Short Communication

Accumulation of unhealthy behaviors: Marked social inequalities in men and women

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ABSTRACT

The objective of this study was to compare the accumulation of unhealthy behaviors at the bottom of the social scale in men and women and, secondarily, to compare social and gender-based inequalities.

Fifty-two general practitioners from the Paris area volunteered to participate. A sample of 70 patients (stratified by gender) aged 40–74 years was randomly chosen from each physician's patient panel and asked to complete a questionnaire about their social position and health behaviors: tobacco and alcohol use, unhealthy diet, and physical inactivity. Mixed Poisson models were used to describe, with relative risks (RRs) and relative inequality indexes (RIIs), the social inequalities in the accumulation of these four unhealthy behaviors.

In 2008–2009, 71% of the 3640 patients returned their questionnaires. Men had an average of 1.59 of the 4 unhealthy behaviors we studied, and women 1.35 (RR = 1.18; 95% CI [1.11–1.25]). The mean number of unhealthy behaviors increased significantly for both genders from the top to the bottom of the social scale. The order of magnitude of RIIs was similar among men and women, ranging from 1.33 (occupational RII among women, 95% CI [1.11–1.60]) through 1.69 (financial RII among women, 95% CI [1.43–1.99]). None of the interaction tests between gender and social position was significant. The social inequalities had significantly wider amplitudes than those between genders for two of the three indicators of social position. The amplitude of social gradients related to unhealthy behaviors was similar between men and women and exceeded the gender inequality between them.

1. Introduction

The reduction in life expectancy and deterioration in health status of individuals at the bottom, compared with the top, of the social scale, is a public health problem common to all countries: social inequalities in health (Mackenbach et al., 2008). One of their most poorly understood aspects is that social differences appear to be more marked among men than women (Hunt and Macintyre, 2010; Matthews et al., 1999). We know that a part of these inequalities correspond to the socially differentiated adoption of unhealthy behaviors or habits. Smoking, excess alcohol consumption, physical inactivity/sedentarity, and an unbalanced diet are examples of behaviors that are both risk factors for many diseases (Lim et al., 2012) and much more prevalent at the bottom of the social scale (Mackenbach et al., 2017; Stringhini et al., 2010, 2011). Unhealthy behaviors are also associated with gender: men adopt these behaviors more frequently (Emanuel et al., 2012; Erol and Karpyak, 2015; Peters et al., 2014) and are at greater risk of acquiring several of them than women (Noble et al., 2015). We thus hypothesized that the more marked social inequalities among men than women might be explained, at least partially, by men's accumulation of more unhealthy behaviors. Although several recent studies have studied the influence of gender and social position on the accumulation of unhealthy behaviors (Noble et al., 2015), a careful search uncovered none that studied both simultaneously.

The objective of this study was therefore to compare the amplitudes of the accumulation of unhealthy behaviors at the bottom of the social scale in men and women. To specify the relative importance of both types of inequalities (social and gender-based), we secondarily aimed to

compare the amplitude of each.

2. Methods

This study is an ancillary analysis of data from an observational cross-sectional survey named *Prev Quanti* (Thebault et al., 2017), designed to document social inequalities in preventive care provided by general practitioners (GPs) in France. This survey took place in 2008–09 among GPs who supervised students training in general practice during an internship at their offices. We used email and telephone to recruit 50 participants among the 215 physicians then working with two medical school departments of general practice in the Paris metropolitan area. Each was paid €300 for work estimated to take around 10 h.

For each participating GP, a random sample of 35 men and 35 women aged 40 to 74 years was drawn from their patient lists (patients who had reported them to be their regular doctor) furnished by the national health insurance fund. There were no exclusion criteria.

All patients self-reported their unhealthy behaviors and social position in a postal questionnaire (80 items including 10 on gynecology) mailed to them by their GPs, who also completed a form for each patient included, using information in their medical files.

Four unhealthy behaviors were considered: smoking (current consumption of tobacco), excessive alcohol consumption (at-risk consumptions according to the WHO criteria: 40 g/day for men and 20 g/day for women, mean over the past seven days), unhealthy diet (ate fewer than 5 portions of fruits and vegetables the previous day) and physical inactivity (no regular physical activity over the week). Our variable of interest was the proportion of unhealthy behaviors adopted by a patient (i.e., the number of unhealthy behaviors of each patient, divided by four – the number of behaviors studied).

