Desegregation and occupational health: how male and female hospital attendants collaborate on work tasks requiring physical effort

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Abstract

Until recently, hospital attendants in Québec were assigned tasks on the basis of gender, but now few hospitals practice segregation explicitly. However, some attendants suggest that women attendants do not carry out their fair share of tasks involving physical effort, resulting in male attendants being exposed to increased risk of injury. To examine this assumption, the authors observed attendants carrying out 1,169 physical operations for a total of 61 hours. Surprisingly, women performed significantly more operations per hour than their male counterparts. After discussions with participants, a number of factors were proposed to account for the divergence between the assumption (that women did not share equally in physical tasks) and the authors’ observation (that women carried out more tasks per hour than men). These factors include: retention of stronger women, stereotyping, and recourse to men for rare, extremely demanding operations. In conclusion, the authors suggest that the desegregation of jobs should be accompanied by both observation and discussion to identify problems and adapt work practices and environments.

Key words

Attendants, ergonomics, gender, hospitals, job segregation, lifting, male–female differences, non-traditional jobs, teamwork, women and work

Introduction

Evidence is divided as to whether women who enter jobs with a physical component, and which traditionally have been carried out by men, are exposed to a higher risk of injury than their male counterparts.\(^1\)\(^–\)\(^7\) Sex\(^*\)-specific physical risk factors that are associated with some tasks may arise from the fact that, on average, men (in this case North American men) are taller, heavier and, under most conditions, can lift more weight than the average woman. Even so, differences among members of the same sex outweigh those between the sexes for most of such parameters.\(^8\)\(^,\)\(^9\)

Excess risk of injury for one sex could be due to insufficient physical ability, to gender-typed, high risk task assignments,\(^10\) or to equipment or situations designed for one sex’s average body size or shape and hence inappropriate for the other sex.\(^11\)\(^,\)\(^12\) Men and women have also developed specific work techniques to suit their specific physical capabilities, and injury

\(^*\)‘Gender’ is usually used to refer to socially determined male–female differences, distributed on a continuum; ‘sex’ refers to genetically-determined differences, usually dichotomous. However, this paper refers to biological phenomena with genetic and social determinants. Confronted with the difficulty of determining the relative biological and social contributions to each phenomenon, and the multiple interactions involved in them, the authors have chosen to use ‘sex’ except where the discussion clearly refers to social forces only.
patterns may be associated with some work techniques more than others.\textsuperscript{13–15} It may also be the case that, within the same integrated job role, team dynamics result in differences in risk exposure that vary according to gender. In one municipality undergoing desegregation, workers reported that in about half of work teams, female municipal blue collar workers ‘gravitated’ to gender-specific tasks, characterised by less climbing, less work with machines, and less intense but more sustained effort.\textsuperscript{16–18} Although some men and women felt that such assignments protected women’s health, others expressed resentment over this division of labour. It is clear, therefore, that issues of health and safety, as well as equity, are associated with desegregation in the workplace.

**Background to the study**

In the Canadian province of Québec, following desegregation of the public sector occupation of hospital orderly/attendant (‘proposé aux bénéficiaire/proposée aux bénéficiaire’, hereafter referred to as ‘attendant’), controversy arose over the relative contributions of male and female workers. Attendants are responsible for the physical care of patients, including hygiene, clothing, feeding, bed-to-wheelchair transfers, and transport to radiology and other services. Prior to 1975, the job title was explicitly separated by sex (‘préposé aux malades/préposée aux malades’), with different salary levels and job descriptions. In 1975, the Québec government adopted a charter of human rights that included provisions against discrimination in job assignment,\textsuperscript{19} and trade union women’s committees and individual workers put pressure on hospitals to desegregate several jobs. From that point on, collective agreements between the government and its healthcare workers eliminated progressively sex specifications in the job titles of attendants. In 1976–1979, the job descriptions were given different names, with the job previously designated for the male sex newly dubbed ‘heavy work’ and the female job ‘light work’. Workers could apply for the job title primarily held by the opposite sex, although such crossing of lines remained rare. The maximum salary on the ‘heavy work’ job pay scale was 15 per cent higher than that payable to those on the ‘light work’ pay scale. In the 1979–1982 agreement, these final distinctions were abolished, and the two job titles were fused. In 1991, there were 35,523 attendants, and their job classification had the highest compensated ‘accident’\textsuperscript{*} rate of all Québec healthcare workers, with women suffering 24.2 accidents per 100 workers each year compared to 18.5 for men.\textsuperscript{20} The average age of women attendants was 38.6 years old (as opposed to 34.2 years old for men), and women had more accidents, injuries and illnesses than men of corresponding age. The typical accident (63.3 per cent of all accidents) for both sexes involved a back injury that occurred

\*Includes illnesses and injuries, collectively called ‘lésions professionnelles’ in the Cloutier & Duguay\textsuperscript{20} report. Because of the way Québécois law works, compensation is usually restricted to injuries deemed to result from an accident, defined as ‘a sudden, unforeseen event’.
While moving a patient or a box. The problem of injuries among nursing staff is commonplace and has led to intense interest among health and safety professionals.

