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Women and men with coronary heart disease in three countries. Are they treated differently?

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Women and men with coronary heart disease in three countries. Are they treated differently?

Abstract

Non-medical determinants of medical decision making were investigated in an international research project in the US, in the UK and in Germany. The key question in this paper is whether and to what extent doctors' diagnostic and therapeutic decisions in coronary heart disease (CHD) are influenced by the patients' gender.

A factorial experiment with a videotaped patient consultation was conducted. Professional actors played the role of patients with symptoms of CHD. Several alternative versions were taped featuring the same script with patient-actors of different sex, age, race and socio-economic status. The videotapes were presented to a randomly selected sample of 128 primary care physicians in each country. Using an interview with standardized and open-ended questions, physicians were asked how they would diagnose and treat such a patient after they had seen the video.

Results show gender differences in the diagnostic strategies of the doctors. Women were asked different questions, a CHD was mentioned more often as a possible diagnosis for men than for women, and physicians were less certain about their diagnosis with female patients. Moreover, results indicate that gender differences in management decisions (therapy and lifestyle advice) are less pronounced and less consistent than in diagnostic decisions. Magnitude of gender effect on doctors' decisions varies between countries with smaller influences in the US.

Although patients with identical symptoms were presented, primary care doctors' behavior differed by patients' gender in all three countries under study. These gender differences suggest that women may be less likely to receive an accurate diagnosis and appropriate treatment than men.

Introduction

The knowledge of gender differences in the morbidity and mortality of coronary heart disease (CHD) is well established. (Central Health Monitoring Unit, 1994; Tunstall-Pedoe, Morrison, Woodward, Fitzpatrick, & Watt, 1996; Derby, Lapane, Feldman, & Carleton, 2000; National Center for Health Statistics, 2005; Statistisches Bundesamt, 2006). These differences are often described as results of biological processes and unhealthy lifestyle behaviors that influence coronary risk. Estrogens are discussed to have a protective effect for women (Mendelsohn, 2002; Rossouw et al., 2007). In contrast men's different health lifestyles could cause a coronary illness. Gender specific behaviors (e.g. smoking, high-level alcohol consumption) increase the probability of a CHD (Yusuf et al., 2004).

These gender differences in the prevalence of CHD and risk behavior are well known by most general practitioners, yet doctors could hold stereotypical views on what kind of patients are at risk for a CHD and those who are not. These views could affect the probability of being correctly diagnosed and treated for certain patient groups (Bond et al., 2003; Van Ryn & Fu, 2003). For example, female patients who are at a lower risk of CHD (overall) are at risk of not being diagnosed correctly. Thus, mediated by these stereotypes, non-medical factors could affect the doctors' decision making process and subsequently the therapeutic outcome of a patient with symptoms of a CHD (McKinlay, Lin, Freund, & Moskowitz, 2002; Arber et al., 2004; Anand, Xie, & Metha, 2005; Arber et al., 2006; Frich, Malterud, & Fugelli, 2006; Mikhail, 2006; Bönke et al., 2007). In research on health disparities the provider behavior itself is often unaddressed, though important to understand the development of epidemiological gender differences. Furthermore information about gendered care pathways in CHD are relatively well documented, but primarily focused on differences within secondary care. Raine (2000) provides evidence for the existence of gender bias in the use of specialist services by critically appraising the literature. His review indicates that female

patients are less likely than male patients to undergo CHD related diagnostic investigations and surgical treatment.

Another limitation of many studies on medical decision making is that they do not control for other potential patient factors (like age, ethnicity or social status) or physicians' attributes (like gender and age) that might influence the doctors' decisions (Feldman, Freund, Burns, Moskowitz, & Kasten, 1997). In addition, results are often limited to one region or country and the role of the health care system in which patients are diagnosed and treated is often not taken into account. Comparative research in this field is important to determine the contribution of the health care system to health disparities (Blendon, Schoen, DesRoches, Osborn, & Zapert, 2003; Herlitz et al., 2003; Blendon et al., 2004; Schoen et al., 2004). In this regard, McKinlay et al. (2006) described how doctors in the US and the UK manage the same patient. Without analyzing the effect of gender specifically, their results show a high level of consistency in medical decision making for coronary heart disease in the two countries.

