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GENDER DIFFERENCES IN THE PERCEPTIONS OF COMMON COLD SYMPTOMS

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Abstract—Higher rates of reported morbidity among women are sometimes attributed to lower thresholds among women for experiencing and reporting symptoms. Gender differences in the perception of signs and symptoms of minor illness were examined on data from the MRC Common Cold Unit. Volunteers assessed the presence and severity of colds at the end of their stay in the Unit, using the same two measures as a trained clinical observer (all ratings were double blind). Even after adjustment for other variables, men were significantly more likely to 'over-rate' their symptoms in comparison with the clinical observer than were women. These data, and recent analyses from elsewhere, suggest that rather than artefactually exaggerating gender differences in morbidity, differing thresholds for perceiving and reporting symptoms may produce underestimates of gender differences in morbidity.

Key words—self-reported health, gender differences

INTRODUCTION

It has consistently been reported from developed countries that although male death rates are higher than women's at all ages, women report more symptoms, illness, disability days, use of medications, and contacts with the medical profession [1-5]. One of the explanations frequently proffered for the female excess in rates of illness and health care use is that females may be more sensitive to bodily discomforts and more willing to report symptoms of distress and illness than are men [6, 7, 8]. Sex differences in the way symptoms are perceived, evaluated and acted upon are thought to result from childhood socialisation as well as adult role expectations and obligations [9, 10, 11].

There are methodological difficulties in testing the hypothesis that women are more likely to perceive and report bodily discomfort than men. The most obvious is that in the absence of any 'direct' or 'objective' measure of discomfort, there is no way of choosing between two competing explanations for greater reported incidence of symptoms among women—namely that the incidence is 'really' higher (whether for social or biological reasons) or that women have a lower threshold for perceiving and reporting symptoms. An interesting study of gender differences in the experience of headache, for example, found significant gender differences in perceived pain associated with headaches, in the reported duration and frequency of attacks, and in utilisation of medical care in the month before interview. It was unable, however, to answer the question: "whether gender-related headache differences are due to biology or explained by socially defined roles (and behaviour)" [12].

Mechanic has pointed to other problems of research on this topic. One is that even if one can compare people's self-perceptions of their symptoms with a standardised examination by a physician, it could well be that the latter would itself be influenced by the sex of the person whose health is being assessed. Another is that there is likely to be a great variability in men's and women's responses depending on the condition or symptoms being examined, yet most investigations look at aggregate indices of physical or mental illness rather than at specific conditions [10]. It may be that men are more inhibited than women at reporting certain conditions less compatible with culturally acceptable male roles, but are as ready as women to perceive and report symptoms without such pejorative connotations.

Two interesting studies have attempted to get round all three problems described above. A study of illness behaviour among people with cancer of the colon or rectum found that women were no more likely than men to recognise and respond to cancer symptoms. Among patients with cancer of the rectum, women were in fact more likely than men to delay seeking care. Differences in patient delay persisted with adjustment for age, education, and barriers to seeking care. Among patients with cancer of the colon, women were more likely than men to experience diagnostic delay. Men and women had similar over-the-counter drug use, talked to a similar number of people about their symptoms, and read a similar amount about their symptoms [13].

A study of sex differences in reports of chronic joint symptoms found that symptom reporting for both men and women was significantly related to X-ray evidence of osteoarthritis. Men with osteoarthritis, however, were more likely to report pain than osteoarthritic women. Independent of severity of disease and treatment behaviour. There were no sex differences in symptom reporting among those with normal X-rays. The author suggests that the
findings are more consistent with the ‘view that reports of symptoms in interview surveys are contingent upon the type of condition and specific experience associated with a particular morbidity, or set of symptoms, than they are with views suggesting a selective tendency either for women systematically to report more symptoms or for men to be inhibited in reporting symptoms’ [14, p. 306].

Thus studies focusing on specific conditions, and those for which there is some degree of objective validation by clinical or X-ray evidence, have not found support for the hypothesis that women are more likely than men to perceive and report symptoms. Both the conditions studied—cancer and osteoarthritis—can, however, be considered to be relatively serious, the former in terms of prognosis and the latter in terms of pain and disability. Mechan has pointed out that sex differences in reporting are least for the most ‘tangible’ and observable conditions [10], and other commentators have remarked on the fact that the female excess in morbidity becomes greater the less serious the illness or symptoms [1, 2]. It might therefore be that the hypothesised lower thresholds for females’ perceiving, reporting and evaluating symptoms might be apparent for relatively minor conditions but not for more serious conditions such as cancer and osteoarthritis.

