Mortality patterns in the Russian Federation: indirect technique using widowhood data

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Objective The Russian mortality crisis of the early 1990s attracted considerable attention, but information on possible covariates of mortality is lacking, and concerns have been raised about the validity of official mortality data. To help elucidate the determinants of mortality, we examined whether indirect demographic techniques could be used to study mortality in countries such as the Russian Federation, where mortality data are inadequate, using input data independent from official vital statistics.

Methods A national sample of the population was interviewed ($n = 1600$, response rate = 67%). Participants who had ever been married (82% of the sample) were asked about the date of birth and vital status of their first spouse. Spousal mortality was then estimated indirectly for the 531 men and 710 women for whom valid data were available.

Findings The estimated risk of death between the ages of 35–69 years was 57% for male spouses and 17% for female spouses. Corresponding figures derived from national data for 1990 were 52% and 25% for the Russian Federation, and 31% and 20% for the United Kingdom. According to spouses' reports, 38% of their husbands died from cardiovascular disease, 22% from cancer, and 14% from injuries and accidents. Mortality of male spouses was inversely related to the education level of their wives, and the age-adjusted hazard ratios for death from all causes, compared to primary education, were 0.77 for secondary education and 0.57 for university education (trend $P = 0.03$). Mortality was also inversely related to ownership of household items, but not to size of settlement, pride in Russia, membership in the Soviet Communist Party, nationality or self-assessed social status.

Conclusions Although the indirect estimates were imprecise (partly owing to the small population size of the study), and mortality in women was probably underestimated (owing to many factors, including poorer reporting by males and high male mortality), our results are nevertheless consistent with the mortality pattern observed in official mortality data. The indirect technique thus appears to be a useful tool to study the determinants of mortality in the Russian Federation and other populations, where reliable or sufficiently extensive data are not available.

Keywords Mortality/trends; Cause of death; Widowhood; Spouses; Statistics/methods; Survival analysis; Sex factors; Age factors; Socioeconomic factors; Politics; Sampling studies; Cross-sectional studies; Russian Federation (*source: MeSH, NLM*).

Mots clés Mortalité/orientations; Cause décès; Veuvage; Epoux; Statistique/méthodes; Analyse survie; Facteur sexuel; Facteur âge; Facteur socio-économique; Politique; Etude échantillon; Etude section efficace; Fédération de Russie (*source: MeSH, INSERM*).

Palabras clave Mortalidad/tendencias; Causa de muerte; Viudez; Esposos; Estadística/métodos; Análisis de supervivencia; Factores sexuales; Factores de edad; Factores socioeconómicos; Política; Muestreo; Estudios transversales; Federación de Rusia (*fuente: DeCS, BIREME*).

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Voir page 880 le résumé en français. En la página 881 figura un resumen en español.

Introduction

During the Russian mortality crisis, mortality increased dramatically between 1987–94. Since then, it has fluctuated enormously in absolute terms. Between 1990–95, for example, the rise in mortality was equivalent to more than 2 million additional deaths above long-term mortality rates (*1*). Although the mortality fluctuations are real (*2–6*), their scale raises questions about the quality of official vital statistics data in the Russian Federation. It is also questionable whether official estimates accurately identify groups in the population that are at high risk of death, especially given that extensive mortality data are not available. By combining death certification data and microcensus data, it was inferred that mortality rates were particularly high in men and among people with low education (*7*), but this finding was based on official data and may be affected by biases similar to those in routine data. It would be useful, therefore, to be able to assess the mortality patterns in Russia using data independent from vital registration.

A striking feature of previously collected data was the high proportion of widows (*8*). Russian population data also show a large deficit of men at middle and older ages (*9*). Between 1970–93, for example, the sex differential in life expectancy at birth

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was approximately 11 years in Russia, compared with an average of about six years in European countries (*6*).

