



Can marital selection explain the differences in health between married and divorced people? From a longitudinal study of a British birth cohort

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In view of the rising divorce rates, the impact of divorce on health has an increasing importance in public health. The differentials in health between the married and the divorced may be explained by 'marital selection' and 'marital protection'. Using longitudinal data from a study of the 1958 British birth cohort, factors that select people into divorce were identified from the areas of socio-economic status, health, and attractiveness, which included physical attractiveness, health-related behaviour and temperament. Evidence for both positive and adverse selection is found. The different sets of selection factors for females and males appear to be in line with gender role expectations. The health differentials between married and divorced men were weak and can be explained away by the selection factors. Having controlled for the selection effects, there were still significant associations between divorce and physical and psychological health in women. Though these unexplained differentials cannot be definitely interpreted as the consequences of marital dissolution, this interpretation remains plausible.

Keywords: divorce; marriage; selection; protection; Britain

Introduction

Divorcees are often found to have poorer health status and higher mortality level than married people. In Britain, government statistics has shown that divorced females and males aged 30–34 had mortality rates 68% and 62% higher than their married counterparts.¹ In view of the sharp increase of divorce rates since the Divorce Reform Act of 1969 in Britain,² the health differentials between married and divorced people have increasing public health importance. In contrast to American studies, British studies on social determinants of health have been much dominated by class analysis.³ Not much is known about divorce as a risk factor of illness and death. A recent study using longitudinal data from the British Regional Heart Study has demonstrated a relation between divorce and mortality in men aged over 40.⁴ There is a need for studies on other age-sex groups and non-fatal health outcomes.

Marital differentials in health may be explained by 'marital selection' and 'marital protection'. The former suggests that health and health related attributes determine marital experience; the later suggests the other way round. In the studies of marital dissolution, three groups of health determinants that may select people out of marriage can be proposed: Firstly, socio-economic background is often related to divorce. Manual workers, people with low income level, couples with poor housing conditions, and the jobless are more likely to divorce.^{2,5,6} Secondly, poor health may be hazardous to maintaining a marriage. It reduces the range of possible spousal activities and may reduce marital satisfaction.⁷ However, there may also be adverse selection, that is, people with poor health may have higher incentive to maintain a marriage in order to enjoy the benefits of a marriage. In a recent American study, adverse selection with regard to health status has been found for men over age 50.⁸ This suggests that marital

selection can either exaggerate or suppress a relation between divorce and health, or both. The net effect of it is empirical. Third, marital choice is affected by physical attractiveness on the one hand, and by behavioural and temperamental attractiveness on the other.^{9,10} Weight and height are indicators of both physical attractiveness and health.¹¹ Undesirable behaviour and temperamental characteristics may induce marital dissatisfaction and instability. Alcoholic persons and smokers seem to have higher likelihood of divorce,¹² so are irritable and hostile people.⁵ Since these groups of factors may be related to both health and marital experience, they have the potential of confounding the relation.

Controlling for confounders in epidemiological studies involves two issues: 'identifying the confounders (which entails an understanding of the behavioral dynamics linking the associations), and taking account of the confounders in data analysis.'¹³ Past research on marital selection and marital protection tended to focus on data analysis. Many of them statistically adjusted for a wide range of potential selection factors without discussion about the dynamics linking the selection factors, marriage, and health outcome.³ This has several drawbacks. Theoretically, it is interesting to examine what exactly the selection factors are and how they confound the relation between divorce and health. For instance, do they exaggerate the relation, as it is commonly assumed? Or do they suppress it because of adverse selection? Besides, such a knowledge is also useful for understanding how changes in social conditions may affect the marriage system, and therefore public health. Statistically, the common practice risks over-adjustment. For example, Ben-Shlomo and colleagues¹⁴ controlled for smoking habit in their study of marriage and mortality in British men. They mentioned that smoking might not be a selection factor in their study population, and that the persistence of smoking habit could depend upon marital status. As such, adjusting for the smoking habit may actually remove part of the marital protection effects. This is also true for other covariates that have not been tested for selection effects but are nevertheless controlled for.