This paper addresses this possibility by examining men’s and women’s self-perceptions of the presence and severity of common cold symptoms, in relation to a clinical assessment of these symptoms by a trained observer. The common cold is, as its name suggests, a common condition; most people have experienced numerous colds in their lives, whereas colorectal cancer and osteoarthritis are relatively rare. While colds can be unpleasant, they do not have the same degree of seriousness or chronicity as cancer or osteoarthritis. It is thus a good model for minor, acute, episodic conditions which women are hypothesised to be more likely to perceive and report than men.

**DESIGN AND METHODS**

This paper is based on data collected at the Medical Research Council’s Common Cold Unit in Salisbury, England, between 1984 and 1989 (the Unit closed in 1989). Volunteers used to stay at the Unit for periods of 10 days during which they were inoculated with either a virus or an inert substance, and then given either some treatment under test or a placebo.

Volunteers were visited daily by a trained clinical observer (medically qualified) who assessed the presence and severity of symptoms and signs, using a standardised numerical scoring system. Scores for each recorded symptom or sign (e.g. sore throat, fever, swollen glands) were added to produce a total overall score for each volunteer at the end of the trial. In addition to this numerical clinical score, each volunteer was also given a ‘clinical grade’, based on the clinical observer’s overall assessment at the end of the trial. The following grades were used: no cold; very mild or doubtful cold; mild; moderate; and severe. There is an overall correlation, but no formal relationship, between clinical grade and clinical score; that is, the 5 category clinical grade was not designed to map precisely onto the numerical clinical score [15, 16]. The viruses used during the period under study included rhinoviruses, coronaviruses, influenza viruses and other viruses. Strictly speaking the signs and symptoms reported should be described as referring to ‘illness’ rather than ‘colds’, but the term cold is used as a shorthand to cover all the illnesses described.

For the purpose of this self-assessment study a special form was designed on which volunteers were asked to indicate their own assessment of the clinical grade of their symptoms, using the same 5 categories, from no cold to severe, as the clinical observer. In order to do this they were given the definitions of these categories that the clinical observer used. They were also asked to mark on a 10 cm horizontal line where they thought their cold symptoms were in relation to the polar anchor points “no cold at all” and “the worst cold I could imagine”. This analogue scale [17] could be compared with the numerical clinical score used by the clinical observer. The clinical grade and clinical score were assessed by both volunteer and doctor at the end of the 10 day trial, i.e. all assessments were made at the same time. Self and observer-assessments were made independently (i.e. “blind” of each other). Since the clinical grade categories and criteria are identical for the volunteers and the clinical observer, whereas the clinical score and the analogue scale are not identical, the analysis presented in this paper mainly concentrates on the clinical grade. Volunteers were also asked to record their age, sex, occupation and marital status since the literature on self-assessments suggests variation by such socio-demographic characteristics. Throughout the period covered by this paper there was one, male, clinical observer.

Completed forms were sent at the end of each trial to the MRC Medical Sociology Unit, Glasgow, where the occupations of the volunteers and their spouses were coded into social class categories using the Registrar General’s 1980 classification of occupations [18], and the mark on the analogue scale was measured from the zero point in millimetres. Data were entered onto computer in Glasgow and SPSS X was used for analysis.

An early analysis, based on the first 1100 cases, found an extremely high correlation between self and observer ratings. Although this high level of agreement was found within all the age, sex, occupational class and marital status groups, men were significantly more likely than women to “over-rate” their
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no such differences in over-rating were found by age, class or marital status [19].

The present analysis is based on the complete data-set containing 1700 cases. Of the volunteers, 40.2% were aged 18–30, 40.1% were aged 31–45 years, and 19.5% were over 45. 40.7% were male and 59.3% were female. 51.9% were single, 34.3% were married and 13.8% were separated, widowed or divorced. Using their own occupations, 51.8% were in non-manual social classes, 18.2% in manual social classes, and 29.6% were homemakers or students. The sample is thus unrepresentative of the general population, with young, female, unmarried, and higher social class or unoccupied people being over-represented. These characteristics stem from the nature of participation in the Unit’s research programme, with volunteers having to be prepared to stay at the Unit for 10 days. The distribution of viruses administered was: no virus 6.7%; rhinovirus 51.8%; corona or flu virus 17.5%; other virus 15.6% and virus not stated 8.5%.

