RESEARCH REPORT

Social capital in a changing society: cross sectional associations with middle aged female and male mortality rates

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Objectives: Social capital has been linked to self rated health and mortality rates. The authors examined the relations between measures of social capital and male/female mortality rates across counties in Hungary.
Design: Cross sectional, ecological study.
Setting: 20 counties of Hungary.
Participants and methods: 12 640 people were interviewed in 1995 (the "Hungarostudy II" survey), representing the Hungarian population according to sex, age, and county. Social capital was measured by three indicators: lack of social trust, reciprocity between citizens, and help received from civil organisations. Covariates included county GDP, personal income, education, unemployment, smoking, and alcohol spirit consumption.
Main outcome measure: Gender specific mortality rates were calculated for the middle aged population (45–64 years) in the 20 counties of Hungary.
Results: All of the social capital variables were significantly associated with middle age mortality, but levels of mistrust showed the strongest association. Several gender differences were observed, namely male mortality rates were more closely associated with lack of help from civic organisations, while female mortality rates were more closely connected with perceptions of reciprocity.
Conclusion: There are gender differences in the relations of specific social capital indicators to mortality rates. At the same time, perceptions of social capital within each sex were associated with mortality rates in the opposite sex.

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Accepted for publication 13 May 2002
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U p to the end of the 1970s, mortality rates in Hungary were actually lower than in Britain or Austria. Subsequently, mortality rates continued to decline in Western Europe, whereas in Hungary and in other Central East European (CEE) countries this tendency reversed, especially among middle aged men.[1–3] In the late 1980s, mortality rates among 45–64 year old men in Hungary rose to higher levels than they were in the 1930s, while the mortality rates in the older age groups were comparable to the worst in Western Europe.[2 3] What explains the vulnerability of middle aged men during this period of rapid economic change?

This deterioration cannot be ascribed to deficiencies in health care, because during these years there was a significant decrease in infant and old age mortality and improvements in other dimensions of health care.[2] Furthermore, between 1960 and 1989 there was a constant increase in the gross domestic product in Hungary. Thus the worsening health status of the Hungarian male population cannot be explained by a worsening material situation.[2]

A growing polarisation of the socioeconomic situation occurred in the CEE countries, especially in Hungary between 1960 and 1990. The vast majority of the population lived at nearly the same low level in 1960, with practically no income inequality, and there were no mortality differences between socioeconomic strata. Since that time, increasing disparities in socioeconomic conditions have been accompanied by a widening socioeconomic gradient in mortality, especially among men. According to Whitehead, *Inequalities in health*[4]:

"The trends in Hungary over the past fifty years show that in the pre war period there were large differentials in mortality rising from non-manual to manual occupations and highest in manual agricultural workers. These differ-

ences decreased under the new system after the war, until by 1960 they had virtually disappeared. This lack of inequalities was relatively short-lived, and an increase was noted again for men up until 1983. This resulted from an increase in both groups of manual workers, with mortality of non manual men remaining unchanged over the period. For women, inequalities in mortality were also reduced in the immediate post-war period, and when they increased again, this increase was smaller than that found in men."

The mortality ratio comparing the lowest to highest educational stratum is 1.8 for Hungarian men, compared with 1.2 for women.[5] That is, one of the most interesting features of the so called "Central-Eastern-European health paradox" is the gender difference in worsening mortality. It is more intriguing because men and women share the same socioeconomic and political circumstances.

Besides the polarisation of socioeconomic circumstances, an attitude of disrespect for the law relating to financial matters seems to have become more prevalent in Hungarian society during the period of economic transformation. This led many citizens to perceive that they could attain a desired standard of living only through deviant means, thereby increasing the sense of *anomie*. Anomie is one of the basic concepts in modern sociology since Durkheim, referring to a situation in which social norms lose their hold over individual behaviour.[6]

Several studies in Hungary showed a weakening in community values during the political changes of 1989 and the 1990s. Spéder, for example, found that people who agreed with the statement "to achieve a good career, one must break some rules" increased by 12.8% between 1993 and 1997 (Z

Spéder,Conference on "New political system in the new century in Hungary" Budapest, 1999, Spéder[7], and Andorka[8]).