Through a union–university agreement, the authors were involved in union-based health and safety training for attendants. The authors participated in 10 sessions, during which some men and women suggested that women attendants were unable or unwilling to share equally in tasks that involved physical effort. Some women attendants said that their health was at risk during some heavy manipulations, and some men said that they were exposed to extra hazards because they did the lion’s share of lifting. Little overt disagreement was heard when these perceptions were voiced, and an exercise was introduced so that they could be discussed and examined. Subsequent sessions using the exercise convinced the authors that such issues were important for many workers. At the same time, a physician responsible for health and safety in one hospital – faced with reassignment requests from several women workers – contacted the research group and asked for a study to be implemented to find out whether women were able to perform tasks expected of attendants. Although the hospital later refused to participate – citing fears of creating ill feeling among attendants – funding for the present study was secured. We report here an examination of collaboration among men and women hospital attendants, the implications of collaboration for musculoskeletal injuries, and possibilities for their prevention. Using information gathered in this context, we ask, what is the health and safety effect of desegregation of employment categories that involve physical effort and were previously reserved for males?

**Methods**

The methodology chosen to analyse the work activity of the attendants was developed by ergonomists in France and integrates observation of work activity in the workplace and collection of the perceptions of work in order to create a portrait of working conditions. The process begins with a general characterisation of the work activity and then critical operations are chosen and observed in more detail.

Four steps are usually involved in the analysis of work activity:

- During the first stage, preliminary data are collected from individuals, records and other sources, about work activity, constraints and demands, as well as the worker population.
- Preliminary observations are then carried out, from which researchers generate a broad picture of the work. Typical operations are identified by the researcher and the choice is validated with the workers and supervisors.
- During the third stage, data are collected systematically at times and places that are thought to represent the most important characteristics of the work. Employee comments are collected during or immediately after the observations. In this way, the work activity is analysed as a compromise between, on the one hand, the constraints and demands of the job and, on the other, the workers’ ability to do their jobs without damaging their health or wellbeing. As pointed out by Garrigou et al., this analysis must have both technical and social components.
- At the end of the process, the results of the research are reported to workplace participants, whose comments are integrated into a final report. This last step serves to validate the choices and conclusions of the researchers. (The authors have found the method to be helpful in producing change in the workplace.)

**Stage I: Interviews with employer and union representatives**

In preparation for observations in selected hospitals, interviews were carried out with one
employer and one union representative from each of the 15 hospitals across Québec. The criteria for choosing the hospitals reflected the authors’ assessment about the determinants of the constraints associated with lifting. At the inception of the study, it was assumed that lifting aids, ergonomics training and patient characteristics would vary depending on the size, vocation (eg acute versus chronic care) and region of the hospital. Children’s hospitals were excluded because lifting is easier in these hospitals. All hospitals in the study were French-speaking.*

The directed interviews included questions about the size and vocation of the hospital, the number, sex and task assignments of attendants, the hospital’s activities in terms of health and safety, and the equipment available for patient transfers. On the basis of these variables, a total of four wards in two hospitals were chosen for further study.

Hospital X is a 400-bed chronic care hospital, with females constituting 20 per cent of attendants. Male and female attendants’ jobs were merged in 1986. The hospital is relatively well equipped, with two manual lifting devices and one ceiling lifting device per ward, but no electrically controlled beds. There is a health and safety committee, but it does not meet and has established no health and safety priorities. The person responsible for health and safety is the assistant director of human resources, a former nurse with no specific health and safety training. No union member has been assigned specifically to oversee matters of health and safety.

Hospital Y is a 700-bed general hospital, with women totalling 46 per cent of attendants. Male and female attendants’ jobs were merged in 1980. The hospital is relatively poorly equipped, with one electric lifting device per ward, one bed with electric controls and no ceiling lifts. The hospital has an active health and safety programme, headed by an enthusiastic industrial hygienist with extensive experience. There is a union representative assigned specifically to deal with health and safety matters. Interviews were carried out with the nursing supervisor of each ward and two healthcare workers on work organisation (‘non-official’ interviewees).

In order to explore some points further, a number of observations were also carried out in hospital Z, a chronic care institution that is extremely well equipped and has a moderate amount of health and safety activity. Seventy-two per cent of the attendants are women. In contrast to the other two hospitals, in rooms where the condition of patients is such that they cannot move without help, there is a patient-transfer apparatus mounted on rails on the ceiling. According to hospital records, installation of this equipment in 1996 was associated with a 57 per cent fall in sickness absence rates among attendants in the following year.

The list of physically demanding operations was established in the following way. Preliminary observations in hospitals X and Y led to the compilation of a list of physically

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*It should be noted that hospitals are under provincial jurisdiction and in Québec, government priorities for intervention in occupational safety and health were established in such a way that hospitals are given a very low priority and are not required to have an occupational safety and health committee, to free up union delegates for health and safety activities, or to register any plan for prevention. Hospital budgets have been under intense pressure since the early 1980s and hospital directors’ remuneration is determined, in part, by how low they can keep their budgets.
demanding operations. This list was checked by personnel in the four wards studied and by
the health and safety committee in hospital Y. This list was further validated by the results of a
questionnaire given to attendants in hospital Z.

Stages 2 and 3: Observations in hospitals X and Y
Ergonomics observation follows the principles of qualitative analysis insofar as sampling is
oriented by a conscious desire to observe all relevant situations, rather than a random
sampling according to time or place. Twenty-eight hours of preliminary observations were
carried out in order to understand how the teams worked. Then, between September 1996 and
May 1997, 61 additional hours of systematic observations were carried out; 28 hours with 12
women and 33 hours with 18 men (reflecting the proportion of women and men in the
hospitals where the observations were made). In order to study experienced workers, only
regular, permanent personnel were observed. Personnel were not formally assigned to teams,
and collaborations were often carried out with a number of other personnel. One attendant at
a time was observed, and was chosen according to:

• who was working when observations were permitted (this was an important constraint
  since the supervisor had to sanction such observations)
• whether the attendant agreed to be observed
• the desire to balance observations of women and men under circumstances where men, at
times, greatly outnumbered women.