Before presenting the results it is important to point out that one could treat either the self-assessment or the observer-assessment as the “gold standard” against which to measure the other. In the earlier paper we treated the observer-assessment as the gold standard, and examined self-ratings in terms of deviations from that, because the question that had been asked of us was “how valid are self-assessments compared to physician assessments?”; or “are self-assessments good surrogates for clinical assessments?” [19]. I shall continue with this usage in this paper although I shall return to a discussion of its utility later.

RESULTS

Table 1 shows the relationship between the self-assessed and observer-assessed clinical grade, with the ‘moderate’ and ‘severe’ categories grouped because the latter contained so few cases. There is a high level of association between the self and observer assessments ($\chi^2 = 1873.3$, $df = 9$, $P = 0.0001$). The statistic of choice for assessing agreement between observers using ordinal scales is kappa or weighted kappa [20,21]. Both scores can range from $-1$ (indicating complete disagreement) to $+1$ (indicating complete agreement), with 0 representing the amount of agreement to be expected by chance. Weighted kappa takes account of the distance of cells from the diagonal, weighting those further from the diagonal to indicate more disagreement than those nearer the diagonal. Both kappa and weighted kappa (calculated by the weighting scheme recommended by Fleiss and Cohen [21]), show a high level of agreement between the self and observer assessments ($K_w = 0.888$, $SE = 0.026$, $Z = 34.15$, $P < 0.001$).

According to the clinical observer, females were significantly more likely than men to get a cold while they were at the Unit = 41.2% compared with 35.6% ($\chi^2 = 5.22$, $df = 3$, $P < 0.05$). However, no such gender differences were found in the self-assessments; that is, men and women did not differ significantly in whether they said they had developed a cold ($\chi^2 = 1.3$, $df = 1$, ns). The agreement between self and observer assessments was therefore examined separately for men and women. There was a significant level of agreement between the observer and male volunteers ($K_w = 0.783$, $SE = 0.046$, $Z = 17.21$, $P < 0.001$) and between the observer and female volunteers ($K_w = 0.917$, $SE = 0.041$, $Z = 22.36$, $P < 0.001$). The male and female agreement scores were however significantly different from each other ($Z = 2.28$, $P < 0.05$), with men being less likely than women to agree with the clinical observer on the clinical grade category.

The sample was divided into two groups—those who ‘over-rated’ compared with the clinical observer, and those who either ‘under-rated’ or agreed with the clinical observer. Men were significantly more likely than women to ‘over-rate’ their cold symptoms compared with the clinical observer; 20% males ‘over-rated’ compared with 14% females ($\chi^2 = 9.15$, $df = 1$, $P < 0.005$) (Table 2).

The sample was also divided into those who ‘under-rated’ and those who either ‘over-rated’ or agreed with the clinical observer. Although more women than men ‘under-rated’ compared with the

| Table 1. Clinical grade observer-assessed by clinical grade self-assessed (number of cases: cells in italics) |
|--------------------------------------------------|
| **Self-assessed** | v. mild cold | mild cold | moderate + severe cold | Total |
|-------------------|-------------|-----------|------------------------|-------|
| No cold           | **888**     | **138**   | **8**                  | **1035** |
| Very mild cold    | 35          | **121**   | 37                     | 186   |
| Mild cold         | 7           | 65        | **232**                | **384** |
| Mod + severe cold | 0           | 1         | **18**                 | 89    |
| Total n           | **930**     | **315**   | **295**                | **1694** |
| %                 | 54.9        | 18.6      | 17.4                   | 100.0 |

$\chi^2 = 1878.3$, $df = 9$, $P < 0.0001$, Kendall’s Tau $b = 0.806$, $P < 0.0001$.

Kappa = 0.613, SE = 0.030, $Z = 20.43$, $P < 0.001$.

Weighted Kappa = 0.888, SE 0.026, $Z = 34.15$, $P < 0.001$. 