On the basis of the above facts our hypothesis was that in a suddenly changing society the county level variations in "social capital" might be related differentially to the premature mortality rates among men and women. There is growing evidence at the individual and within country level, that psychosocial factors, like distrust affect health.[9][10] We examined regional differences in indicators of social capital in Hungary.

Social capital is defined as the assets and resources available to individuals through their connections to their communities and to society.[11–13] It has been measured by indicators such as the level of trust between citizens, the existence of norms of reciprocity, as well as citizen participation in (and support received from) civic and voluntary associations. As social cohesion erodes, and the sense of *anomie* increases, it is hypothesised that levels of social capital decline in society.[11–13] The concept of social capital therefore has potential relevance for examining the mortality crisis in CEE countries.[14] Although the definition and measurement of social capital has been recently contested,[15] it is thought that constructs such as trust and reciprocity measured at the societal or community level have meaning and relevance for health outcomes over and above trust and perceived help measured at the individual level.[11]

METHODS

The Hungarostudy II is a national cross sectional survey representing the Hungarian population over the age of 16 according to sex, age, and the 20 counties of Hungary. In 1995 12 640 persons were interviewed in their homes.[16–18]

Sampling methods

Sample was accomplished through a stratified, multistage sampling procedure. In the first stage all settlements with a population over 5000 were included in the sample, and a random selection was made of those with a population of less than 5000. In the second stage single households were selected from the Central Statistical Institute database according to distribution of the population by county and settlement size. The final sample was controlled for gender, age, and settlement size characteristics of the given county. The final sample characteristics for each county corresponded very well with the population descriptors of the Central Statistical Office for the required parameters (age, gender, settlement size). The refusal rate was 19% for the full sample, although there were significant differences, depending on the settlements. In big cities the refusal rate was much higher than in villages. In such a large study the sampling bias caused by the refusals cannot be avoided. For each refusal, the interviewers selected another person with similar sampling characteristics in the given neighbourhood. The replacement sampling procedure was found not to result in significant selection bias.[16–18]

In this study we used data from these surveys to analyse the relations of components of social capital to male and female mortality rates. Following Putnam[19] and Kawachi,[13] individual components of social capital were measured by three items concerning levels of social trust, perceptions of reciprocity, and support received from civic and religious organisations. The level of trust was assessed from responses to the item that asked whether the interviewed person agreed that "People are generally dishonest and selfish and they want to take advantage of others." (Answer 0–3, totally disagree to totally agree). This item is very similar to the item from the US General Social Survey, used by Kawachi *et al*[13] as an indicator of lack of social trust.

Citizens' perceptions of reciprocity were assessed from the responses to the item "If I do nice things for someone, I can

anticipate that they will respect me and treat me just as well as I treat them." (Answer 0–3, totally disagree to totally agree).

Perceived support from civic or religious organisations was measured according to Caldwell *et al*[20] as follows: "In a difficult situation, whose help can you count on from?" (0=none, 1=little, 2=moderate or average, 3=a great deal). After this question the interviewers asked separately how much support the person could expect from civic organisations and separately from religious organisations?

Civic organisations were defined as non-profit, voluntary organisations, societies, self help groups, and clubs. Political parties, unions and churches were not included. Religious organisations were defined as different types of formal and informal groups set up on a religious basis.

The weighted average values for the above variables were computed for the 20 Hungarian counties.

We also separately computed the middle aged male and female averages for the three social capital items. Male and female mortality rates in the 45–64 years age group were obtained for each county from the 1995 Statistical Yearbook of Hungary.[2]

We included the following confounding socioeconomic and behavioural variables: average per capita GDP values (in 1000 HUF) for each county, the unemployment rate,[2] personal income, education, smoking (prevalence of smokers based on the Ways of Coping questionnaire[19]), and drinking habits (average spirit consumption on one occasion). The weighted average values for the above variables were computed for the 20 Hungarian counties.