Besides implying a large excess lifetime male mortality, the foregoing data suggested a way to estimate mortality without relying on national vital statistics. If vital registration data are unavailable, relatives are the ones most likely to be able to provide information about the deceased. Most people have a living close relative, and relatives will usually be in a good position to report the circumstances of a close relative; in many cases, they will have resided together for years and, as we show later, relatives generally remain in contact with each other. Furthermore, demographers have long used survival data on spouses, siblings or parents in population surveys to estimate mortality in populations where vital status data were unavailable or unreliable (*10–12*). In this paper, we report on a similar, indirect demographic approach in the Russian Federation. The main goal was to investigate whether such an approach could complement routine death registration data, and help elucidate the determinants of mortality.

Methods

The survey was commissioned by the New Russian Barometer survey programme, which is primarily focused on social and political attitudes (*13*), and was conducted by the Russian Agency for Public Opinion Research in February 2000. The sample data, which was collected through interviews across a multistage stratified random population, represented a cross-sectional survey of a national sample of the Russian population. The Russian Federation was stratified into 22 regions, with each region further stratified into urban and rural areas. Within this framework, the number of towns and settlements included in the study was proportional to the size of the regional populations; the specific towns and settlements in the study were chosen at random.

At each randomly selected primary sampling unit (location) an address was randomly selected and interviewers were instructed to seek a face-to-face interview at every *n*-th eligible household. At each address, the interviewer asked for a respondent who matched an age-sex-education grid. In total, 2396 households containing an eligible respondent were identified, and 1600 completed interviews were achieved, an overall response rate of 67%.

In addition to questions on age, gender, socioeconomic characteristics, and social and political attitudes, the participants were asked: whether they had ever been married and, if so, the year of the first marriage, and how old they and their first spouse were at the time; whether the first spouse was still alive at the time of the survey and, if not, how old he/she was when he/she died; and what was the cause of his/her death (if known) (*10*, *11*). Remarried people were reclassified as widowed if their first spouse had died. Never-married people could not be included in the following analyses, but they account for less than 10% of the sample aged $\geqslant 30$ years.

We then estimated the mortality of male and female first spouses of the study participants by dividing the number of deceased male or female first spouses by the total number of first spouses (*10, 11*). To estimate survival of spouses, we used Kaplan–Meier survival analysis and actuarial life-table techniques; and we calculated Cox's proportional hazard ratios to assess the effect of participants' socioeconomic characteristics on their spouses' survival.

Information on survival was collected from the year of marriage. Thus, only older respondents reported on time periods well before the survey began, and only on exposure at younger ages. In the period just before the survey, the whole age range of experience of the married population was covered (Table 1). In particular, experience of older age groups was not available for earlier periods. The mortality estimates for those in their twenties were centred about the 1980s, whereas the estimates for those over 70 years old were centred in the second half of the 1990s. Thus, the overall results do not refer to a well-defined time period, or to a well-defined cohort, but to a non-uniform weighting of experiences of different groups. Although time period and cohort parameters can be estimated using statistical techniques, we only present overall survival curves in this preliminary analysis. However, the time period of survival curve that we chose for comparison, namely 1990, was between the effective mean of the mortality at young and old ages.

Results

Interviews were completed with 1600 people; of those, 1304 (82%) had ever been married; 44 did not state whether their spouse was still living; 5 did not state the year of marriage; 4 did not state the age of their spouse at the time of marriage; and 10 did not report the age of their spouse when s/he died. Valid data were therefore available on 1241 (95%) of ever-married subjects (531 men and 710 women; Table 2).

