3.26) and for sudden deaths (defined as "outpatient death" or "dead on arrival in emergency room") the relative risk was 4.05 (CI 3.71-4.43). We examined models that controlled for smooth functions of the current and previous day's temperature (either mean or minimum) and dew point temperature. They had little impact on the estimated effect of the heat wave.

Conclusion: The Chicago heat wave had substantial effects on all-cause and cause-specific mortality and resulted in mortality displacement. Extreme weather events should be modeled with additional indicator variables, since normal seasonal weather patterns cannot completely capture the effects of those events.

10450- Modelling the effect of cold winter temperatures on mortality

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In recent years, much attention has been given to the short-term, or acute, effects of air pollution and many studies have reported positive associations with both mortality and morbidity. In many of these studies, temperature, both through adjusting for day-to-day changes and also as a result of controlling for seasonality has been treated as little more than a nuisance variable which has to be controlled for. However, the effect of temperature is potentially an important determinant of health in its own right. Of particular public health interest is the question of the possible effects of cold temperatures, including the effect of prolonged periods of cold, e.g., the number of additional deaths that might be expected after a given number of consecutive days below a certain temperature. This study considers the potential short-term effects of temperature on health, with particular focus on possible lagged effects and the effect of prolonged periods of cold. Such analyses have traditionally involved fitting a series of models, many of which contain highly correlated variables, i.e. the different lagged values of temperature, which can make the choice of a single, 'final' model highly problematic. An alternative approach is applied here, that of Bayesian model averaging (BMA), in which the inherent uncertainty in the model selection procedure is acknowledged, and posterior probabilities are calculated for each of the candidate models, allowing weighted averages of the parameter estimates and of predicted values to be calculated. The models presented are applied to data from London for the winters within the period 1981-1997. A clear association between cold temperatures and mortality was observed, with strong suggestion that same day temperature has the greatest explanatory power, with 0.8% (95% CI: 0.6%-0.9%) higher daily deaths associated with a 1C drop in temperature, with excess risks generally decreasing with increasing lags. The possible effects of prolonged periods of cold are also assessed by examining the predicted number of excess deaths (again averaged over all possible models) for various temperature scenarios.

10581- AIR POLLUTION AND NEONATAL DEATHS IN SÃO PAULO, BRAZIL.

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Air pollution has been associated with health effects in different age groups. This work was designed to assess the impact of daily changes in air pollutants (NO₂, SO₂, CO, O₃, and PM₁₀) on total neonatal daily deaths (those that occur between the first and the 28th days of life) in São Paulo, from January 1998 to December 2000. Generalized additive Poisson regression models were used and nonparametric smooth functions (loess) were adopted to control long-term trend, temperature, humidity, and short-term trend. A linear term was used for holidays. The association between air pollutants and neonatal deaths showed a short-time lag. Interquartile range increases in PM₁₀ (23.3 µg/m³) and SO₂ (9.2 µg/m³) were associated with increases of 4% (95% CI 2 – 6) and 6% (95% CI 4 – 8), respectively. Instead of adopting a two-pollutant model we created an index to represent PM₁₀ and SO₂ effects. For an interquartile range increase in the index an increase of 6.3% (95% CI 6.1 – 6.5) in neonatal deaths was observed. These results are coherent with our previous works showing the deleterious effects of air pollutants in perinatal period. Moreover, it presents an alternative approach that was already adopted by our group to carry out analysis with pollutants highly correlated. This abstract was funded by: LIM05-FMUSP, UNISA, and FAPESP.

10593- Health inequalities: life expectancy and mortality in Brazil (1999)

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Health indicator differentials were analyzed according to socio-economic and demographic levels (SEDL) by state and geographical region in Brazil for the year 1999. An ecological cross-sectional design was used in this exploratory investigation. States (n=27) and regions (n=5) were used as geographical units of the study. Descriptive measurements of inequality and linear regression were used to estimate the association between core health indicators and SEDL indicators. The former include life expectancy at birth (LEB), infant mortality rate (IMR), diarrhea (DMR) and respiratory diseases (RMR) mortality rates for children under 5 years of age, homicide (HMR) and traffic accidents (TAMR) mortality rates. In the 1991-1999 period, considerable gains of LEB were observed, producing higher degree of homogeneity among the states, specially for the male population. The IMR (infant mortality rate per 1,000 live births) ranged from 52.5 (Northwest region) to 17.1 (Southern region). The IMR was inversely associated with female literacy levels ($p < 0.001$), even after adjusting for other SEDL variables. The mortality rate of children under 5 years of age was calculated per 10,000 population. All states of the Northwest region presented DMR greater than the national median (DMR=4/10,000). All states from the Southern, Southeast and Center-West regions presented RMR greater than the national median (RMR=11/10,000). The HMR increased with increasing levels of urbanization ($p = 0.001$). The TAMR rose with decreasing poverty rates ($p < 0.001$), decreasing literacy rate ($p = 0.005$), and with increasing population growth rates ($p = 0.016$). In Brazil, the health inequality pattern indicates inter and intra region polarization and a juxtaposition of diseases related to development and poverty. This situation requires a complex reorganization of the health system taking into account the observed health inequality differentials.