However, UK doctors were less certain with the diagnosis and asked more additional questions than their US colleagues. Arber et al. (2004; 2006) analyzed the influence of patient gender on the decision making process for these two countries together. Findings indicate that doctors' diagnostic and management strategies relating to CHD vary by patient gender, to the disadvantage of women.

In this paper gender effects on the diagnosis and treatment of CHD are presented separately for three countries with different health insurance systems (a largely private insurance-based health care system in the US, a National Health Service government-supported, taxation based system in the UK, and a system characterized by decentralized care administered by social security agencies in Germany). The aim is to examine if gender disparities in the diagnosis and treatment of CHD vary in different health care systems or if they are a cross-national invariant phenomenon.

Methods

In this study a factorial experimental design with portrayed video vignettes was used (Feldman et al., 1997). The aim of the study was to estimate the unconfounded influence of patient attributes, physician characteristics and the health care system in which decisions take place.

Design and contents of the video vignettes

To develop the script for the video vignettes clinical consultants role played actual office visits. This step was essential to ensure clinical accuracy. Professional actors were used to portray medical encounters on videotape in which the 'patient' presented with seven signs and symptoms that are typical for CHD including chest pain, pain worsened with exertion, stress and eating, relief after resting, discomfort for more than three months, pain through the back between the shoulder blades and elevated blood pressure. In addition, a key non-verbal cue was incorporated, demonstrated by the 'Levine fist' where the patient clenched his fist to the sternum (Marcus et al., 2007). This single script was used for all videotapes presented to the physicians. Thus all videotapes have exactly the same text. The patient in the videotapes was portrayed as consulting this doctor for the first time with these symptoms.

The portrayed physicians and patients in the US had American accents, while the very same vignette physicians and patients in the UK had British accents. In Germany, the physician and patient voices were dubbed by a professional speaker. Professional actors were trained under experienced physician supervision to realistically portray a patient presenting the symptoms of disease to a primary care provider. Care was taken to construct a culturally neutral set, neutral clothes as well as a culture-neutral facial expression.

The video was presented to primary care doctors in their practice. Actors on the tapes differed according to gender (male vs. female), age (55 vs. 75 years), race (black vs. white) and social status (low vs. high) in order to mirror respective patient characteristics. In the present analyses we focus on differences between female and male patients.

Instruments

One CHD-video was presented to each physician. Thereafter, physicians were asked various questions regarding diagnosis and treatment in a personal interview with standardized and open-ended questions. In terms of diagnostic decision making, the first question was whether the physician would ask the patient any additional questions and if so, what kind of question(s). Secondly, doctors were asked what they thought was going on with the patient and how certain they were with their diagnostic decision. Moreover, physicians were asked to name diagnostic tests they would order for this patient. In terms of the management of the patient, we wanted to know if they would prescribe or recommend any medication, if they would refer the patient to another health care professional and when they would like to see the patient again. Finally, physicians were asked if they would recommend any lifestyle advice or behavior change.

Physician Sample

Physicians were randomly selected from lists provided by local health care organizations. Selection was made within four strata, defined by combinations of the physicians' gender and length of clinical experience (less than 5 years or more than 15 years). To be eligible for participation, physicians had to be internists or family practitioners in the US and in Germany or general practitioners in the UK. In addition, they had to be working at least half-time and had to be trained at an accredited medical school in the country in which they were practicing. A letter of invitation was sent to selected doctors who met these criteria. Thereafter, screening