Mortality levels

Survival curves of spouses by age are shown in Fig. 1. In the age group 55–64 years, 9% of men and 41% of women had lost their first spouse. The data are slightly biased because the period of exposure to risk of death in the single state prior to marriage is included in the denominator, but death cannot have occurred then since the individual must have survived until marriage to be included in the sample. However, since death rates at young ages are low, and 97% of respondents' first marriages take place before 30 years of age, such biases are small after this age and we therefore present results only from 30 years of age (Fig. 1). Mortality of men was high: we estimated that 57% of males married by 35 years of age had died by 69 years of age. This is consistent with a risk of death of 52% estimated on the basis of national vital statistics for 1990, which are shown in the chart for comparison (*5*). By contrast, the risk of death for males between the ages of 35–69 years in the United Kingdom was only 31%.

Table 1. **Exposure of study spouses, in person years**

Age group (years)	Time period		
	1970–79	1980–89	1990–99
20–29	1572.5	1941.5	1290.0
30–39	1945.5	2519.5	2501.0
40–49	1738.5	1916.5	2335.5
50–59	715.0	1572.0	1662.5
60–69	115.0	525.0	1164.0
70–79	4.0	85.0	317.0

Table 2. **Characteristics of survey participants**

Characteristic	Men (n = 531)	Women (n = 710)
Age group (years)		
<35	89 (17)[a]	138 (19)
35–44	132 (25)	156 (22)
45–54	135 (25)	139 (20)
55–64	86 (16)	99 (14)
⩾65	89 (17)	178 (25)
Education		
Low	170 (32)	259 (36)
Medium	293 (55)	359 (51)
High	68 (13)	92 (13)
Age at first marriage (mean years ± 1 SD)	23.7±3.4	21.5±3.3
Age of first spouse at marriage (mean years ± 1 SD)	22.0±3.6	24.1±3.9
First spouse had died (n)	26 (5)	196 (28)

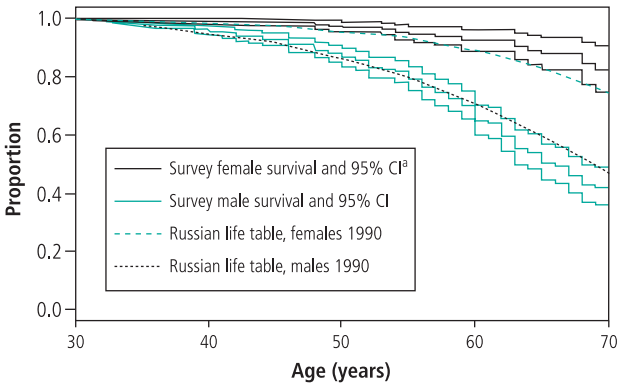
[a] Figures in parentheses are percentages.

The second noteworthy feature is the large gender gap in mortality. We found that only 17% of female spouses died between the ages of 35–69 years; corresponding 1990 published data for the whole population, of all marital statuses, suggested risks of 25% for the Russia Federation and 20% for the United Kingdom. The differences between our results and official estimates for males are not large, especially considering the precision of the estimates (see 95% confidence intervals, Fig. 1), and the fact that the population bases and the timing of the estimated mortality risks were different for the two studies. Our study estimated the survival of a cohort of spouses, while the official data estimated hypothetical survival, assuming current mortality rates.

The data in the present study do not correspond to a well-defined time period or cohort, but do include information going back to the earliest year of marriage in the survey population. However, the experience covered was weighted towards the period just before the survey date, since nearly all respondents provided information on that period, whereas only the relatively small proportion of older people provided information about earlier periods. In addition, information for earlier periods was confined to the experiences of people who were younger at the time, since those who were old were not alive at the survey date. Such information is routinely available from cross-sectional surveys and censuses, and have been extensively analysed (*14, 15*).

In practice, contribution of different calendar periods should not be a major problem in Russia since male expectation of life at birth was similar between 1958–92, at 61.9–64.9 years, but dropped sharply in 1993. The period estimate in 1990 should therefore be similar to that for cohorts reporting in 2000. However, 1990 was a high point for female expectation of life at birth and we would have expected the survey survival results to be lower than the vital statistics estimate, whereas they were in fact higher. Our method probably underestimated female mortality for a number of reasons, as discussed later. Given the small total number of reported deaths of wives — all, 22 in total — and the reservations about data quality, we confined subsequent analysis to male deaths only.