The duration of observations was between 15 minutes and four hours, depending on when the
personnel took their breaks in relation to the start of observations. Since physically demanding
tasks were concentrated during the early hours of shifts, observations were also concentrated
during these times. The 61 hours of systematic observation included eight hours of detailed
observations of two men and two women working in the presence of workers of the opposite
sex, followed by discussions of notes with the attendants involved.

All operations involving physical actions relating to patient care were scored as to whether
there was collaboration; with whom they were carried out (sex and job title); and whether the
collaboration took place at the spoken request of the observed attendant or of the other
person. Determining whether a task was shared was decided by the observable physical
dimensions of the task. For example, if two attendants lifted a patient at the same time, the
task was scored as ‘shared’. If, on the other hand, one attendant asked another to carry out a
task while he/she moved a patient in bed, for example, then this was scored as ‘not shared’.
All communications regarding physical tasks involved in patient care were scored using
categories relating to the nature of the task and the job title of those involved.

Stage 4: Validation
Since the sampling of personnel observations was non-random, validation of the results by
recourse to the perceptions of a wider sample of workers and supervisors was critical. In fact,
the validation stage provided the most interesting results.

A preliminary report was submitted to the personnel of all four wards, to their supervisors, to
the union presidents, and to the health and safety officer of hospital Y. Copies were also
distributed to the human resources supervisors of hospitals X and Y. Comments from all of
these sources were incorporated into the final report. When the authors did not agree with a
comment, it was discussed with those concerned until agreement could be reached or until it
was clear that agreement was not possible.
Results

Job descriptions
Job descriptions were obtained from hospitals X and Y. They can be summarised as follows:

- The attendant works under the supervision of the head nurse. He/she is responsible for the physical care of the patient, including their hygiene, dressing, comfort, moving and feeding.
- Attendants are usually assigned to patients in numbers, depending on the physical needs of the patients, established according to quantitative care standards (ie rating of patients’ illnesses and state).
- Attendants work alone, in teams, or in partnership with a nurse or a nurse’s aide. The latter are almost always female.

Interviews with personnel in 15 hospitals
Hospital staff varied in their awareness of health and safety issues and of the means used to ensure standards of health and safety. Some hospitals had active joint employer–employee health and safety committees that worked to diminish musculoskeletal injuries; some did not. Chronic care institutions were somewhat better equipped than acute care institutions, in that they provided lifting aids, push-button-controlled beds and variable-height bathtubs. Most hospitals provided courses in how to handle patient transfers (available from a provincial employer–employee joint health and safety association), but few were given follow-ups to these courses. Only hospital Z reported having enough ceiling-mounted, patient-transfer apparatuses to take care of its needs. Most used mobile units, with only one per department.

Almost all of the employer and union representatives in the 15 hospitals said that male and female attendants had been assigned the same tasks for at least five years preceding the present study. Physically demanding manipulations, such as bed-to-wheelchair transfers, repositioning patients in bed, and cleaning and redressing incontinent patients, were thought to be done by both women and men equally. Stated exceptions to this were:

- some or all women attendants were assigned to or requested lighter tasks (in three hospitals)
- women attendants were sometimes or always assigned to women patients (in three hospitals)
- there was always a male attendant on each floor, to be called on as needed (in two hospitals)
- when work was especially heavy, it was preferred that a male attendant was called on (in one hospital)
- women attendants used lifting equipment more than male attendants, and more often worked in teams (in one hospital).

Based on the interviews, the four wards in hospitals X and Y were chosen for further study (see Table 1). Wards A and B are long term care units in hospital X. On ward A, attendants work alone and each is assigned to a specific set of patients. On ward B, attendants’ work is assigned somewhat more collectively. In addition, most of the personnel on this ward are part of a group of friends, and pride themselves on working as a team.

Wards C and D are poorly equipped units in hospital Y, where attendants work in teams. Ward C serves patients who are recovering from surgery and/or severe accidents. Ward D has patients whose situation is roughly comparable to those in wards A and B.
Difficulty of tasks
Based on preliminary investigations, a list was compiled of tasks that require physical effort. Meetings with attendants were carried out on each of the four wards. Tasks that attendants agreed were difficult at least some of the time are listed in Table 2, according to the level of difficulty indicated by the attendants. As expected, operations moving patients were the most difficult. Seven male and 18 female attendants in hospital Z rated eight of the most difficult tasks on a scale of 1 (‘never difficult’) to 4 (‘always difficult’) (see Table 3). Women rated the eight tasks, taken together, to be significantly more difficult than men did (p < 0.005, t test for pooled ratings). Patient handling tasks were rated the most difficult by both sexes.

During the 61 hours of systematic observation in hospitals X and Y, 327 ‘very difficult’ operations were observed, an average of 5.4 per hour. The use of mechanical aids to lifting was observed in only seven cases; attendants attributed this to time pressures. In hospital Y, two women attendants tried to use an electric lift but did not know how to use the apparatus and did not consult anyone on its use.