This paper has two sequential aims: Firstly, to identify the health-related factors that select people into divorce, and examine how they affect one's marriage. Secondly, to examine whether marital selection can explain the health differentials between the married and the divorced. Attention is given to removing the effects of marital selection in a reasoned manner.

Methods

Subjects

The National Child Development Study (NCDS) is a longitudinal study of the people born in England, Wales and Scotland in the week 3–9 March 1958. There have been five sweeps of follow-up: at ages 7, 11, 16, 23 and 33 (NCDS1–5). The present study uses information from the 4 and 5 sweeps. The samples have been shown to be representative of the national population in a similar age range.^{15,16} Respondents who were first-married at age 23 and either remained in first marriage or became separated/divorced at age 33 form the study population. The numbers of female and male subjects were 2453 and 1443 respectively.

Variables at age 23

Table 1 shows the variables used and how they were categorised. Social class was classified according to the respondents' current (or most recent) occupation, using the Registrar General's 1980 classification. The convention of

categorising housing tenure as owner-occupier, private renter and council renter was adopted. There were a substantial number of people who were neither owner-occupier nor renters. They were mainly sharing flats with relatives or someone else. They were classified as 'other tenants'. Unemployment refers to unemployment since age 16 (up to 23). It was categorised as less than 1 month (including never unemployed), 1–12 months, and over 12 months.

The presence of limiting longstanding illness or disability was reported by respondents. Self-rated health was dichotomised into 'excellent or good' vs 'fair or poor'. These measures have been shown to be useful indicators of physiological health and mortality by recent British studies.^{17,18}

Over-weight and height were taken as indicators of physical attractiveness. Attractiveness is a cultural and perceptual, instead of medical issue. As such, the variable over-weight was based on a question asking respondents' self-perception. It was classified as 'not over-', 'over-' and 'very over-weight'. Height was reported by respondents and was standardized for females and males separately. It was then grouped into short (≤ 1.5 sd), moderate, and tall (> 1.5 sd). Level of alcohol consumption was based on four questions asking about consumption of spirits, beer, wine and martini, etc. in the last 7 d. The amount consumed was then converted into units according to the Health Education Authority's (HEA) estimates and categorised according to HEA recommendations.¹⁹ Smoking habit was classified as 'non-smoker' (never and ex-smoker), 'light smoker' (less than 20 cigarettes/d) and 'heavy smoker' (20 or more

Table 1 Variables from NCDS4 (survey at age 23) and frequency distribution

Variable	Category	Female ($n = 2453$) ^a	Male ($n = 1443$) ^a
Social class	I & II	276	178
	III	1259	723
	IV & V	456	254
	Owner-occupier	1532	790
Housing tenure	Private renter	122	81
	Council renter	578	371
	Other tenant	205	195
	Unemployment	<1 month or never	1535
Unemployment	1–12 months	750	460
	>12 months	167	107
	Education	Below O level	926
Education	O level or equivalent	1165	584
	A level or above	354	175
	Limiting longstanding illness	No	2365
Yes		88	62
Self-rated health	Excellent or good	2201	1331
	Fair or poor	249	112
Over-weight	Not over-weight	1198	925
	Over-weight	951	457
	Very over-weight	292	54
Height	Short (≤ 1.5 sd)	472	151
	Moderate	1629	992
	Tall (> 1.5 sd)	201	112
Alcohol consumption	Low risk	1423	914
	Increased risk	151	280
	Harmful	10	80
Smoking	Non-smoker	845	369
	Light smoker (< 20 /d)	937	575
	Heavy smoker (≥ 20 /d)	661	483
Temperament	Normal	1733	1089
	Bad	720	354

^aFigures may not sum due to missing values.