RESULTS

Relation between social capital measures and male and female middle aged mortality rates in 1995

In the 45–64 year old population, 1521 men and 1790 women were interviewed. Table 1 shows the correlation coefficients between social capital variables and female and male middle aged mortality rates. Among men the most significant correlations were found with overall mistrust, as well as with male reports of perceived help from civic associations. Interestingly male mortality showed a highly significant correlation with perceptions of reciprocity among women. Among women, the average values of mistrust and reciprocity reported by women, as well as male reports of perceived help from civic associations were most strongly correlated with mortality. Male and female mortality rates were significantly interrelated in the 20 Hungarian counties ($r=0.571$, $p=0.009$).

Tables 2 and 3 show the correlation coefficients for male and female middle age mortality by social capital and confounding variables (per capita GDP, unemployment, education, personal income, spirit consumption, and smoking). The markers of material circumstances correlated significantly with social capital variables. Moreover, both the markers of socioeconomic situation and health behaviours were independently correlated with both male and female mortality rates. Social capital variables showed also highly significant correlations with both male and female middle aged mortality rates, more among women than among men.

After including the socioeconomic and behavioural confounding variables, middle aged male mortality correlated most closely with GDP, unemployment, personal income, and education. Received help from civic organisations, distrust, and reciprocity were also highly significantly correlated with mortality. Among the social capital variables received support from civic organisations was most closely connected with GDP, unemployment, and personal income.

Among women there was a stronger correlation between female middle aged mortality and the social capital variables, compared with other SES measures (GDP, unemployment, income, education) as well as risk behaviour and mortality

Table 1 Pearson correlations for female and male (45–64 years old) mortality by social capital variables (weighted by number of cases, age 45–64)

	Middle age (45–64 year) male mortality	Significance (two tailed)	Middle age (45–64 year) female mortality	Significance (two tailed)
	N (male)=1521		N (female)=1790	
Distrust	0.390	0.000	0.302	0.000
Reciprocity	−0.202	0.000	−0.354	0.000
Received help from civil associations	−0.248	0.000	−0.248	0.000
Male distrust	0.353	0.000	0.160	0.000
Male reciprocity	−0.098	0.000	−0.292	0.000
Male received help from civil associations	−0.331	0.000	−0.256	0.000
Female distrust	0.383	0.000	0.443	0.000
Female reciprocity	−0.300	0.000	−0.388	0.000
Female received help from civil associations	−0.146	0.000	−0.226	0.000
Middle age male distrust	0.335	0.000	0.128	0.000
Middle age male reciprocity	−0.214	0.000	−0.349	0.000
Middle age male received help from civil associations	−0.340	0.000	0.012	0.616
Middle age female distrust	0.329	0.000	0.588	0.000
Middle age female reciprocity	−0.086	0.001	−0.366	0.000
Middle age female received help from civil associations	−0.138	0.000	−0.153	0.000

Table 2 Pearson correlations between mortality rates, social capital indicators, and potential confounding variables for male, 45–64 years (n=1521) (weighted by the interviewed men in the counties)

	Male mortality	Male distrust	Male reciprocity	Male received help from civil organisation	GDP	Unemployment rate	Male education	Male income	Male spirit consumption	Male smoking
Male mortality	1.000	0.335**	−0.214**	−0.340**	−0.750**	0.734**	−0.493**	−0.624**	0.066*	−0.044
Male distrust	0.335**	1.000	0.188**	−0.245**	−0.174**	0.396**	−0.161**	−0.117**	−0.155**	0.059*
Male reciprocity	−0.214**	0.188**	1.000	−0.090**	0.119**	−0.122**	0.073**	−0.016	−0.095**	0.213**
Male received help from civil organisation	−0.340**	−0.245**	−0.090**	1.000	0.572**	−0.465**	0.224**	0.423**	0.056*	0.177**
GDP	−0.750**	−0.174**	0.119**	0.572**	1.000	−0.710**	0.534**	0.826**	0.045	0.246**
Unemployment rate	0.734**	0.396**	−0.122**	−0.465**	−0.710**	1.000	−0.730**	−0.751**	0.109**	−0.183**
Male education	−0.493**	−0.161**	0.073**	0.224**	0.534**	−0.730**	1.000	0.741**	−0.043	0.136**
Male income	−0.624**	−0.117**	−0.016	0.423**	0.826**	−0.751**	0.741**	1.000	0.016	0.251**
Male spirit consumption	0.066*	−0.155**	−0.095**	0.056*	0.045	0.109**	−0.043	0.016	1.000	0.556**
Male smoking	0.044	0.059*	0.213**	0.177**	0.246**	−0.183**	0.136**	0.251	0.556**	1.000