Fig. 1. **Survival of male and female spouses of study participants, from age 30 years**



[a] Confidence interval.

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Mortality over time

We also examined whether the survey data provided information on the temporal variation in mortality in the Russian Federation, and checked the results in Fig. 1 against known trends in male mortality. We focused initially on men aged 45–64 years, in whom most deaths occurred. We calculated the proportion of men who were alive in 1985, 1990 and 1995, and who died in the subsequent 5 years. These 5-year periods (1985–89, 1990–94 and 1995–99) roughly correspond to periods in the country of relatively low, high and declining mortality, respectively; the 5-year mortality risks were 10.2% (19/186) in 1985–89; 14.8% (28/189) in 1990–94; and 11.6% (20/172) in 1995–99. Although the absolute numbers of deaths were small, the pattern was consistent with national mortality trends.

To obtain more precise overall indicators, we computed life tables for a number of 10-year time periods before the survey, by estimating the number of person-years of exposure and deaths in the first married state (the survival curves are available on request); this overcame the problem of including the premarital exposure noted above and also permitted period life tables to be computed which can be compared directly with official statistics. Our estimates showed relatively high mortality in the 1970s and the first part of the 1990s, a trend similar to that seen in official statistics, even though the average number of deaths in each group was only about 40. In particular, the data do not appear to underrecord deaths, at least up to 30 years before the survey date.

Causes of death

According to spouses' reports, 38% of married men died from cardiovascular disease, 22% from cancer and 14% from injuries and accidents. In women, the absolute numbers of deaths were substantially smaller; 28% died from cardiovascular disease and 28% from cancer. Because the primary causes of death change with age, we compared the distribution of causes of death in male spouses aged 45–64 years (which contained most deaths in our sample) with that for the 1995 national data (*16*). The proportions of deaths attributed to main causes in this age group in the sample and in the national data, respectively, were remarkably similar: heart disease, 29% vs 27%; stroke, 12% vs 11%; cancers, 16% vs 18%; and injuries, 12% vs 12%.

Socioeconomic predictors of mortality

We examined whether socioeconomic characteristics of the responders were associated with the mortality of their spouses. Because of the small number of deaths among female spouses, these analyses were again restricted to men (but patterns were similar in women). We found that men's mortality from all causes increased markedly as the spouse's level of education decreased (Table 3). Even stronger gradients were found for cardiovascular deaths; the relative risks for spouses of women with secondary and university education, compared to those with primary education, were 0.71 (0.42–1.19) and 0.45 (0.14–1.44), respectively, (trend $P = 0.08$ (not shown)). The corresponding relative risks (comparing spouses of women with secondary and university education to those with primary education) were 0.55 (0.27–1.13; trend $P = 0.13$) for death from injuries, and 0.37 (0.09–1.59; trend $P = 0.06$) for causes related to alcohol (not shown). We also found a large gradient in all-causes mortality by the number of items (colour TV, video recorder and car) owned by the responder's household (Table 3), which was not reduced by adjusting for spouse's education. We found no differences by size of settlement, spouse's nationality, pride in Russian citizenship, membership in the Soviet Communist Party or by self-assessed social status (Table 3).