telephone calls were conducted to identify eligible physicians and an appointment was scheduled for a one-hour long in-person, structured interview conducted in the physician's practice. Each physician subject was provided a modest stipend to partially offset lost revenue and to acknowledge their participation. The response rate was 64.9% in the US, 59.6% in the UK and 65.0% in Germany. Altogether 384 interviews were conducted in the US (Massachusetts) in the UK (the West Midlands, SW London and Surrey) and in Germany (North Rhine-Westphalia). The final sample included 64 female and 64 male primary care doctors in each country, half of them with less than 5 years of clinical experience, the other half with more than 15 years. For a sample size of 128 per country the design has 80% power to detect differences of 25 percent. For example, if 25% of physicians would refer a female patient to a cardiologist / specialist facility and 50% of physicians would refer a male patient to a cardiologist / specialist facility (a difference of 25%) then we would expect to find a significant difference (at $\alpha = 0.05$) 80 percent of the time. For a sample size of 384 (all three countries), the design has 80% power to detect of difference of 14.5 percent.

Analyses

Analysis of variance (ANOVA) was used to assess the effect of patients' gender on doctors' diagnostic and therapeutic decisions. Because a balanced factorial design was used, the effects due to patient gender are un-confounded (orthogonal to) with the other design effects (patient age, socioeconomic status and race as well as physician gender and physician level of experience). Precise p-values are reported in the tables. Significant results ($p < .05$) are shown in bold. For the data analysis of the open ended questions coding frames were developed and answers were summarized into categories (e.g. Antihyperlipidemics, Beta-Blockers, Calcium Channel Blockers, Salicylates and Vasodilating Agents were coded as CHD appropriate prescriptions). These coding frames were finalised after achieving over 90% inter-coder reliability between medical advisers in the three countries.

Results

Questioning

Table 1 shows that women presenting with CHD symptoms would generally receive less attention than men. They would be asked fewer questions in the UK and in the US, although this gender difference failed to reach statistical significance ($p < .05$). Moreover, the topics of the questions differ between women and men. This especially holds for the UK, where significantly more men would have been asked about their medical history, about smoking, alcohol consumption, and their psychological state, while significantly more women would have been asked about their general health status. In Germany, women are significantly less likely to be asked about smoking and alcohol, while in the US gender differences are significant only for questions about smoking. Looking at the three countries together, the gender differences in all areas of physician's questioning are significant ($p < .05$).

-Table 1-

CHD diagnosis

Table 2 shows that CHD was mentioned more often as a possible diagnosis for men than for women with a significant gender effect in Germany. In addition, on a scale from 0 (total uncertainty) to 100 (total certainty) doctors were significantly more certain of their CHD diagnosis with male than with female patients in the UK and in the US. If they mentioned CHD as a possible diagnosis, significantly more doctors would order a test for CHD if the patient was a man in Germany. Again, looking at the three countries together, all gender differences related to the CHD diagnosis are significant at the 5% probability level.

-Table 2-Therapy

As shown in Table 3, gender differences were also evident in doctors' management decisions. In the UK, men would be significantly more likely than women to receive an appropriate prescription for possible CHD after the first contact. Moreover, men would be more likely to be referred to a cardiologist or a specialist facility in Germany and in the UK. Gender difference in days to the next appointment is not significant in any country. Effects of patient's gender on therapeutic decisions are non-significant in the US.

-Table 3-Advice giving

Doctors were asked if they would give the patient any advice to change their lifestyle behavior. Table 4 shows that on average 2.5 pieces of advice would be given to the patient across all countries combined. The amount of advice did not vary by gender overall or within a given country. Advice about smoking would be given to more male than female patients, although this failed to reach statistical significance ($p < .05$) in each of the three countries. There is only one significant difference in advice giving by patients' gender: physicians would only recommend reducing weight if the patient was male in Germany.