Teamwork
There is a large amount of teamwork on the hospital wards. During the observation period, in hospitals X and Y there were 495 communications relating to physical operations and 1,169 actions involving physical operations. Of the 1,169 actions, 45 per cent were carried out

<table>
<thead>
<tr>
<th></th>
<th>Hospital X (chronic care)</th>
<th>Hospital Y (general hospital)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ward A</td>
<td>Ward B</td>
</tr>
<tr>
<td>Clientele</td>
<td>chronic illness, geriatric</td>
<td>chronic illness, geriatric</td>
</tr>
<tr>
<td>Beds</td>
<td>56</td>
<td>57</td>
</tr>
<tr>
<td>Average care (per patient each day*)</td>
<td>3.5 hours</td>
<td>3.5–4.5 hours</td>
</tr>
<tr>
<td>Average stay</td>
<td>4.3 years</td>
<td>6.5 days</td>
</tr>
<tr>
<td>Number and type of personnel during day and evening</td>
<td>Day 6 attendants 7 nurses</td>
<td>Day 6 attendants 7 nurses</td>
</tr>
<tr>
<td></td>
<td>Evening 4 attendants 4 nurses</td>
<td>Evening 4 attendants 4 nurses</td>
</tr>
<tr>
<td>Equipment</td>
<td>Two manual patient-transfer units and one ceiling transfer unit per ward</td>
<td>Adjustable-height bath</td>
</tr>
</tbody>
</table>

*This is a theoretical measure developed to generate staffing ratios and is meant to reflect the patients’ need for care.
in collaboration with other attendants. Most collaborations involved another attendant, but many involved nurses’ aides or, more rarely, nurses. The calculated proportion (45 per cent) greatly underestimates the degree of collaboration since, as noted above, sequential exchanges of operations were not scored as collaborations if no shared action was involved.

As the difficulty of operations increased, so did the degree of collaboration. Of particular interest were the 327 ‘very difficult’ operations, of which 21 per cent were carried out alone (compared with 55 per cent of all operations). Collaboration varied with time, with the lowest proportion taking place during the beginning of the morning shift (in all three hospitals). It should be noted that the first three hours of the morning shift included fewer physically demanding tasks per hour than the corresponding time on the evening shift (six an hour as opposed to 17 per hour), but many more time-consuming tasks, since patients have to be sent to other departments for tests, nurses may need assistance with medication administration, doctors and nurses make rounds and so on. Attendants attributed the lack of collaboration to a shortage of time. As one attendant in ward B commented:

It’s the time. We’re alone to wash our patients. Together it would take more time. We have to finish by 9 o’clock because some go to physio, hairdressing etc. The ideal is when there are two of you in the same room and you can get the other attendant to come when you need to.

In a similar vein, another attendant in ward D stated: ‘Here, working in pairs would be ideal but we’d need more time.’

<table>
<thead>
<tr>
<th>Operation (hospitals X and Y)</th>
<th>Degree of difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pull patient up in bed</td>
<td>Very difficult</td>
</tr>
<tr>
<td>Turn patient over</td>
<td>Very difficult</td>
</tr>
<tr>
<td>Move patient to centre of bed</td>
<td>Very difficult</td>
</tr>
<tr>
<td>Transfer patient from bed to chair without mechanical aid</td>
<td>Very difficult</td>
</tr>
<tr>
<td>Empty laundry</td>
<td>Difficult</td>
</tr>
<tr>
<td>Move loaded cart or gurney</td>
<td>Difficult</td>
</tr>
<tr>
<td>Raise head of bed</td>
<td>Difficult</td>
</tr>
<tr>
<td>Dress/undress patient</td>
<td>Difficult</td>
</tr>
<tr>
<td>Give patient a bath</td>
<td>Difficult</td>
</tr>
<tr>
<td>Make bed</td>
<td>Not difficult</td>
</tr>
<tr>
<td>Personal services (eg hair care, denture care, washing)</td>
<td>Not difficult</td>
</tr>
<tr>
<td>Feed patient</td>
<td>Not difficult</td>
</tr>
<tr>
<td>Put laundry on cart</td>
<td>Not difficult</td>
</tr>
<tr>
<td>Other routine services (eg get object, close window)</td>
<td>Not difficult</td>
</tr>
</tbody>
</table>
The degree of collaboration also varied between hospitals. If the three most difficult operations during the first three hours of the morning shift are considered (27 hours of observations of transfers, repositioning and helping patients to sit up), 55 per cent of those in hospital X were carried out alone, compared with only 27 per cent of those in hospital Y (\( \chi^2 = 6.3, p < 0.02 \)). Despite the positive team spirit and the pride taken in collaboration on ward B, the proportion of operations that involved collaboration did not vary at all between wards A and B in hospital X.

A hypothesis was generated by observations in hospitals X and Y, namely that collaboration is conditioned to some extent by the number of potential helpers available. The hypothesis was tested in hospital Z, where rooms were shared by two chronic care patients. In some rooms, the same attendant had been assigned to both patients, while in others, the two patients had been assigned to two different attendants. Assigning two attendants to the same room increased the potential for collaboration in carrying out difficult operations; in those cases, 22 per cent of 157 manipulations involving washing and dressing patients in the morning were collaborative. In those cases where the same attendant was assigned to the two patients, only 7 per cent of 151 operations were carried out in collaboration (\( \chi^2 = 13.6, p < 0.001 \)).