Table 3. **Age-adjusted hazard ratios of death from all causes among Russian men, by socioeconomic characteristic of spouse**[a]

Spouse socioeconomic characteristic	No. of deaths/ No. of men	Hazard ratio
Education		
Low	133/259	1
Medium	53/359	0.77 (0.55–1.06)[b]
High	10/92	0.57 (0.30–1.10)
		P for trend = 0.03
Household items ownership[c]		
0	65/116	1
1	106/346	0.62 (0.46–0.85)
2	20/175	0.46 (0.28–0.77)
3	5/73	0.45 (0.18–1.14)
		P for trend = 0.001
Nationality		
Russian	175/627	1
Ukrainian	7/26	0.98 (0.46–2.09)
Other	14/57	1.22 (0.71–2.11)
Pride in the Russian Federation		
Very proud	72/238	1
Somewhat proud	93/344	1.08 (0.79–1.47)
Not very/not at all proud	30/123	1.14 (0.74–1.75)
		P for trend = 0.51
Self-assessed social status		
Low	87/207	1
Medium	64/341	0.92 (0.66–1.27)
High	43/159	1.07 (0.74–1.54)
Member Soviet Communist Party in the family		
Yes	84/266	1
No	110/438	1.08 (0.81–1.44)
Size of settlement		
<50 000	98/349	1
<500 000	43/159	0.99 (0.69–1.42)
>500 000	55/202	0.91 (0.65–1.27)
		P for trend = 0.60

[a] The men were all first spouses of female study participants and their hazard ratios have been listed by their spouses' socioeconomic characteristics.
[b] Figures in parentheses are 95% confidence intervals.
[c] Household items: colour TV, video recorder and car.

Discussion

An analysis of the Russian mortality crisis, using data independent from national vital statistics, gave results that were consistent with official national mortality data. Mortality rates were high among Russian men, contributing to a large gender gap in death rates, and there was also a pronounced social gradient in mortality rates.

Limitations of the study

There are a number of limitations to data based on spouses' reports. First, the data may have been biased by the nonresponse rate and refusal of interview. If spouses of nonresponders were more or less likely to have died, the data would have over- or underestimated mortality of ever-married people, respectively.

Second, our study says nothing about never-married and formerly-married people. Never-married people, especially men, in Eastern Europe may be particularly socially isolated and vulnerable and they experience considerably higher mortality than married men (*17*), but they cannot be studied by the widowhood method. Since never-married people (including the widowed and divorced) have, in general, higher mortality than married people, the risks of death estimated in this study would probably underestimate the risk in the general population (although using data on siblings (*12*) would mitigate this problem). However, since over 90% of men aged 35 years and older were married (*18*), this will not seriously bias these values as estimates of overall mortality. Some underreporting of deaths may have occurred among participants who were remarried and did not know whether their first spouses had died. We did not ask about remarriage and therefore could not examine this possible bias, but the survival curves of male spouses were consistent with the official data, which suggested that remarriage did not introduce a major bias into our data. This bias would probably not have affected the associations between participants' characteristics and their spouses' death risks (Table 3).

Third, as this was a small study, the estimates of mortality or relative risks were imprecise. Fourth, these data probably underestimated female mortality in Russia, since men are poorer at recalling such events than women (*19*). Also, because mortality of spouses is positively correlated, perhaps due to lifestyle or diet, those women at higher mortality risk were probably underreported, since their spouses were more likely to have died before we could interview them, compared to the spouses of women at lower risk. Since there is far less attrition of females, the effect is smaller for the reporting of male deaths. Thus, female mortality would be differentially underestimated and the gender gap in mortality overestimated. On the other hand, estimates of male mortality are probably not substantially biased.

Finally, the characteristics of the study subjects were indirect, and probably imprecise indicators of spouses' socioeconomic status. However, misclassification was most likely random and would have led to an underestimation of the social

differences in mortality. Similarly, the causes of deaths reported by spouses are imprecise, but they can serve as a rough guide.

Strengths of the study

The method used in this study has several advantages. It is a relatively low-cost way to study mortality in a national population, and may also allow determinants of mortality to be studied when the spouses' reporting is reliable. The method makes it possible to complement routine statistics with independent data. The quality of the data gathered by this method should be better in Russia, where the population is well educated, compared to countries with high illiteracy rates, where indirect methods have so far been predominantly used (*12*).