Table 2 Variables from NCDS5 (survey at age 33) and frequency distribution

Variable	Category	Female ($n = 2453$) ^a	Male ($n = 1443$) ^a
Marital status	Married	2056	1238
	Divorced	397	205
Longstanding illness	Absent	2116	1226
	Present	333	214
Self-rated health	Excellent or good	1781	1127
	Fair or poor	648	310
Malaise	Low (0–7)	2184	1361
	High (≥ 8)	227	67

^aFigures may not sum due to missing values.

cigarettes/d). NCDS4 did not include any item measuring temperament, but it included a few items related to temperament. Two survey questions were used for a rough indication of temperament. They asked 'Do you often get into a violent rage?' and 'Do people often annoy and irritate you?' Respondents saying yes to both questions were classified as having 'bad temper'.

Variables at age 33

Table 2 shows the frequency distributions of marital status and health variables from NCDS5. Only those in their first marriage or divorced by 33 years were included in this study. Divorce and separation were combined into one category. In this paper it is referred to as divorce for brevity. The numbers of respondents who became widowed were tiny (13 widows and no widowers) and thus ignorable.

Longstanding illness and self-rated health were taken as indicators of physical health since they had been found to be so in previous studies.^{17,18} Both of the survey questions were different from the ones in the previous sweep. The longstanding illness item in sweep five was not restricted to limiting conditions. The self-rated health item asked specifically about health in the preceding 12 months. The malaise inventory is an indicator of psychological health. It consists of 24 yes-or-no items. A conventional cutting point of 0–7 (low malaise level) and 8–24 (high malaise level) was adopted.¹⁶

Analysis

The analysis handled females and males separately since it has been well established that sex is an effect modifier. Two stages of analysis were performed. The first employed a multivariate logistic regression model to identify the factors that select people into divorce. Having identified the selection factors, two series of models were used to estimate the cross-sectional association between marital status and health measured at age 33: one without adjustment for the selection factors and the other with. The differences between the two series reveal the confounding effects of marital selection.

Results

Marital selection

Table 3 shows the odds ratios of divorce estimated by multivariate logistic regression. Most of the statistically significant selection factors are known to be risk factors of poor health. However, there were also signs of adverse selection. Among the female respondents, being a council

tenant was related to higher likelihood of divorce (OR = 1.92; $P < 0.05$), which is in line with previous studies. Drinking at the harmful level was associated with drastically elevated odds of divorce (OR = 8.03; $P < 0.05$). Light smokers had (marginally) significantly higher odds (OR = 1.47; $P < 0.1$). Adverse selection in the form of females having poorer self-rated health being less likely to divorce (OR = 0.57; $P < 0.1$) was found. This agrees with the theory and recent American finding that people with health problems may have more to gain in a relationship and, therefore, a stronger incentive to maintain it.⁸ None of the rest was significantly associated with divorce in women.

Three factors were found related to divorce in men. Being a private renter (OR = 2.54; $P < 0.05$) and being unemployed (OR = 1.76 and 2.28 for duration 1–12 months and over 12 months respectively; $P < 0.05$) were risk factors, but lower educational attainment and social class were not. The influence of socio-economic background seems to be mainly instrumental instead of ideational. Health, physical attractiveness and temperament were not significantly related to divorce. Surprisingly, smoking appeared to have a dose-response relation with reduced likelihood of divorce. Light smokers had a lower though insignificant odds ratio (OR = 0.71; $P < 0.1$). Heavy smokers had a significantly lower one (OR = 0.54; $P < 0.05$). This phenomenon remains theoretically unexplained in the present paper.