Male–female collaboration

Overall, women attendants did more operations per hour observed (excluding communications)

<table>
<thead>
<tr>
<th>Operation</th>
<th>Rating of difficulty by all (average ± SD)</th>
<th>Rating of difficulty by males* (average ± SD)</th>
<th>Rating of difficulty by females (average ± SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pull patient up in bed</td>
<td>3.3 ± 0.6</td>
<td>3.4 ± 0.5</td>
<td>3.3 ± 0.6</td>
</tr>
<tr>
<td>Turn patient over</td>
<td>3.2 ± 0.6</td>
<td>2.8 ± 0.4</td>
<td>3.3 ± 0.6</td>
</tr>
<tr>
<td>Move patient to centre of bed</td>
<td>3.4 ± 0.7</td>
<td>3.2 ± 0.4</td>
<td>3.4 ± 0.7</td>
</tr>
<tr>
<td>Transfer patient from bed to chair without mechanical aid</td>
<td>3.4 ± 0.7</td>
<td>3.0 ± 0.8</td>
<td>3.4 ± 0.7</td>
</tr>
<tr>
<td>Empty laundry</td>
<td>3.3 ± 0.8</td>
<td>2.6 ± 0.9</td>
<td>3.5 ± 0.6</td>
</tr>
<tr>
<td>Move loaded cart or gurney</td>
<td>3.0 ± 0.7</td>
<td>2.8 ± 0.4</td>
<td>3.1 ± 0.7</td>
</tr>
<tr>
<td>Raise head of bed†</td>
<td>3.0 ± 0.6</td>
<td>2.6 ± 0.5</td>
<td>3.1 ± 0.6</td>
</tr>
<tr>
<td>Give patient a bath</td>
<td>3.2 ± 1.0</td>
<td>2.8 ± 0.5</td>
<td>2.3 ± 1.0</td>
</tr>
<tr>
<td>Overall</td>
<td>3.2 ± 0.7</td>
<td>2.9 ± 0.6</td>
<td>3.3 ± 0.7</td>
</tr>
</tbody>
</table>

* \( p < 0.005 \), t test for the differences between the ratings of men and women.
† Beds were badly maintained in this hospital and it was usually difficult to turn the cranks to raise them.
and a greater proportion of operations alone than men (see Table 4). When operations during the morning were selected so as to have comparable conditions, women did slightly (but not significantly) more operations and more ‘very difficult’ operations per hour of observation (see Table 5). The proportion of demanding operations done alone was similar for women and men.

There were insufficient observations to examine the case where attendants of opposite sex worked together during the peak hours. In cases where a male attendant was observed while assigned to the same section at the same time as a female, and vice versa, at all times combined, women performed 9 ‘very difficult’ operations per hour, and men 5.4; men worked alone somewhat more than women (30 per cent and 22 per cent of operations respectively), so that women and men performed similar numbers of ‘very difficult’ operations alone per hour (2 and 1.6 per hour respectively).

It was suggested to the authors, by both women and men attendants, that nurses preferentially called on men to help them. One woman said:

### Table 4
Collaboration among attendants according to sex

<table>
<thead>
<tr>
<th></th>
<th>Women</th>
<th>Men</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>All operations</td>
<td>623</td>
<td>546</td>
<td>1,169</td>
</tr>
<tr>
<td>Done alone (%)</td>
<td>381 (61%)</td>
<td>265 (48%)</td>
<td>646 (55%)</td>
</tr>
<tr>
<td>Hours observed</td>
<td>27.9</td>
<td>33.1</td>
<td>61.0</td>
</tr>
<tr>
<td>Operations per hour</td>
<td>22.3</td>
<td>16.5</td>
<td>19.2</td>
</tr>
<tr>
<td>Operations carried out alone per hour</td>
<td>13.7</td>
<td>8.0</td>
<td>10.6</td>
</tr>
</tbody>
</table>

### Table 5
Operations according to sex (first three hours of the morning shift)

<table>
<thead>
<tr>
<th></th>
<th>Women</th>
<th>Men</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total operations for the period</td>
<td>195</td>
<td>187</td>
<td>382</td>
</tr>
<tr>
<td>Total operations per hour</td>
<td>16.0</td>
<td>12.6</td>
<td>14.1</td>
</tr>
<tr>
<td>Total operations done alone</td>
<td>118 (61%)</td>
<td>103 (55%)</td>
<td>221 (58%)</td>
</tr>
<tr>
<td>Demanding operations</td>
<td>45</td>
<td>48</td>
<td>93</td>
</tr>
<tr>
<td>Demanding operations per hour</td>
<td>3.7</td>
<td>3.2</td>
<td>3.4</td>
</tr>
<tr>
<td>Demanding operations done alone</td>
<td>16 (36%)</td>
<td>18 (38%)</td>
<td>34 (38%)</td>
</tr>
</tbody>
</table>
Equal pay for equal work, I find it difficult that they ask Richard* more than me; it’s unfair. The tendency exists and it has to be corrected all the time.

Consequently, all tasks where a nurse requested or offered help in a task were compiled (see Table 6). Nurses were observed asking women attendants for help significantly more often than they asked male attendants. The same tendency existed for ‘very difficult’ operations, although there were insufficient numbers for analysis. Thus, the data collected did not support the perceptions of the attendants.

Isolated incidents
Two incidents were observed where a male attendant was asked to do unusually heavy tasks. The first was when an assistant head nurse on a ward asked a male attendant to hold a violent woman patient who was resisting having a blood sample taken, although two female attendants were more readily available. The second was when two female attendants asked a male attendant (who had previously suffered a severe work accident) to help them with a heavy patient who was falling out of her wheelchair. The man was busy, but the women waited for him to be free, even in this emergency situation, despite the fact that one of the women suggested to the other that they themselves should try to lift the patient together.

