



REVIEW ARTICLE

The relevance of gender in the care of hip fracture patients

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Abstract As in many conditions, gender interplays with other social structures of inequality to impact upon women’s and men’s health and healthcare. This narrative review examines knowledge about sex, gender and hip fracture and suggests ways of highlighting the influence of gender in hip fracture healthcare. These will be considered in relation to two areas. Firstly the multifactorial dimension of hip fractures which identifies ethnicity, marital status, lifestyle, co-morbidities, environment in relation to falls and osteoporosis as important factors influencing the experience of hip fracture. Secondly the importance of acknowledging gender as a key element within research and management of care. Implications for practice are that we need a raised awareness of gender when we assess and care for patients, to ask critical questions about the gender bias in the evidence we use and reflect on how services and care practices may be biased towards gendered assumptions.

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Introduction

Many of the patients with hip fractures cared for on Trauma and Orthopaedic wards are women. In the UK, according to the National Hip Fracture Database (2014), 72.3% of fractures occurred in women. In accepting that hip fractures mainly occur in women there is a danger that there are missed opportunities to consider how practice is influenced by gender inequality. Gender refers to the beliefs and values, socially generated within a culture, about what it is like to be a woman or man; it is different from sex which is related to the biological or physiological differences between women and men (Lorber, 1994). As a social construction, gender also acts as a system of social stratification, structuring and ranking unequal roles and norms that place women in a subordinate position, compared to men, limiting their ability to access and control resources (Sen and Ostlin, 2008). Gender also influences every aspect of our lives as it is embedded in our personal identities, expectations, cultural discourses and institutions, such as workplaces and families (Lorber, 1994).

Moreover, gender, as a social factor, interacts with biological/physiological sex differences and with other sources of social inequalities (social class, race, etc.) to impact upon women's and men's health and needs (Iyer et al., 2008; Sen and Ostlin, 2008). This complex interplay can determine not only our health but also how we diagnose, care for people and allocate healthcare resources. When assessing and caring for hip fracture patients it may be useful to know some of the areas in which patients might be disadvantaged due to gender and reflect on the assumptions that guide our daily practice.

The aim of this narrative review is to examine knowledge about sex, gender and hip fracture and suggests ways of raising awareness of the influence of gender in hip fracture healthcare. Only peer-reviewed articles published in the last 25 years were included. Two areas will be considered. Firstly the multifactorial dimension of hip fractures which identifies ethnicity, marital status, lifestyle, comorbidities, environment in relation to falls and

osteoporosis as important factors influencing the experience of hip fracture. Secondly, the importance of acknowledging the relevance of gender within hip fracture research and management of care.

The multifactorial dimension of hip fractures

There is substantial variation in hip fracture incidence between the sexes, countries and different groups in society (Kanis et al., 2012). This is evident within ethnic groups, in relation to marital status, lifestyle and comorbidity. There are multiple and diverse risk factors and situations that lead to hip fracture and no single factor can completely account for their occurrence (British Orthopaedic Association, 2007; Cummings and Melton, 2002). Therefore, evidence is needed to explain differences in hip fracture rates in a range of populations encompassing gender, ethnicity and age as determinants of health and illness (Solar and Irwin, 2010). This section will discuss some factors where gender plays a role in the experience of hip fracture.

Ethnicity

There are variations in hip fracture rates among different groups in society. Rates of hip fracture are higher in urban and white populations (Cummings and Melton, 2002; Kanis et al., 2012; Melton, 1996). African Americans and Hispanic patients are younger at the time of fracture and have a higher incidence of fracture in men compared to the white population (Sterling, 2011). Recent population data from the USA showed that the highest risk of hip fracture was among Caucasian women (Kanis et al., 2012) and in Europe women have twice the incidence of hip fracture compared to men (Cummings and Melton, 2002). However, in Switzerland age-adjusted incidence of hip fractures is declining among white women in certain age groups, but not among men (Chevalley et al., 2007). In low risk populations, such as Asian or African, the rates between women and

men were similar (Benetos et al., 2007; Cummings and Melton, 2002). The reasons why the incidence varies are still unknown and some authors suggest environmental factors were the cause rather than genetic differences (Cummings and Melton, 2002; Kanis et al., 2012). Further research to understand variation within local populations may help us to consider particular needs within these groups and design strategies for fracture prevention.