**Correlation is significant at the 0.01 level (two tailed). *Correlation is significant at the 0.05 level (two tailed).

Table 3 Pearson correlations between mortality rates, social capital indicators, and potential confounding variables, for women 45–64 years (n=1790) (weighted by the interviewed women in the counties)

	Female mortality	Female distrust	Female reciprocity	Female received help from civil organisation	GDP	Unemployment rate	Female education	Female income	Female spirit consumption	Female smoking
Female mortality	1.000	0.588**	−0.366**	−0.153**	−0.350**	0.373**	−0.118**	−0.055*	0.241**	0.139**
Female distrust	0.588**	1.000	−0.076**	−0.389**	−0.040	0.261**	0.091**	−0.030	0.165**	−0.128**
Female reciprocity	−0.366**	−0.076**	1.000	−0.259**	−0.266**	0.161**	−0.247**	−0.550**	−0.571**	−0.519**
Female received help from civil organisation	−0.153**	−0.389**	−0.259**	1.000	0.356**	−0.303**	0.134**	0.193**	−0.072**	0.522**
GDP	−0.350**	−0.040	−0.266**	0.356**	1.000	−0.711**	0.658**	0.423**	0.340**	0.394**
Unemployment rate	0.373**	0.261**	0.161**	−0.303**	−0.711**	1.000	−0.799**	−0.563**	−0.112**	−0.185**
Female education	−0.118**	0.091**	−0.247**	0.134**	0.658**	−0.799**	1.000	0.536**	0.445**	0.333*
Female income	−0.055*	−0.030	−0.550**	0.193**	0.423**	−0.563**	0.536**	1.000	0.280**	0.485**
Female spirit consumption	0.241**	0.165**	−0.571**	−0.072**	0.340**	−0.112**	0.445**	0.280**	1.000	0.497**
Female smoking	0.139**	−0.128**	−0.519**	0.522**	0.394**	−0.185**	0.333**	0.485**	0.497**	1.000

**Correlation is significant at the 0.01 level (two tailed). *Correlation is significant at the 0.05 level (two tailed).

(alcohol and smoking). Among the social capital variables, received support from civic organisations was also more closely connected with GDP and unemployment than the other social capital variables.

After controlling for these potential socioeconomic and behavioural confounding variables, regression analyses indicate, that the social capital variables (trust, reciprocity, and help from civic organisations) remain significantly associated with mortality rates (tables 4 and 5) Among men in the multivariable regression model, when we included the confounding variables beside the social capital variables, the variables explained 77.3% of the variance, more than the social capital variables alone. For men GDP, unemployment, and education were the most important variables explaining the middle aged

Table 4 Multivariable linear regression results for middle aged (45–64 years old) male mortality (weighted by the interviewed men in the counties) (n=1521)

	β	SE	t	p	Adjusted r²
Model (Constant)	14.96	0.59	25.29	0.000	
GDP	−9.7E-03	0.001	−29.61	0.000	
Unemployment rate	0.32	0.02	19.99	0.000	
Male smoking	4.25	0.19	22.17	0.000	
Male distrust*	0.648	0.15	4.38	0.000	
Male reciprocity†	−1.53	0.11	−13.95	0.000	
Male received help from civic associations‡	2.43	0.25	9.66	0.000	
Male spirit consumption	−4.0	0.37	10.83	0.000	
Male education	0.563	0.08	7.21	0.000	0.773

*Measured by the average responding, "People are generally dishonest and selfish and they want to take advantage of others" (0–3). †Measured by the average responding, "If I do nice things for someone, I can anticipate that they will respect me and treat me just as well as I treat them" (0–3). ‡Measured by the average responding, "In a difficult situation, whose help can you count on from: (0–3) How much support can you expect from civic organisations and from religious organisations?