Validation
A preliminary report was presented to workers, worker representatives and employer representatives. The report suggested that there were a large number of physically demanding tasks and that they were too often carried out alone and without the use of mechanical aids. It listed possible reasons why attendants would work alone, including lack of equipment, insufficient training, lack of time and institutional policies. The results of this part of the report and their interpretation were accepted by everyone, except for one head nurse, who felt strongly that employees were not rushed for time but that they lacked the will to collaborate. In explaining why they carried out difficult operations alone, attendants emphasised the shortage of time as well as schedule assignments that constantly changed work teams, while the remaining supervisors gave importance to organisational factors and the attitudes of certain attendants. During validation, attendants also mentioned hierarchy as a reason for not being able to secure collaboration from nurses. Typical comments include the following:

<table>
<thead>
<tr>
<th></th>
<th>In response to a request for help from a nurse</th>
<th>In response to a request for help addressed to a nurse</th>
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<tbody>
<tr>
<td>Female attendant</td>
<td>29</td>
<td>9</td>
</tr>
<tr>
<td>Male attendant</td>
<td>13</td>
<td>19</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 9.22, \ p < 0.01 \]

*Names are fictitious.
• ‘You can’t get the nurses to help you, but the attendant you can’
• ‘Teamwork is with the other person, not for the other person’
• ‘You have to ask them [nurses]. Some never offer. It gets embarrassing to ask. You’d almost rather do it alone.’

Agreement between researchers and those in the workplace was not so easily reached when it came to the results on male–female task sharing. Male and female attendants (seen in mixed groups) were unanimous in disagreeing with both the results and the interpretations. They denied that women did more operations per hour, that nurses called on women more often, and that women worked alone at least as often as men. Head nurses, however, were unanimous in supporting the authors’ interpretation. Two comments typify their responses:

• ‘That the women do 50 per cent more, it doesn’t astonish me at all’
• ‘I’m not surprised.’

The idea of discussing the results in single-sex groups was discussed with the trade union and was met with resistance. Even so, two women attendants came to the authors privately and stated that the findings were in accordance with their experience.

On ward B, one group consisting of three male and two female attendants was particularly insistent that the authors’ figures were wrong. They were asked to rate the eight regular daytime attendants on their ward in terms of their qualities as team mates for carrying out difficult operations. They were unanimous that three males and three females collaborated fully, and that one male and one female (‘Rose’) did not. They explained the fact that they rated the three men as highly as the three women by saying that the competent women regularly assigned to their ward were exceptions (‘If they could only all be like Carole!’) and that newly hired women who did occasional work on the ward were ‘toothpicks’ (unable to face the workload). Rose, a woman of 52 with over 20 years’ seniority, explained that because of her sex and age, she could not perform the physically demanding parts of her task, and that she often asked her team mates to help her with heavy lifting.

Discussion

Context

The study was carried out at a time of accelerated change in the Québec healthcare system. Healthcare spending decreased by 5.5 per cent in 1995–1996 and by a further 5.7 per cent in 1996–1997. Much of the savings came from a programme of early retirement for personnel, and between 1994 and 1997 the workforce was reduced by 9 per cent. In the same period, the average short term hospital stay for surgery was reduced by 3.5 per cent. For general medicine, the proportion was reduced by 5 per cent. The workforce was therefore somewhat younger and more pressed for time than that studied by Cloutier & Duguay.

Determinants of collaboration

Previous ergonomic studies of teamwork have usually emphasised performance on cognitively based operations or emotional support in situations of risk, rather than co-operation in physical tasks. One exception is the work of Estryn-Behar & Vinck, whose study of the work of female attendants in Paris found a high degree of collaboration and communication. Another exception is the study by Assunção & Laville, who studied collaboration in meal preparation and serving in a cafeteria. They found that offers of help
for cognitively based tasks were conditioned by experience, and for physically based tasks by state of health. All those with musculoskeletal problems in this study were older women, so the effects of their sex and age could not be separated from those of their state of health.

In the absence of sufficient, user-friendly lifting aids, co-operation was important in performing physically demanding operations. This was a particularly important phenomenon on ward C, where workers felt that the delicate handling required could not be provided by mechanical lifting aids. Attendants on all wards co-operated in lifting and transferring patients.

Several elements determined the extent of co-operation. The first was lack of time. A number of organisational factors combined to prevent workers from having sufficient time for collaboration, particularly the recent cuts in personnel levels. This can be seen in the differences between hospitals X and Y in terms of the number of operations performed per hour. Hospital Y had many more personnel for patients of a comparable level of autonomy, and the number of operations per hour carried out by each attendant was therefore much lower. The authors identified that the frequent rotation of personnel was due to ‘flexible scheduling’, with its increased hiring of part-time and occasional workers as another possible source of lost time due to disruption of working relationships.

The morning period was especially busy for attendants, in part due to a work organisation that involved responding to a large number of services while cleaning, dressing and feeding patients. The early portion of the shifts was also particularly busy because workers tried to get as many operations done as early as possible, to leave them free to respond to unforeseen demands such as a sudden health crisis or requests from medical staff. The authors felt that some attention should be given to better co-ordination with other services, and to the possible elimination of some operations, such as dressing patients who were in pain and therefore resisted help.

Because attendants worked alone on some wards, more time was required to get together to collaborate on lifting than when attendants worked in the same areas. One ward changed its organisation in response to the research results, making sure that attendants worked in teams with nursing personnel. Both supervisors and employees reported that the change had made a great difference in the amount of lifting and in work satisfaction generally.

Institutional policies are probably important determinants of collaborative behaviour. The difference in policy between hospitals X and Y is shown in the significantly greater proportion of lifts done alone in hospital X. In hospital Y’s active health and safety programme, lifting alone is proscribed. In hospital Y, ward D, some men explicitly refused to lift patients, saying:

‘Men no longer think we are Superman … 10 years ago we overexerted ourselves and thought about it only later.’

By way of contrast, in hospital X, some attendants, including some women, were proud of their ability to lift patients on their own.