Age

Despite the continuing increase in hip fracture incidence with advancing age, existing studies indicate that hip fractures occur later in women than in men. For example, in Denmark men were on average 4 years younger than women at the time of fracture (Nimann-Kannegaard et al., 2010). Other studies from Morocco (El Maghraoui et al., 2013), Sweden (Rogmark et al., 1999), Australia (Chang et al., 2004) and Switzerland (Chevalley et al., 2007) concur. It has been hypothesised that the difference in mean age at fracture may be a consequence of a shorter life span among men compared with women (Chang et al., 2004; Chevalley et al., 2007). Social research demonstrates that there is a system of inequality based on age that privileges the young at the expense of the old with imbalances of power based on gender (Calasanti and Slevin, 2006). In a society where independence and autonomy are highly valued, changes in dependency related to the ageing process are different for women and for men due to the gender norms that lead women into providing care (Allen and Walker, 2006). After a hip fracture help is often required with daily living and we have evidence that some older patients explain their fracture as a sign of ageing and forthcoming death (Ziden et al., 2008) but more research is needed. As the majority of patients with hip fracture are older people, taking into consideration a life-course gendered approach to understand their current health, gender role expectations and conflicts and their ideas about dependency is recommended. The inclusion of patient perspectives in the context of ageing is one way in which person-centred care can be operationalised in hip fracture care (Brent and Coffey, 2013).

Marital status

Being married appears to have a protective effect for both men and women. Studies consistently showed a significant association between marital status and a decrease in hip fracture risk among those married or cohabiting (Benetos et al., 2007; Brennan et al., 2009; Dudkiewicz et al., 2011; Endo

et al., 2005; Guilley et al., 2011; Reimers and Laflamme, 2007). Moreover, it had been suggested that current marital status correlates with hip fracture risk (Farahmand et al., 2000). Guilley et al. (2011) found that being married appeared to delay the hip fracture only among men but was associated with earlier hip fracture occurrence among women. The authors felt the burden of being married among the oldest women could be found in their caregiver role. In contrast, men's advantage might be associated with the social support inherent in the marital relationship and the positive influence of marriage on their lifestyle.

Prior to hip fracture, more men were likely to be married or living with a caregiver compared to women (Dudkiewicz et al., 2011; Endo et al., 2005). This corresponds to UK population data which, in 2011, showed that 67% of men over 65 years old were married and only 16% of them were a widower. The profile of older women is the opposite: 59% were widowed and only 20% were married (Office for National Statistics, 2011). Furthermore, it is known that marital status impacts on material resources and health in later life. For example, in the UK, marriage in later life was associated with material well-being for both women and men and widowhood had a major adverse effect on the material well-being of older women but less so for older men (Arber, 2004). As a result of living longer, most women usually take care of their partners during illness but have few people to care for them (Lorber and Moore, 2002). This is particularly important in recovery after a hip fracture when the role of informal carer is crucial (Nahm et al., 2010). On the other hand, after a hip fracture the distribution of gendered roles and tasks at home among married women may change and their husbands become more actively involved (Ziden et al., 2008).

The role of marital status and its dynamics may be important not only for hip fracture risk but also when planning discharge and treatment for older patients. Their needs and family situation should be considered when commissioning care for this group, especially among older women who often live alone. More research is needed to understand the impact of having a fractured hip on family dynamics and gender roles.

Socioeconomic status

Few studies have researched hip fractures in relation to socioeconomic status. Their results are conflicting but they have shown similar patterns in men and women (Barone et al., 2009; Benetou et al., 2015; Icks et al., 2009; Reimers and Laflamme, 2007).

For example, adjusted by age and sex, people living in the most deprived part of the UK are more likely to have a hip fracture and worse outcomes than those in the least deprived and these trends have not reduced over the last 10 years (Smith et al., 2013). Similar results were reported in Italy where low socioeconomic level was significantly associated with higher risk of mortality and lower risk of early intervention (Barone et al., 2009). In Stockholm, the effect of economic deprivation of the living area and hip fracture lose significance in women and men after adjustment for other exposure such as marital status or country of birth (Reimers and Laflamme, 2007). One ecological study from Portugal found that in both sexes a higher risk of hip fracture was observed in deprived areas. However, the interaction between age, socioeconomic status and hip fracture risk was different between women and men. Among men, younger men living in higher socioeconomic areas had a lower risk of hip fracture compared to younger men living in lower socioeconomic areas but the reverse pattern was found in older men with higher risk in more affluent areas. The authors suggest that the lower risk in younger men living in affluent areas may be a result of a higher education which may positively influence their health behaviours. Among women, older women from medium socioeconomic areas had lower risk of hip fracture compared to women from lower socioeconomic areas but the risk for women in the age group 70–74 years was similar in all the areas studied (Oliveira et al., 2015). Low socioeconomic status is a useful social determinant of hip fracture. An awareness of this helps with the targeting of hip fracture prevention services and in determining risks when planning discharge arrangements.