10744- INFLUENCE OF SOCIOECONOMIC CONDITIONS ON AIR POLLUTION ADVERSE HEALTH EFFECTS IN SÃO PAULO, BRAZIL.

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Several studies have shown a significant association between daily fluctuations of air pollution and mortality due to respiratory causes in elderly. The purpose of the present study was to evaluate if the effects of particulate matter (PM₁₀) on respiratory mortality of elderly people were affected by socioeconomic factors. We performed time series studies using generalized additive Poisson regression models controlling for seasonality, weather and day of the week, from January 1997 to December 1999, in six different regions of São Paulo City, Brazil, grouped by the proximity of air pollution monitoring stations, but that also presented differences in their socioeconomic profiles. The correlation between the effect of PM₁₀ on mortality and three socioeconomic indicators (percentage of people with college education, percentage of families with monthly income higher than US\$ 1,450 in 1997, and percentage of population living in slums) was explored using Spearman Rank Order Correlation. We found different percentages of increase in daily respiratory deaths due to a 10µg/m³ increase in the 3-day moving average of PM₁₀ in each region. The smallest percentage increase in mortality was observed in Cerqueira Cesar (1.3%, 95% CI – 5.6, 8.2), while the biggest one was observed in São Miguel Paulista (13.9%, 95% CI 1.9, 25.9). The overall percentage increase in the six regions was 4.3% (95% CI 2.1, 6.5). The effect of PM₁₀ was negatively correlated with two socioeconomic indicators: percentage of people with college education and high family income (p=0.0167). On the other side, PM₁₀ effect on mortality was positively associated with the percentage of people living in slums. Low economic income and less education augmented the estimated coefficients relating PM₁₀ to respiratory mortality in elderly. These results reinforce the idea that socioeconomic deprivation represents an important risk factor that should be taken into account when determining the health consequences of air pollution. This abstract was funded by: LIM05-FMUSP and UNISA.

10993- MORTALITY CAUSED BY SÃO PAULO'S AIR POLLUTION IN THE LAST DECADE OF THE 20TH CENTURY: A CRITICAL REVIEW.

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The Laboratory of Experimental Air pollution (LEAP) of the Department of Pathology of São Paulo University's Medical Faculty is in a process of reviewing all its production since 1979, the year when it became operational. The new millennium is a good opportunity to reanalyze our data and to assess the social and human context of our work done in the last 20 years. In this paper the association of the São Paulo's inhabitant mortality with air pollution from 1991 to 1999 is presented. Generalized additive Poisson regressions were fitted for each outcome, i.e. fetal, neonatal, children respiratory, and elderly total, respiratory and cardiovascular deaths, in two periods of time (1991-1994, 1997-1999), modeling the logarithm of the expected number of daily deaths as a sum of parametric terms and nonparametric smooth functions for seasonality and weather. Fetal mortality remained associated with air pollution, with a significant contribution of gaseous pollutants. Neonatal deaths were associated with O₃ in 1991-94 period. Children respiratory mortality was associated with CO in the earlier period (91-94) and with SO₂ in the later (97-99). PM₁₀ was associated with respiratory mortality of elderly people while SO₂ and CO were significantly associated with total, respiratory and cardiovascular elderly mortality. In summary, we may conclude that in São Paulo mortality due to air pollution in early years of life, from fetus to children with less than 5 years, is associated with gaseous pollutants, mainly NO₂, SO₂ and CO; while for elderly people PM₁₀, SO₂ and CO present the most robust associations with deaths. Moreover, despite the positive association observed between mortality and air pollution during the last decade of the 20th century in São Paulo, a clear tendency of decline can be seen. These data are coherent with the improvement of the town's air estimated by pollutant measurements. **This study was funded by LIM05-FMUSP and it was submitted to Ecosystem Health journal.**