-Table 4-**Discussion**

This paper focuses on the role of patient gender for clinical decision making in CHD in the US, the UK and in Germany. Since vignettes are a valid and comprehensive method for measuring the quality of care provided by physicians (Peabody, Luck, Glassman, Dresselhaus, & Lee, 2000), a factorial experiment with video vignettes was conducted in the three countries. Results show gender differences in the diagnostic strategies of the doctors (information seeking, possible diagnosis). Although there are cross-national differences in the magnitude indicating strongest effects of gender on doctors' questioning in the UK, a consistent general trend can be observed in all countries: Irrespective of identical information being presented in the video vignettes, women presenting with CHD symptoms would generally receive less questioning than men. In terms of diagnostic decisions, results show a consistent tendency: female patients with coronary illness may be less likely to receive an accurate diagnosis by primary care doctors in all three countries. Moreover, results indicate that differences in therapy decisions (prescription, referrals and lifestyle advices) according to patients' gender are less pronounced and less consistent than in diagnostic decisions. Gender differences in physician decision making among patients presenting with symptoms of CHD were described earlier (Arber et al., 2004; Arber et al., 2006). Based on this knowledge, we have chosen a comparative perspective for our analyses. Although all three countries show a similar trend, the magnitude of the gender effect on doctors' decisions varies between countries with smaller influences of the patient's gender in the US. Thus, gender differences in the diagnosis and management of CHD seem to be a generalized though not invariant phenomenon. Future studies should give more attention to international variations in health care disparities to determine the contribution of the health care system to such disparities (McKinlay et al., 2006). To improve our understanding of the women's role as well as her cultural and socioeconomic status other countries should be included in respective studies.

Stereotypical beliefs about what kinds of patients are at risk for CHD might influence the decision making process (Arber et al., 2004; Adams et al., 2006; Arber et al., 2006; Bönnte et al., 2007). If those stereotypes are aligned with the knowledge of socio-demographic differences in the risk structure of CHD, this strategy could lead to a more precise targeting of diagnostic and therapeutic arrangements. But working with standardized videotaped patients, where all male and female actors express exactly the same symptoms, treatment differences are not indicated. In fact, lower detection rates of CHD amongst female patients could have serious consequences for their health. It seems that the epidemiological knowledge of higher CHD rates among men could lead the doctors to concentrate their attention on a coronary diagnosis among male patients and to under diagnose CHD among women. This assumption is supported by the fact that gender differences in the diagnosis of a CHD in the present study are more pronounced among midlife patients (55 years) than among older patients (75 years) (results not shown). This "gendered ageism" (Arber et al., 2006) can be seen in the context of known prevalence and risk profiles. Well known variations in illness rates by gender are therefore not only a consequence of differences in the biological or behavioral risk structure, but might also be socially constructed (Horton, 2007). In a qualitative work Adams et al. (2007) explored sources of gender bias in the decision making process of primary care doctors in the UK and the US. During the interviews, that were part of the present study, doctors were asked to explain and justify diagnostic and therapeutic decisions for a CHD patient. Findings reveal an interaction of physicians' and patients' gender. Male doctors appear less affected by patient gender but both male and especially female doctors take more account of male patients' age and consider more age-related disease possibilities for men than women. It is one future task to analyze the qualitative data collected in the present study to provide more information on how patient gender affects doctors' cognitive processes during consultations. While the rigorous experimental design permits excellent internal validity, external validity remains a threat. Several precautionary steps were taken to hopefully minimize this threat.

The physicians were specifically instructed to view the patient on the videotape as one of their own cases. In addition, the doctors viewed the tapes in the context of their practice day and not at a professional meeting, a course update, or in their home. Thus it was likely they encountered real patients before and after they viewed the patient in the videotape. To enhance the clinical authenticity of the videotaped patient, the script of the vignette was based on role plays conducted with skilled physicians. During the production of the videos experienced clinicians were present, and only professional and experienced actors were used. At the beginning of each interview doctors were asked how typical the videotaped patient was compared with patients they see in their practice. In the US, 90.6% of the doctors considered them as very or reasonably typical, 91.4% in the UK and 81.3% in Germany. Using Tukey's multiple comparisons to test for differences between the three countries we found that rating in Germany is significantly ($p= 0.0102$) lower than in the UK or in the US. The lower rate in Germany might be a result of the dubbing that makes the scenario more unrealistic than in the two other countries.

Additionally interviewers were carefully trained and certified and frequent transatlantic telephone calls were conducted to ensure standardized interviewing and to minimize interviewer variability (Johannes, Crawford, & McKinlay, 1997). Quality control interviews and site visits were conducted and selected tape recorded interviews were reviewed by supervisors on a regular basis to minimize variation within the three countries.