Our results confirm that the high mortality rates among Russian men are genuine, rather than an artefact of poor-quality vital data, and they support the anecdotal notion that the Russian Federation is "a country of widows". This study corroborates the work of Shkolnikov, who reconstructed the Russian life tables from previously available data (*2–5*), and of Leon et al. who demonstrated that death rates from cancer remained stable during the period 1987–94, indicating that a numerator-denominator bias was unlikely (*6*). Although the numbers of subjects and deaths in this study were small, the results show that this method could be used to validate temporal fluctuations in mortality, and to examine whether the fluctuations were larger in some groups than in others.

A large number of studies have unanimously agreed that socioeconomic differences influence mortality and other health outcomes (*20*). Although the causes are not understood, they are probably related to the direct effects of material conditions, unhealthy lifestyles and psychosocial factors (*20, 21*). Our study confirmed there was a pronounced socioeconomic mortality gradient in the Russian Federation. Shkolnikov et al. estimated that in 1993–94, men with lower than secondary education had 62% higher mortality than men who had completed secondary or higher education (*7*). Similarly, men with lower education also had an excess of mortality from coronary heart disease (*22*), and follow-up studies of participants in the Novosibirsk MONICA surveys also found a strong educational gradient in mortality (S. Malyutina, personal communication, 2002.). While some of the effect of material conditions (measured by household items) may be artifactual, such as from a decline in living standards after widowing, the association with education seems genuine, because education is a stable characteristic. The results of this study are also consistent with studies of self-rated health in Russian population samples, which showed that poor education and material deprivation were strongly associated with poor health (*8, 23*), but political attitudes were not (*8*). The self-assessed social status of the study participants was not related to their spouses' survival, and it is possible that this indicator is not sufficiently objective to provide a meaningful measure of the socio-economic status of the spouses.

The results of this pilot study suggest that the indirect technique based on survival of spouses (and other relatives) can be a good and cost-effective tool to study the determinants and patterns of mortality. The method allows the collection of data on a wider range of potential risk factors, and may be used where reliable or extensive data are not available. When large effects of relatively common exposures are suspected, the indirect technique may be an alternative to cohort studies and, with a sufficient sample size, be able to provide more timely information than vital statistics. ■

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Conflicts of interest: none declared

Résumé

Tableau de mortalité dans la Fédération de Russie : technique indirecte d'après les données sur le veuvage

Introduction La crise de mortalité qu'a connu la Russie au début des années 90 a soulevé un vif intérêt, mais les données sur les covariables possibles font défaut et des doutes ont été émis quant à la validité des données officielles de mortalité. Dans le but d'aider à élucider les déterminants de la mortalité, nous avons examiné s'il était possible d'utiliser des techniques démographiques indirectes pour étudier la mortalité dans des pays comme la Fédération de Russie – où les données concernant la mortalité sont insuffisantes – en faisant appel à des données indépendantes des statistiques officielles d'état civil.

Méthodes Un échantillon national de population a été interrogé (n = 1600, taux de réponse = 67 %). Les participants ayant été mariés au moins une fois (82 % de l'échantillon) ont été interrogés sur la date de naissance de leur premier conjoint et il leur a été demandé si ce conjoint était encore en vie ou s'il était décédé. La mortalité conjugale a alors été estimée de façon indirecte pour les 531 hommes et les 710 femmes pour lesquels on disposait de données valables.

Résultats Le risque estimé de décès dans la tranche d'âge 35-69 ans était de 57 % pour les époux et de 17 % pour les épouses. Les chiffres correspondants dérivés des données nationales pour 1990 étaient de 52 % et 25 % dans la Fédération de Russie et de 31 % et 20 % au Royaume-Uni. D'après les informations fournies par les épouses, 38 % des époux étaient décédés de maladie cardio-vasculaire, 22 % de cancer et 14 % de traumatismes ou d'accidents. La mortalité des époux était inversement proportionnelle au niveau d'étude des épouses, et les rapports de risque ajustés sur l'âge pour les décès toutes causes confondues étaient, par rapport à un niveau d'études primaire, de 0,77 pour les études secondaires et de 0,57 pour les études universitaires (p de tendance = 0,03). La mortalité était de même inversement proportionnelle à la possession de biens d'équipement domestique, mais non à la population du lieu de résidence, au sentiment de fierté vis-à-vis de la Russie, à l'appartenance au Parti Communiste soviétique, à la nationalité ni à la situation sociale telle que jugée par l'intéressé(e).