The socioeconomic position of each patient was assessed according to three indicators:

- Occupation: occupational class was based on the patient's current or last occupation (or, for patients who had never worked, their partner's last occupation), coded into four categories derived from the standard classification of occupations in France (French National Institute for Statistics and Economic Studies, INSEE) and ranked as follows: managers and superior intellectual professions; intermediate professions; office, sales, and service workers, and blue-collar workers.
- Education: educational level was categorized in three levels according to the highest diploma: did not pass school-leaving exam, passed it, or university diploma.
- Financial situation: patients had to answer a question about their perceived financial situation coded into four categories: "I'm not managing", "It's tight, I must be careful", "It's OK", "I'm quite comfortable".

The social inequalities in this accumulation of unhealthy behaviors were described by relative risks (RRs) and relative inequality indexes (RIIs), which are interpreted as RRs comparing both ends of the social scale. But unlike RRs, which describe deviations between two social categories of a population, RIIs have the advantage of furnishing a single, synthetic measure of social inequalities for the entire population. The higher the RII, the stronger the social inequalities. In addition, RIIs (i.e., scales of social inequalities) can be compared between populations with different social structures (a comparison impossible for RRs) and are habitually compared between men and women (Mackenbach and Kunst, 1997).

In our analyses, we used mixed Poisson models with a random intercept (Snijders and Bosker, 2011) to take the hierarchical structure of the data into account (behaviors were grouped by patient and patients were grouped by physician) and thus obtain unbiased estimators (Diez, 2002). Besides age (divided into 5-year age groups, collected from the

patient's questionnaire), all models were adjusted for variables collected from the physician's files: body mass index (divided into 3 classes < 25, $25– < 30$ and $\geq 30 \, kg/m^2$), number of consultations during the past year (0, 1, 2, or 3 or more consultations) and length of doctor-patient relationship (0–1, $> 1–3$ and > 3 years) – all characteristics that may vary across the social groups and influence unhealthy behaviors. We first performed analyses stratified for gender, then tested interactions (between gender and social position), and finally compared social and gender inequalities.

All analyses were conducted with Stata and SAS software. The National Data Protection Authority (CNIL, Commission nationale de l'informatique et des libertés), which is responsible for ethical issues and protection of individual electronic data, approved the study. All patients were informed of the study's subject by their GP and provided informed consent to participate.

3. Results

The study included the first 52 GPs who volunteered to participate. The forms used to collect information from the GP files were completed for 98.9% (n = 3600) of the 3640 patients; the patient participation rate was 71.6% (n = 2605). Our analyses finally included the 2599 patients (71.4%) for whom both patient and doctor data were available.

Their mean age was 53.9 (± 9.5) years, and their most frequent socio-occupational category was managers (55.0% of men and 40.5% of women, Table 1).

The mean number of unhealthy behaviors increased significantly for both genders from the top to the bottom of the social scale (for all 3 of the socioeconomic indicators we used, Table 2), with RIIs of a similar order of magnitude among men and women, ranging from 1.33 through 1.69.

Men had a mean of 1.59 of the 4 unhealthy behaviors studied, and women 1.35 (RR = 1.18; 95% CI (1.11–1.25); $P < 0.001$). This result, showing gender inequality in unhealthy behaviors, is from the adjusted model that did not include any social position indicator, but the RRs were nearly identical when any one of the three indicators of social position was introduced into the model. None of the three tests of the interaction between gender and social position was significant. The social inequalities for educational level and perceived financial situation had wider amplitudes ($P < 0.001$ and $P < 0.008$, respectively) than those for gender, but there was no difference in width of amplitude for occupation ($P = 0.16$).

Sensitivity analyses (not presented) adjusted only for age yielded essentially identical results.

4. Discussion

In our study, the number of unhealthy behaviors increased from the top to the bottom of the social scale among both men and women. The amplitude of social gradients related to the accumulation of unhealthy behaviors did not differ between men and women and exceeded the amplitude of the gender inequalities between them.

4.1. Limitations and strengths

Our study has several limitations. First, we did not use a standardized questionnaire to collect the patients' dietary and physical activity data, but the questions were framed simply and unambiguously, close to the way physicians ask about these facts during appointments. For diet, we chose the threshold value of 5 portions of fruit and vegetables daily, as recommended, but by asking the patients about their consumption the day before rather than over the previous week.

Second, PrevQuanti observed a lower rate of unhealthy behaviors than the *Baromètre santé* (*Health Barometer*), a French survey representative of the general population. The difference lies principally in PrevQuanti's lower estimates of the rates of unhealthy diet and physical