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Table 2. Extent to which volunteers 'over-rated' their signs/symptoms compared to the clinical observer, by sex (based on clinical grade categories)

|          | Male         | Female       | Total       |
|----------|--------------|--------------|-------------|
|          | n  | %    | n    | %    | n    | %    |
| Not-over rate | 551 | 80.1 | 862  | 85.6 | 1413 | 83.5 |
| Over-rate  | 137 | 19.9 | 143  | 14.2 | 280  | 16.5 |
| Total     | 688 | 100.0| 1005 | 100.0| 1693 | 100.0|

\[ \chi^2 = 9.15, df = 1, P < 0.005. \]

clinical observer, 8% compared with 7%, this difference was not statistically significant (Table 3).

A log linear analysis was performed to see whether this 'over-rating' remained taking account of the other socio-demographic variables. Results are shown in Table 4. Adjusting for virus given, whether the observer assessed them as having a cold, age, marital status and occupational class, the odds of men 'over-rating' are 1.6 times those for women (95% confidence intervals 1.19, 2.10). The adjusted odds of over-rating for those whom the observer assessed as having a cold were 1.6 times the odds for those the observer did not assess as having a cold.

The log-linear analysis was repeated for 'under-rating'. The odds ratio for women under-rating compared with men was 1.06; this was not statistically significant (95% CI = 0.68, 1.66).

Although the main outcome of interest in this analysis is agreement between volunteers and the clinical observer on the five category clinical grade, an analysis was also conducted on the agreement between the observer's clinical score and the volunteers' scores on the analogue scale. There was a high correlation between these two scores (Pearson's \( R = 0.796, P < 0.0001 \)). The mean observer-assessed clinical score was significantly higher for females than for males (9.6 cf 7.5; \( t = -2.95, P < 0.01 \)). There was no such difference for the self-assessed clinical score (13.2 cf 13.9, \( t = 0.80, n.s. \)). Thus the picture for the clinical score is the same as that for the clinical grade; the observer scored the women as having more signs and symptoms than the men, but the female volunteers did not score themselves as having more signs and symptoms than men.

A measure indicating the difference between the volunteer's and observer's clinical scores was calculated by subtracting the observer's score from the volunteer's. An analysis of variance was undertaken to see whether this measure differed between men and women, controlling for all the other variables. The results are presented in Table 5. Adjusting for all the other variables the differences between self and observer's clinical scores are significantly greater for men than for women (\( F = 20.7, P < 0.001 \)). The grand mean, 4.72, indicates that on average the volunteers scored higher than the clinical observer, men scored even higher on average than women, indicating a greater propensity to 'over-rate'. The analysis of the clinical scores therefore confirms the analysis based on the clinical grade.

**SUMMARY AND DISCUSSION**

In summary, among this unusual sample of 1700 individuals a trained clinical observer was more likely to assess women than men as having a cold, and as having a worse cold. However, the female volunteers were not more likely than the males to assess themselves as having a cold. Comparing self and observer assessments, the difference between the two was significantly greater for men than for women. Men were significantly more likely than women to 'over-rate' their signs and symptoms compared to the clinical observer.

The question arises as to whether these results imply that (a) men are less tolerant of symptoms, or more likely to complain about them, at any given level of observable clinical signs, than women (the 'whingeing male' interpretation); or (b) that the clinical observer is more likely to diagnose signs or symptoms in women than in men (the 'chauvinist observer' interpretation) or (c) that there is some combination of men being less tolerant of symptoms and the observer being less likely to define men as ill.

The data available from this study could support any of these three interpretations. However, the "whingeing male" hypothesis is given some support by the fact that the clinical score in particular is supposed to be based on a highly objective set of criteria including signs such as temperature, quantity of nasal secretions, swollen glands, etc. However, it may be that the clinical observer's assessments are subtly (and possibly subliminally) influenced by the gender.

Table 3. Extent to which volunteers 'under-rated' their signs/symptoms compared to the clinical observer, by sex (based on clinical grade categories)

|          | Male         | Female       | Total       |
|----------|--------------|--------------|-------------|
|          | n  | %    | n    | %    | n    | %    |
| Not-under rate | 642 | 93.5 | 921  | 91.6 | 1563 | 92.4 |
| Under-rate  | 46  | 6.7 | 84   | 8.4 | 130  | 7.6 |
| Total     | 688 | 100.0| 1005 | 100.0| 1693 | 100.0|

\[ \chi^2 = 1.38, df = 1, n.s. \]
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Table 4. Odds ratios and Z score from log-linear analysis of 'over-rating' by volunteers