Table 5 Multivariable linear regression results for middle aged (45–64 years old) female mortality (weighted by the interviewed women in the counties) (n=1790)

	β	SE	t	p	Adjusted r²
Model (Constant)	11.49	0.20	56.74	0.000	
Female distrust*	2.07	0.05	44.53	0.000	
Female reciprocity†	−1.00	0.04	−22.82	0.000	
GDP	−3.2E-03	0.001	−35.24	0.000	
Female smoking	1.16	0.05	23.96	0.000	
Female personal income	−9.9E-05	0.001	−20.02	0.000	
Female unemployment rate	−0.01	0.006	−16.71	0.000	
Female education	−0.27	0.03	−8.87	0.000	
Female spirit consumption	0.76	0.20	3.73	0.000	0.743

*Measured by the average responding, "People are generally dishonest and selfish and they want to take advantage of others" (0–3). †Measured by the average responding, "If I do nice things for someone, I can anticipate that they will respect me and treat me just as well as I treat them" (0–3).

mortality differences among counties, but all three social capital variables remained significant predictors of male mortality.

Among women, in multi-variable regression model, these parameters explained 74.3% of the mortality differentials among countries. Female distrust was the most important predictor of middle aged female mortality differences among counties, more important than GDP. Female reciprocity was more important predictor of female mortality than the other socioeconomic and behavioural parameters.

The male/female difference in perceived support from civic organisations was significant in relation to religious organisations, but not significant for other civic organisations:

- Perceived help from religious organisations (1–3): male 10.5% female 14.8%

- Moderate to lots of help from religious organisations (2–3): male 5.1% female 8.4%

(χ^2=19.9, df=3, p<0.000).

- Perceived help from civic organisations (1–3): male 5.7% female 3.1%.

- Moderate to lots of help from civic organisations (2–3): male 1.2% female 1.2%

(χ^2=1.4, df=3, NS).

There were highly significant differences in perceived support from civic organisations among counties. In the counties with significantly better health characteristics (north western counties), the perceived support from civic organisations was highly significantly higher than in the Eastern counties.

We also analysed the same interrelations of social capital variables with the mortality rates above 65 years of age. In these age groups the predictive power of social capital variables was less significant than in the younger age groups.

DISCUSSION

Overall social trust, which is the opposite of the following statement "People are generally dishonest and selfish and they want to take advantage of others", was more strongly correlated with male than the female middle aged mortality rates. By contrast, perceived reciprocity (assessed by the question: "If I do nice things for someone, I can anticipate that they will respect me and treat me just as well as I treat them") showed a stronger correlation with female mortality rates. Close instrumental bonds among women also seem to be protective for male health, as judged by the association of perceived reciprocity among women to male mortality rates.

Perceived help from civic associations seems to be a more important protective factor for men. These differences suggest that the associations of social capital to mortality rates may vary by gender, and that gender specific and generation specific measures of social capital may be more relevant than overall gender blind assessments.

Difficulties in the interpretation of civic engagement constitute one limitation of this study. On the one hand, grass roots movements and social organisations were regarded as a sign of open defiance of the state in Hungary until the end of the 1980s. This situation discouraged most people from becoming members of such "illegal" organisations. On the other hand, the ruling elite established so called "social organisations" in order to influence members of society. As a result, the concept of "social organisations" gained a bad reputation in Hungarian society. Toward the end of the 1980s, however, civic associations and funds could be established without any fear of retaliation or administrative difficulties. However, many such organisations were used to conceal economic activities. Because of all these uncertainties, we chose to measure perceived support from civil and religious organisations instead of participation in these organisations. Despite difficulties in the interpretation, male support

Key points

- Indicators of social capital—perceived trust, reciprocity, and support received from civic and religious organisations—are strongly correlated with mid-age (45–64 years) male and female mortality across the 20 counties of Hungary.
- Mortality rates were most closely associated with levels of mistrust; male mortality rates were more closely associated with lack of help from civic organisations, while female mortality rates were more closely connected with perceptions of reciprocity.
- There are gender differences in the relation of social capital to mortality rates.

perceived from civic associations seems to be a very important protective factor for men, and interestingly for women as well.