Male–female co-operation

Both male and female attendants told the researchers that they thought male attendants did far more physically demanding operations, but the statistics appear to demonstrate that the opposite is the case. During the validation process, four hypotheses were considered to explain the differences between the research results on male–female co-operation and the perceptions of workers.
The research figures could have been wrong if the scoring system was biased or if the researchers had sampled unfairly. In the authors’ view, the scoring system was not biased. It was straightforward and allowed little room for judgment calls. In fact, rather than being biased toward thinking that women did more, the authors were quite surprised by the results, since all workers – both male and female – had insisted that women attendants were unable to do their fair share. It is still possible that women who were particularly strong or diligent were over-sampled. However, even if we eliminate from the figures all data involving one woman who was especially apt to work alone (70 per cent of her difficult operations were carried out alone), as well as the closest equivalent time periods of the male attendants who worked with her, overall male–female comparisons are not affected. The woman in question, ‘Carole’, contributed only 1.1 hour to the final results. It is possible that women who felt unable to work hard did not allow the researchers to observe them. For the figures to be biased, this factor would have to apply to women more than men. However, few workers of either sex refused to be observed.

Workers’ perceptions may have been influenced by what happens in extreme situations. A few situations with extreme demands were observed, where supervisors or colleagues did appear to prefer to seek help from male attendants. Many anecdotes of this type were recorded. It is highly likely that, in situations that require exceptional strength or courage, some supervisors and colleagues insist on involving male attendants. Although these situations are relatively rare, their effect on attendants’ perceptions may be considerable. Also, such situations may be especially worthy of consideration from a health perspective. Similar results have been reported by Salminen et al., who found that men were preferentially called on to deal with violent psychiatric patients, and therefore had a higher accident rate. Similarly, in a study of hospital cleaners, there were instances where male cleaners were asked to perform occasional tasks that were potentially dangerous for them. It is still necessary, however, to explain the higher work accident rate of women attendants reported by Cloutier & Duguay.

Only regular workers with seniority were observed. The women workers may have undergone a selection process such that only the strongest stay on as attendants, a process that may have been accelerated by the optional retirement programme in place at the time of the study. Such worker selection is known as the ‘healthy worker’ effect and has been found in many manual occupations. This explanation was rejected by the workers on wards A, C and D, since they felt that the regular, oldest workers were those less able to do their part physically, although to some extent their knowledge and skill were able to make up for this. A similar interpretation comes from Assunção & Laville, who found that older workers compensated for failing strength by doing more complex tasks and fewer physical operations. Thus, it is unlikely that these regular workers were stronger than the average.

Cloutier & Duguay found that older women attendants were much more likely to have work accidents than younger women, whereas the opposite was true for men. It is possible that women have musculoskeletal problems due to the accumulation of ‘microtraumatic’ events, while men are affected by discrete events with more severe stressors. Due to the way the Québec Occupational Health and Safety Commission compiles its statistics, it is impossible to tell whether women’s compensated work accidents were more likely than men’s to involve over-use injuries rather than sudden events. If this were true of attendants, selection would therefore have forced more men than women to leave their jobs due to severe work accidents, and a larger proportion of women still working should have
accumulated some damage due to over-exertion. The authors have no information on the health or sex ratio of attendants who have left the profession.

Workers may have stereotyped perceptions of their colleagues, such that women who perform well and men who perform poorly are seen as atypical. This explanation was rejected by the workers but accepted by the supervisors and health and safety representatives, all of whom were women. Some evidence in favour of this view was provided by the ratings given to team members on ward B. This group seems to have been strongly influenced by the insistence by ‘Rose’ that she should be given special treatment.

Male–female differences in size and strength

Although men are generally taller and stronger than women, within-sex differences usually far outweigh differences in ability between men and women (see Table 7). The extent of male–female differences depends on the task (less for pushing weights than for lifting), the muscles involved (certain angles more than others), level of training, task duration, and work speed, as well as other factors. However, in almost all tasks involving manipulation of weights, men accept much heavier weights than women. The average performance of women is usually situated at between the fifth and tenth percentiles of male performance.

It is possible that young men accept more extreme physical challenges and are more easily injured than women. Injured male workers may be selected out of the profession or may learn to protect their backs. This interpretation is borne out by the discussion with workers on ward D, who said that experienced males no longer tried to be ‘Superman’. One strategy of self-protection for men may be to insist or imply that women should do more, resulting in risks to women. It is also possible that some men perceive that women perform less well, due to a desire to protect their jobs in a time of cuts to levels of hospital staffing. This tendency was previously observed in printing in the UK and during the closing of a biscuit factory in Québec.

<table>
<thead>
<tr>
<th></th>
<th>Tenth percentile</th>
<th>Mean</th>
<th>Ninetieth percentile</th>
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<tbody>
<tr>
<td><strong>Height (m)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>1.57</td>
<td>1.64</td>
<td>1.71</td>
</tr>
<tr>
<td>Men</td>
<td>1.68</td>
<td>1.76</td>
<td>1.84</td>
</tr>
<tr>
<td><strong>Lift strength (kg)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>12</td>
<td>18</td>
<td>25</td>
</tr>
<tr>
<td>Men</td>
<td>20</td>
<td>40</td>
<td>59</td>
</tr>
</tbody>
</table>

*From Messing *et al.*

†Based on lifting a box 34cm wide from knee to shoulder height at a speed of one lift per 2 minutes. From Snook & Ciriello.
Policy options
In the authors’ opinion, because of the difference in average strength and body size between women and men, women’s economic and political disadvantages in the workplace is a policy problem that is not easily resolved. Four options come to mind:

- Segregation could be preserved by winding the clock back to 1970 and eliminating women from jobs requiring the frequent use of physical strength. This would, however, restrict job choices for women and perpetuate economic inequality in a context where, for full-time, full-year work, Canadian women earn 71.7 per cent of the average earnings of men. In addition, it would be unfair to stronger women and do nothing to improve the lot of men whose size and strength is below average.