Environment in relation to falls

Most hip fractures result from a fall from standing height or less (British Orthopaedic Association, 2007; Cummings and Melton, 2002). Despite that, the circumstances around the falls are different among women and men. Studies from Cuba (Castañeda-Gueimonde et al., 2005), Iran (Abolhassani et al., 2006), and the Netherlands (Boye et al., 2014) have shown that the frequency of a fall in their home and resulting hip fracture is higher in women than in men who usually fell outdoors. Similar results were found in a multinational European study where more women fractured indoors than men, whilst men's took place in equal proportion outdoors and indoors (Allender et al., 1998). However, none of the studies explained why these differences exist. One interpretation could be found in the gender division of

labour and its well-known role in determining women's and men's health. Worldwide women have traditionally been restricted in their access to jobs; often working in the domestic sphere or in the informal economy, whereas men performed paid employment in the public sphere. One important characteristic of women's work at home is that it cannot be postponed and, as a result, women spend more time at home and their leisure time is more fragmented than that of men (Messing and Ostlin, 2006). From these studies it would seem that falls prevention work might focus more on the home for women and outdoor activities for men, whilst being aware of how individuals construct their identity and the things that are important to them. The gendered nature of roles may reflect how they cope at home during recovery where there is a disruption in the normal everyday balance of life.

Lifestyle

Various lifestyle factors are implicated as risk factors for fractures with different patterns among women and men. For example, low body mass index (De Laet et al., 2005), deficient calcium, vitamin and protein levels and sunlight exposure, linked to lack of vitamin D, are also important factors associated with hip fracture in women and men (Benetos et al., 2007).

Smoking is widely associated with a higher risk of hip fracture due to its association with a reduction in bone mineral density (Kanis et al., 2005) but there appears to be a difference among women and men. For instance, smoking doubles the risk of hip fracture among men, whereas it has no significant impact among women (Holmberg et al., 2005) but other studies found no sex differences (Høidrup et al., 2000; Kanis et al., 2005). Recent data concerning smoking habits show that women aged over 65 years typically started to smoke 5 years later than men (Peters et al., 2014) and their average number of cigarettes smoked per day is lower (Office for National Statistics, 2013). However, there is strong evidence that the full hazards of prolonged smoking are considerably larger for women compared to men and data suggest that the sex differences in smoking behaviour observed in an older population are narrowing over time which means that women's smoking rates are rising (Hitchman and Fong, 2011; Peters et al., 2014). There is evidence that in medical encounters, men are more frequently asked about their smoking habits than women which may illustrate the gendered assumptions that guide care practice (Ruiz-Cantero et al., 2007).

Alcohol consumption is associated with hip fracture risk and low bone density (Berg et al., 2008).

Low intake was not associated with hip fracture (Høidrup et al., 1999; Zhang et al., 2015); moderate consumption had low hip fracture risk (Berg et al., 2008), especially among men, whereas there was no significant association among women (Zhang et al., 2015). Heavy alcohol consumption was widely associated with an elevated risk of hip fracture (Berg et al., 2008; Kanis et al., 2005) which could be associated with its effect on increasing the risk of falling and decreasing bone mass (Zhang et al., 2015). Some studies found sex differences where consumption was heavy and increased risk of hip fracture among men compared to women (Høidrup et al., 1999). In contrast other studies found no sex difference (Kanis et al., 2005; Mukamal et al., 2007; Zhang et al., 2015) which could be related to a misclassification of alcohol consumption (Berg et al., 2008).

A physically active lifestyle reduces the risk of hip fracture (Marks, 2011; Moayyeri, 2008). Moderate-to-vigorous physical activity is associated with a hip fracture risk reduction of 45% and 38% among men and women respectively (Moayyeri, 2008). Among older adults in the UK it was found that men performed significantly more minutes of moderate-to-vigorous physical activity than women and at higher intensities (Davis et al., 2011). Therefore, greater emphasis should be placed on engaging older women in physical activity.

A number of important modifiable lifestyle factors are potential targets for intervention to prevent hip fractures and, based on the evidence, the pattern of this intervention should be different for women and for men. However, more research is needed to characterise sex differences in the effect of tobacco and alcohol and how the decreasing gender differences may have an impact on future trends in hip fracture and prevention strategies. When assessing individual risks of hip fracture, an awareness of gender and health-related behaviours may be helpful.

Co-morbidities

With the ageing population there is increasing evidence of a greater range and number of comorbidities in the population that experience a hip fracture. Overall, the evidence has shown that men, despite being on average younger, had higher prevalence of comorbidity than women before and after a hip fracture (Dudkiewicz et al., 2011; Sterling, 2011) and most of these conditions would be expected to influence their recovery and increase the risk of mortality (Endo et al., 2005; Hawkes et al., 2006).