Comparing the two sets of selection factors for women and men reveals some interesting phenomena. The risk factors for women were more behavioural while those for men were more instrumental. Smoking and drinking were hazardous to the marriage of women but not men. Unemployment was relevant for men but irrelevant for women. This contrast suggests gender-based social expectations. Women are expected to behave well; men are expected to play the role of breadwinners. They agree with foreign findings that men have a greater emphasis on the attractiveness of their spouses, while women have a greater emphasis on the financial capacity of their spouses.²⁰

Marital differentials in health

Removing confounding correctly is a vital and controversial issue in observational study. Some studies on marital status and mortality in middle- and old-age British men adjusted for a large number of factors such as smoking, drinking, height and disease status.^{4,14} While previous research indicated that the transition from married to unmarried status may cause an increase in unhealthy behaviour,²¹ this study has shown that at least in young men drinking was not a selection factor for divorce. Height, temperament and some other factors have also been shown

Table 3 Relative odds (95% confidence interval) of divorce vs married at age 33: multivariate logistic regression model for females and males

Variable	Category	Female (n = 1197)	Male (n = 861)
Social class	I & II	1.00	1.00
	III	1.09 (0.66,1.79)	1.01 (0.53,1.91)
	IV & V	1.16 (0.64,2.10)	1.44 (0.67,3.07)
Housing tenure	Owner-occupier	1.00	1.00
	Private renter	1.63 (0.84,3.16)	2.54 (1.27,5.09)**
	Council renter	1.92 (1.28,2.90)**	1.45 (0.85,2.43)
	Other tenant	1.15 (0.61,2.19)	1.13 (0.55,2.33)
Unemployment	<1 month or never	1.00	1.00
	1–12 months	1.11 (0.79,1.57)	1.76 (1.11,2.78)**
	>12 months	1.55 (0.88,2.72)	2.28 (1.10,4.71)**
Education	Below O level	1.00	1.00
	O level or equivalent	1.05 (0.73,1.52)	1.04 (0.64,1.69)
	A level or above	1.02 (0.57,1.83)	1.23 (0.58,2.61)
Limiting longstanding illness	No	1.00	1.00
	Yes	1.25 (0.49,3.20)	1.85 (0.65,5.28)
Self-rated health	Excellent or good	1.00	1.00
	Fair or poor	0.57 (0.31,1.05)*	1.78 (0.90,3.53)
Over-weight	Not over-weight	1.00	1.00
	Over-weight	0.87 (0.62,1.23)	0.88 (0.55,1.39)
	Very over-weight	1.26 (0.77,2.05)	0.68 (0.23, 2.08)
Height	Short (< -1.5sd)	1.00	1.00
	Moderate	0.84 (0.57,1.25)	1.07 (0.56,2.03)
	Tall (>1.5sd)	0.99 (0.54,1.83)	1.31 (0.54,3.23)
Alcohol consumption	Low risk	1.00	1.00
	Increased risk	1.45 (0.89,2.36)	1.07 (0.65,1.77)
	Harmful	8.03 (1.83,35.30)**	1.29 (0.57,2.90)
Smoking	Non-smoker	1.00	1.00
	Light smoker	1.47 (0.99,2.19)*	0.71 (0.43,1.19)
	Heavy smoker	1.38 (0.89,2.16)	0.54 (0.30,0.94)**
Temperament	Normal	1.00	1.00
	Bad	0.94 (0.66,1.34)	1.23 (0.77,1.95)

** $P < 0.05$; * $P < 0.1$.

insignificant for both sexes. Controlling for them may remove the causal impact of marital status upon health. Besides, adding too many unnecessary parameters into a statistical model reduces statistical power. As such, the following analyses will take into account only the selection factors established in the multivariate logistic model above. To be on the safe side of not missing a true selection factor, factors with a significance level of 10%, instead of the conventional 5% level, were included.

Table 4 shows the differentials in health. Without adjusting for the selection factors, there is evidence that female divorcees suffered poorer physical health as indicated by their self-rated health (OR = 1.50; $P < 0.05$), as well as poorer psychological health as indicated by malaise scores (OR = 2.71; $P < 0.05$). There is marginally significant evidence that male divorcees had slightly higher odds of longstanding illness (OR = 1.42; $P < 0.1$).