Conclusion Bien que les estimations indirectes soient imprécises (en partie du fait de la petite taille de la population d'étude) et que la mortalité féminine soit probablement sous-estimée (du fait de nombreux facteurs, notamment de la moindre qualité des

informations données par les hommes et de la forte mortalité masculine), nos résultats sont en accord avec le tableau de mortalité issu des données officielles de mortalité. La technique indirecte semble donc utile pour étudier les déterminants de la mortalité dans la Fédération de Russie et dans d'autres populations où il n'existe pas de données fiables ou suffisamment complètes.

Resumen

Estructura de la mortalidad en la Federación de Rusia: técnica indirecta basada en datos aportados por personas viudas

Objetivo El espectacular aumento de la mortalidad que sufrió Rusia a principios de los años noventa atrajo una gran atención, pero falta información sobre las posibles covariables implicadas, y se ha llegado a cuestionar la validez de los datos oficiales sobre la mortalidad. Para contribuir a dilucidar los factores determinantes de ésta, procedimos a analizar si era posible utilizar en países como la Federación de Rusia, con unos datos de mortalidad insuficientes, técnicas demográficas indirectas basadas en datos independientes de las estadísticas vitales oficiales.

Métodos Se entrevistó a una muestra nacional de la población (n = 1600, tasa de respuestas = 67%). A los participantes que habían estado casados (82% de la muestra) se les interrogó acerca de la fecha de nacimiento y el estado vital de su primer cónyuge. Se estimó así indirectamente la mortalidad conyugal de los 531 hombres y 710 mujeres sobre los que se reunieron datos válidos.

Resultados El riesgo estimado de defunción entre las edades de 35 a 69 años fue del 57% para los cónyuges varones y del 17% para las consortes. Las cifras correspondientes derivadas de los datos nacionales para 1990 fueron del 52% y el 25% para la Federación de Rusia, y del 31% y el 20% para el Reino Unido. Según las declaraciones de las mujeres, el 38% de sus maridos murieron de enfermedades cardiovasculares, el 22% de cáncer, y un 14% a causa de traumatismos y accidentes. La mortalidad de los cónyuges varones estaba inversamente relacionada con el nivel de instrucción de sus mujeres, y las razones de riesgos instantáneos ajustadas por la edad para las defunciones por todas las causas, refereridas a la posesión de estudios primarios, fueron de 0,77 para la educación secundaria y de 0,57 para los estudios universitarios (tendencia: $P = 0,03$). La mortalidad también estaba inversamente relacionada con los artículos domésticos poseídos, pero no así con el tamaño de la localidad, el orgullo de ser ciudadano ruso, la pertenencia al Partido Comunista Soviético, la nacionalidad o el estatus social autoasignado.

Conclusión Pese a que las estimaciones indirectas fueron imprecisas (debido en parte al pequeño tamaño de la población estudiada) y a que probablemente se subestimó la mortalidad de las mujeres, (debido a numerosos factores, entre ellos la menor concreción de las declaraciones de los hombres y la elevada mortalidad masculina), nuestros resultados son con todo coherentes con el perfil de mortalidad derivado de los datos oficiales de mortalidad. La técnica indirecta empleada parece por tanto un valioso instrumento para estudiar los factores determinantes de la mortalidad en la Federación de Rusia y en otras poblaciones sobre las que no se dispone de datos fiables y suficientemente amplios.

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