However, although substantial effort was devoted to produce the video vignettes as realistic as possible, videotapes are not the same as real patients. Diagnostic and therapeutic decisions result through the interaction of doctor and patient. This issue could not be addressed in a videotape based experiment. In addition, doctors might have viewed the interview as a test. This could potentially bias the answers in the direction of social acceptability. To avoid this, the doctors were told that the interview is not a test and that there are no right or wrong answers.

These (potential) limitations are counterbalanced by several strengths of the study. The use of a factorial experiment permits simultaneous examination of different types of influence (patient, provider and health care system) and allows the estimation of the independent and unconfounded effects of the respective factors (e.g. gender of the patient) on clinical decision making. Moreover, the design offers the possibility to integrate non-verbal signs like the 'Levine fist'. Finally, physicians were randomly selected to enhance generalizability.

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Tables:

Table 1: Gender comparison of the total number and kind of questions physicians would ask the patient by country

	All three countries			Germany			UK			US		
	Male	Female	p	Male	Female	p	Male	Female	p	Male	Female	p
# of questions (mean)	6.2	5.3	.012	3.2	3.0	.676	6.1	5.0	.054	9.4	7.9	.091
Questions about (%)												
medical history	66	57	.033	40	38	.685	73	52	.010	84	81	.639
smoking	55	29	<.001	28	12	.005	67	30	<.001	69	45	.004
alcohol	32	17	<.001	14	2	.014	41	22	.009	41	28	.149
psychological state	36	23	.006	23	17	.397	42	23	.032	42	28	.100
general health status	54	63	.030	23	38	.054	55	69	.010	83	83	1.000

p<.05 shown in bold

Table2: Gender comparison of correct CHD¹ diagnosis, certainty of diagnosis and test ordering for CHD by country

	All three countries			Germany			UK			US		
	Male	Female	p	Male	Female	p	Male	Female	p	Male	Female	p
CHD diagnosis (%)	91	81	.004	81	67	.033	94	83	.076	97	94	.417
Certainty of CHD diagnosis (0-100%)	52	44	.006	41	37	.487	52	40	.028	62	54	.048
Test for CHD (%)	76	63	.002	48	30	.027	88	73	.065	92	86	.252
# of tests for CHD (mean)	2.8	2.3	.015	1.1	0.7	.095	4.0	3.1	.073	3.4	3.0	.386

¹ CHD (coronary heart disease)

p<.05 shown in bold

Table 3: Gender differences in the therapy for CHD¹ by country

	All three countries			Germany			UK			US		
	Male	Female	p	Male	Female	p	Male	Female	p	Male	Female	p
CHD appropriate prescription (%)	50	39	.015	22	12	.139	58	39	.044	70	64	.458
Referral to a cardiologist or specialist facility (%)	25	15	.011	27	11	.037	39	23	.037	9	11	.764
Referral to other medical professional (%)	33	25	.044	61	42	.027	31	30	.853	8	3	.185
Days to next appointment (mean)	9.6	10.5	.167	4.7	6.8	.080	12.3	14.0	.218	11.8	10.7	.510

¹ CHD (coronary heart disease)

p<.05 shown in bold

Table 4: Gender differences in the lifestyle advice for patients with CHD¹ by country

	All three countries			Germany			UK			US		
	Male	Female	p	Male	Female	p	Male	Female	p	Male	Female	P
# pieces of advise (mean)	2.5	2.5	.786	1.9	1.8	.780	2.8	3.1	.270	2.9	2.7	.641
Advice about (%)												
diet	52	54	.537	50	52	.858	47	59	.149	58	53	.603
smoking	38	26	.004	12	5	.137	62	47	.073	39	25	.088
alcohol	21	21	1.000	8	12	.321	36	36	1.000	20	15	.441
relaxation	9	7	.578	10	6	.369	11	11	1.000	5	5	1.000
weight	5	4	.809	6	0	.049	6	9	.529	2	3	.566

¹ CHD (coronary heart disease)

p<.05 shown in bold