There are several studies on the extremely rapid development of new civic organisations in Hungary after the political changes in 1990, which greatly exceeded similar processes in neighbouring countries. Although one component of this process was motivated by obtaining financial benefits through new forms of organisation (for example, significant tax benefits at the beginning, because the state wanted to revitalise the voluntary civic society), there was also an enormous collective desire to build up the earlier suppressed networks in society. Before the Soviet occupation there was a very rich network of such civic and religious groups and associations in Hungarian society. The participation of men was much more significant in these voluntary groups, although women also participated actively in religious groups.

Perceived help from civic organisations showed the strongest correlations with GDP, unemployment, and personal income. The interrelatedness suggests that the significance of civic associations is most strongly connected with the prosperity of society. On the basis of a cross sectional study it is not clear what is the primary direction of this connection. Because of the very strong interrelatedness between the absolute material situation of the counties and the strength of help from civic organisations, this social capital variable may be explained by the effect of material situation of the counties.

A recent study by Lynch et al[9] suggests that mistrust among the social capital variables do not seem to be a key factor in understanding health differences between the rich countries included in their sample. They noted that mistrust and other psychosocial factors may explain health at the individual level and within country level. Their study excluded Russia, Poland, Hungary, and the Czech and Slovak Republics, although in these countries the correlation between income inequality and life expectancy seems to be strong, and the mistrust-health interactions in these changing societies may be especially important.[1 14] In several other studies of societies undergoing rapid social and economic change, psychosocial factors may indeed be important determinants of the mortality crisis.[22–26]

Our paper analysed within country data. The main question of the paper was related to the intriguing phenomenon of the gender and age group related differences in patterns of mortality changes. Men and women, elderly and middle aged persons, shared the same socioeconomic and political circumstances. What can explain the higher vulnerability of middle aged men compared with women and people in older age groups?

Socioeconomic differences and risk behaviours are well known risk factors of increasing mortality, especially in CEE countries. Mortality can be regarded as a "final common end point" for all of the risk factors. Our underlying hypothesis was that social factors influence health by way of intermediate behavioural, mental, and physiological processes. Among known behavioural risk factors, increasing spirit consumption can only partly explain the rising mortality; therefore there is

a need for additional explanatory models.[21 22] Social capital seems to be an important component of environmental influences, although it is not the sole determinant of increasing mortality rates. From a systems theory perspective, we need to understand the interconnected and mutually reinforcing connections between economic deprivation, risk behaviours, and low social capital.

The main findings of our paper can be summarised as follows:

- Different indicators of social capital—perceived trust, reciprocity, and support received from civic and religious organisations—were strongly correlated with middle aged (45–64 years) male and female mortality across the 20 counties of Hungary.
- Mortality rates were most closely associated with levels of mistrust; male mortality rates were more closely associated with lack of help from civic organisations, while female mortality rates were more closely connected with perceptions of reciprocity.

On the basis of our results it can be hypothesised that in the past decades the social support system of men was more deeply affected by the changes in Hungarian society, while the close knit network of women remained comparatively unchanged. In a suddenly changing society new and more adaptive ways of coping are necessary for adaptation. In a relatively traditional society, middle aged men seem to be more vulnerable to rapid changes in social contexts.

It is an interesting finding that the most important social capital variables of the opposite sex seem to be protective for the other sex. Thus, support perceived by men is a protective factor for women, while the amount of reciprocity perceived by women seems to be a significant predictor of male health. Such interrelations could not be analysed on the individual level. These interactions show that the ecological study of health determinants is an important supplement to the individual level approaches, especially in societies undergoing rapid change.[14 18]

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Conflicts of interest: none.

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