- Strength testing could be carried out, eliminating weaker individuals of both sexes at the level determined to be essential for job performance. However, it has been noted that pre-employment strength tests may be unfair to women if the test used has been standardised using populations solely or primarily composed of males, as is often the case. We must also ask whether strength tests accurately predict job performance and injury rates. As far as performance is concerned, Stevenson et al. have showed that the task dimensions and directives in one widely used test resulted in women’s test performance being poorly related to eventual job performance in comparison to men’s. It has also been pointed out that real-life work tasks include a variety of requirements, and that the approach of screening by the most physically limiting task does not guarantee the best performance overall. Even in the most physically demanding jobs, strength is only one of the required factors. The job of hospital attendant requires (among other things) tact and patience in dealing with patients and colleagues, the capacity to organise a number of operations in a short time, good communication skills, and some technical healthcare knowledge. Attendants should be selected with all of these characteristics in mind.

As for the relation between strength testing and the likelihood of incurring work-related injuries, the evidence is equivocal. Few well-controlled studies that examine both males and females have been carried out with well-defined outcomes or involve tests with a clear relationship to specific jobs. Some research suggests that Canadian hospital workers who perform poorly on back-related strength tests run no increased risk of work-related health damage. Physical parameters that may predict work-related injuries have not been clearly identified and may include flexibility and balance rather than lifting ability. Evidence is scarce, but there is a suggestion that women have been shown to profit proportionately more from strength training, given a lower initial state of fitness. At the present time, no test has been identified that has a proven ability to pinpoint attendants who are at low risk of work-related injury.

- The job could be adapted by introducing better, more user-friendly lifting equipment. Ceiling patient-transfer apparatuses are used successfully in hospital Z. However, they do not solve the whole problem, since this equipment is not well adapted to all physically demanding procedures, such as some repositioning of patients in their beds. Other approaches with the potential for job improvement include adapting hospital corridors, doors and elevators to the tasks performed, and employing enough personnel to do the job properly. Training programmes already in place could be emphasised and perhaps adapted to the different lifting styles of women and men. Unfortunately, such improvements, however desirable, are hard to obtain when the employer is in a precarious financial position, as is the case in hospitals undergoing downsizing.
In addition to attempts to improve the job parameters, a final option is to explore work sharing and collaboration with employees. Discussions can include ways to maximise collaboration among members of the team. During the discussion on ward B, for example, it became evident that most employees of both sexes make contributions of various kinds, and some employees of each sex contribute less than they are thought able to. For reasons ranging from gender stereotyping to fear of work-related injury, some women identify their sex as a reason to avoid certain tasks. For reasons ranging from stereotyping to chivalry, some men promote segregation of tasks. Factors such as fear of being considered incompetent or sexist now hamper discussion of these issues. In the authors' view, discussions on these issues should be sponsored by unions (during time paid for by management) in order that staff feel free to express their opinions. During this process, workers should identify difficult and dangerous operations for which recourse to male attendants has been the preferred solution, in order that other approaches to workload management can be devised. Such discussions should acknowledge the differences in strength among personnel, as well as other differences that may affect performance, and allow free comment on their implications for task assignment. As far as the present case is concerned, reflection on these solutions is ongoing within the union involved. As of 2003, a training manual is being written, based on several studies, intended to stimulate discussion among women and men in the union movement.

Gender and occupational safety and health
This paper has focused on the effect on the health and safety of desegregation in jobs traditionally occupied by men. It has been noted many times by ergonomists and sociologists that physical tasks assigned to women have different characteristics from those assigned to men. For example, in many factories and service organisations, women perform repetitive, fast-paced work while men do work requiring heavy lifting. However, asking whether women in jobs traditionally held by men are at special risk should not imply that men's traditional jobs are more dangerous than women's. Moreover, as occupational health specialists have observed, accidents and injuries occur in work assigned traditionally to women, as well as to men.

Overall, women in North America have fewer compensated accidents and injuries, but one cannot conclude from this that their jobs are safer. The reasons for this are as follows:

- accidents are often compiled on a per-employee basis, and because women, more often than men, work in part-time, temporary work, the practice underestimates the risks to women
- accident records are usually based on successful claims for compensation, and women's claims for musculoskeletal injury are more often refused than men's
- women workers are under-represented in health and safety programmes and in trade unions, so less often find themselves in a context favouring claims for compensation.

Policy-makers still need to know whether women are at special risk of exposure to accidents and injuries if they enter an occupation previously reserved for men, but unfortunately data are not available to answer this question. With regard to the male–female patterns of work-related musculoskeletal injuries that are most closely related to the topic of this paper, it is hard to separate the role of differential exposure from that of differential, sex-based effects. Even after court-ordered efforts to desegregate jobs in a North American municipality, women were only found in 22 of the 201 job titles. Even within the same job title, women were assigned to different tasks 50 per cent of the time. The study reported here adds yet another
element to the difficulty of comparing men’s and women’s accident rates, namely that of
differential working patterns. Thus far, we can only give a partial answer to our question
about desegregation: it is possible that social forces in newly desegregated jobs may impel
women to over-exert themselves, leading to an increased risk of injury. However, it is also
possible that social forces may lead to an increased injury rate for men in jobs involving
physical effort, if assigning a male worker is used as a substitute for investment in
equipment, training and staffing. Comparisons of male and female sex-based health and
safety risks may have to wait for the day when the social forces on women and men are
more similar.

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