Having taken into account the selection factors established in the multivariate analysis, the association between longstanding illness and divorce in men weakened and paled into insignificance (OR = 1.31; $P < 0.1$). The association between poor health and divorce in young British men appeared to have been exaggerated. Nevertheless, the health differentials between married and divorced women remained significant even after the selection effect was controlled. The odds ratio of poor self-rated health was 1.45 ($P < 0.05$). The odds ratio of higher malaise level was adjusted slightly upward (OR = 2.86; $P < 0.05$), suggesting the effect of adverse selection. Female divorcees seemed to

have a genuinely poorer health status than their married counterparts, especially in psychological health.

Discussion

Since the NCDs is not tailor-made for the purposes of this study, some limitations of this paper should be borne in mind. Firstly, not all relevant constructs have been measured. Some proxy measures, such as the measure of temperament based on two questions about rage and irritability, have to be used. Secondly, the sample size was not determined for this study. In particular, the number of male respondents included in this study was much smaller than that of female respondents. Some of the 'rare exposure', such as longstanding illness at age 23, may be real selection factors being undetected due to weak statistical power. So the sets of selection factors shown here should be treated as tentative and requiring verification in further research. Furthermore, this paper examines cross-sectional marital differentials in health at the age of 33. Though causal impact of divorce is one plausible interpretation of the unexplained differentials, this should be understood as suggestive only.

Current epidemiological research often treats confounding like the 19th century 'miasma', which was an unspecified vapor that caused illness and death.²² Multivariate statistical models are often used to round up many suspected confounders without identifying what exactly are the confounders and confounding effects. This practice is also prevalent in the studies of marriage and health. This

Table 4 Relative odds (95% confidence interval) of poor health at age 33, with and without adjustment for selection factors

Health outcome	Marital status	Female		Male	
		Without adjustment	With adjustment ^a	Without adjustment	With adjustment ^b
Longstanding illness	Married	1.00	1.00	1.00	1.00
	Divorced	0.93 (0.67,1.27) (n = 2449)	0.75 (0.48,1.18) (n = 1569)	1.42 (0.97,2.09)* (n = 1440)	1.31 (0.88,1.97) (n = 1418)
Self-rated health	Married	1.00	1.00	1.00	1.00
	Divorced	1.50 (1.19,1.90)** (n = 2429)	1.45 (1.06,1.99)** (n = 1555)	1.06 (0.74,1.51) (n = 1437)	0.95 (0.66,1.39) (n = 1415)
Malaise score ≥ 8	Married	1.00	1.00	1.00	1.00
	Divorced	2.71 (2.00,3.67)** (n = 2411)	2.86 (1.88,4.36)** (n = 1548)	1.34 (0.70, 2.54) (n = 1428)	1.23 (0.63,2.40) (n = 1406)

^aAdjusted for housing tenure, self-rated health at 23, smoking and alcoholic consumption.

^bAdjusted for housing tenure, unemployment and smoking.

** $P < 0.05$; * $P < 0.1$.

paper attempted to disperse the miasma and examine the process and impact of marital selection. It has been found that the selection factors for females were more behavioural; those for males were more instrumental. This finding is consistent with social science knowledge about marriage and therefore very plausible. It has important implication for studies on marital status and health. Researchers at times include a large number of variables as selection factors, and use the same set of factors for both sexes. It is likely to cause over-adjustment and to introduce noise into their statistical models. This paper gives a tentative reference of what are and what are not the factors that select people into divorce.

Conclusions

Taking into account the selection factors established above, it is found that the differences in health between young married and divorced men can be explained by marital selection. Nonetheless, there is significant evidence showing that female divorcees might have genuinely poorer physical and psychological health. The association between divorce and physical health was not very strong. Perhaps women at age 33 still have reasonably robust bodies, so they can resist the impact of divorce on physical health. Nonetheless, it is widely estimated that one in three marriages in contemporary society ends in divorce.² Given this scale of prevalence, the public health impact is substantial. The differences in malaise levels for women remain significant, strong and unexplained. It is plausible that divorce would induce stress, depression and psychosomatic problems.

Comparing the health differentials in women and men suggests that divorce may have a stronger impact on women than men. It appears to be so for both physical and psychological health. It gives a reason for directing more research attention and social services to female divorcees.

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