|                              | Odds ratio | 95% Confidence intervals | Z-score | P     |
|------------------------------|------------|---------------------------|---------|-------|
| **No 'cold'**                | 1          |                           |         |       |
| 'Cold'                       | 1.55       | 1.18 - 2.05               | 3.14    | <0.001|
| Female                       | 1.57       | 1.19 - 2.10               | 3.15    | <0.001|
| Male                         | 1.57       | 1.19 - 2.10               | 3.15    | <0.001|
| No virus                     | 1.74       | 0.92 - 3.29               | 1.73    | ns    |
| Rhinovirus                   | 1.28       | 0.64 - 2.55               | 0.49    | ns    |
| Corona/flu virus             | 1.28       | 0.59 - 2.45               | 0.54    | ns    |
| Other virus                  | 1.19       | 0.85 - 1.68               | 1.01    | ns    |
| Under 31                     | 1.09       | 0.75 - 1.61               | 0.48    | ns    |
| 31-45                        | 1.43       | 1.03 - 1.97               | 2.15    | <0.02 |
| Non-manual                   | 1.16       | 0.73 - 1.9                | 0.64    | ns    |
| Manual                       | 1.03       | 0.59 - 1.49               | -0.27   | ns    |
| Unoccupied                   | 0.11       |                           |         |       |
| Single                       | 0.30       |                           |         |       |
| Married                      | 0.38       | 0.06 - 3.1                | 0.047   |       |
| Sep, wid, div                | -0.32      | 0.01 - 0.1               | 0.913   |       |

Goodness-of-fit test statistics.
Likelihood Ratio Chi Square = 253.88 df = 258 P = 0.561.
Pearson Chi Square = 233.39 df = 258 P = 0.862.

of the patient; and it is certainly the case that the staff at the Common Cold Unit believed that women were more likely to get colds. Thus although the analysis has used the clinical observer's assessment as the 'gold standard', it is not possible to reject Mechanic's suggestion that clinicians may be influenced by the gender of those they examine [10]. The analysis could be turned round to say that clinical observers are more ready to attribute symptoms and illness to women than to men, and that they under-rate men's symptoms.

Whether it is more appropriate to use the volunteer's or the observer's assessments as the gold standard against which deviations should be measured, it is clear that the findings of this study do not support the hypothesis that for minor, acute and transient conditions women have lower thresholds for perceiving and reporting symptoms. This is an important conclusion because it suggests that the consistently reported higher incidence of illness and symptoms among women might not be explained away as a result of women's greater sensitivity to bodily cues or readiness to admit to illness. Although this study is restricted to one condition, and involved a rather selected group of persons, its findings are in line with those from studies of colorectal cancer and osteoarthritis. The similarity of the findings from studies pertaining to conditions differing in prognosis, severity and chronicity gives added support to a hypothesis contrary to that normally suggested; namely that at given levels of clinical signs of a condition, men and women are either equally likely to report related symptoms, or men are likely to report more severe symptoms. This recasting of the usual interpretation of the excess of female over male morbidity suggests that rather than artefactually exaggerating gender differences in morbidity, different thresholds for perceiving and reporting symptoms may produce underestimates of gender differences in morbidity.

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Table 5. Analysis of variance (ANOVA) of the difference between volunteer's and observer's clinical score. Grand mean = 4.72 (volunteer's clinical score minus observer's score)

|              | Adjusted deviation | Beta  | F     | Sig F |
|--------------|--------------------|-------|-------|-------|
| No cold      | -3.35              | 0.33  | 199.5 | 0.000 |
| Cold         | 5.14               | 0.33  |       |       |
| Male         | 1.68               |       |       |       |
| Female       | -1.15              | 0.11  | 20.7  | 0.000 |
| No virus     | -1.24              |       |       |       |
| Corona/flu virus | -1.34  |       |       |       |
| Other virus  | -0.07              | 0.07  | 2.6   | 0.051 |
| Under 31     | 0.30               |       |       |       |
| 46 +         | -0.12              | 0.02  | 0.3   | 0.772 |
| Non-manual   | -0.65              |       |       |       |
| Manual       | 1.30               |       |       |       |
| Unoccupied   | 0.38               | 0.06  | 3.1   | 0.047 |
| Single       | 0.11               |       |       |       |
| Married      | -0.03              |       |       |       |
| Sep, wid, div| -0.32              | 0.01  | 0.1   | 0.913 |

Multiple R² 0.134.
Multiple R 0.306.

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