In addition to all the factors already mentioned, many chronic medical conditions such as diabetes mellitus, cardiovascular disease, hyperthyroidism and

hyperlipidemia are well documented risk factors for hip fracture (Marks, 2010). Some studies showed associations between hip fracture and diabetes mellitus, ischaemic stroke, hyperlipidaemia or blood pressure in women and men (Benetos et al., 2007; Holmberg et al., 2005). For example, ischaemic stroke increases the risk of hip fracture, causes frequent falls and increases the risk of developing osteoporosis (Benzinger et al., 2015). Women surviving a stroke had a higher risk of hip fracture compared to men (Wu et al., 2011). In middle-aged people diabetes was associated with hip fracture but the association was stronger among men than women (Holmberg et al., 2005).

Cognitive impairment is associated with increased risk of hip fracture and postoperative morbidity and mortality (Nandi et al., 2013; Seitz et al., 2011). The prevalence of memory loss among older patients with hip fracture is approximately 40% and it is similar among women and men (Seitz et al., 2011). Samuelsson et al. (2009) reported that men with cognitive impairment were more likely to reside in their own homes, had more co-morbidities and a higher risk of reduced mobility and death compared to women.

Clinically managing comorbidities alongside treatment for hip fracture means this group is becoming increasingly complex and requires more care skills associated with chronic illness. Management by gerontologists has therefore become increasingly important (British Orthopaedic Association, 2007).

Osteoporosis

Hip fracture risk is multifactorial and reflects general frailty, falls risk and bone fragility (British Orthopaedic Association, 2007; Geusens and Dinant, 2007). Despite the number of studies that associate fractures and bone density, the link remains controversial and while it may contribute to the occurrence of hip fracture, as a single factor it is not a sufficiently accurate predictor (Cummings and Melton, 2002; Moynihan et al., 2002). Osteoporosis is of clinical concern in relation to hip fracture and strategic activity such as Fracture Liaison Services focuses on treating patients with low bone density, especially following a fracture, with a view to prevention of future fracture risks (Compston, 2015). However, some authors argue that as other risk factors, osteoporosis, which occurs as people age, is being conceptualised as a medical disease (Moynihan et al., 2002) and are critical of hip fracture prevention strategies (Järvinen et al., 2008, 2015). Despite the efficacy of pharmacotherapy this has been less well studied for primary prevention,

but shown to be cost-effective in secondary prevention of fracture (Compston, 2015).

Advancing age increases the prevalence of osteoporosis and the incidence of fractures is much higher in women than in men. Research suggests that sex hormones play a central role in the physiology of bone by direct and indirect mechanisms and the abrupt loss of oestrogen at menopause is considered the major reason for primary osteoporosis in women. Men do not have a dramatic loss of androgens with ageing and they build larger bones with greater strength (Adler, 2014; Geusens and Dinant, 2007). However, in women and men of the same age and femoral neck bone mineral density, the probability of hip fracture rises similarly (Kanis et al., 2012).

Osteoporosis is not limited to women; men also suffer poor health outcomes related to it (Adler, 2014; Cawthon, 2011). In addition, there is evidence that men are more likely than women to have osteoporosis that is undiagnosed or undertreated (Adler, 2014; Cawthon, 2011; Dy et al., 2011) and after a hip fracture older men are much less likely to have received any osteoporosis treatment (Antonelli et al., 2014; Cawthon, 2011; Kiebzak et al., 2002). Diverse causes contribute to these disparities, such as lack of awareness in physicians and patients about osteoporosis; less prevention efforts in men; and their exclusion from research and clinical trials for pharmacological interventions (Adler, 2014; Cawthon, 2011; Dy et al., 2011; Järvinen et al., 2015). Men's gendered beliefs about osteoporosis, such as their interpretation of osteoporosis as a female disease and the impact of male stereotypes also have an impact on their care experience (Solimeo et al., 2011).

Being identified as at risk of having osteoporosis can be a traumatic time for patients (Hovey and Craig, 2012) when they are already traumatised from their hip fracture and care should be taken to include older men in treatment decisions. Understanding bone density scans, evidence and subsequent treatment with a reflection on gender could help to improve care following this traumatic experience.

Acknowledging gender in hip fracture

Weaknesses in our knowledge are based on gender stereotypes and biases such as assumptions that there are no differences in health and illness between women and men when they might exist or differential patterns of care with men and women when they might be the same. Assumptions of equality or differences between women and men may result in biased knowledge that may lead to discriminatory healthcare practice (Ruiz-Cantero et al., 2007). For

example, Canadian providers tended to categorise severely injured women into less urgent or even non-trauma specific pathways than men, after adjusting for age, comorbidity, mechanism of injury and measures of injury severity (Gomez et al., 2012).

These gender disparities have often been explained in terms of differences in help-seeking behaviour, proposing that men and women perceive and report some symptoms differently and use the health system in a different way. However, there is increasing evidence which suggests that these differences in care might also be due to healthcare provider behaviour and their gender-biased knowledge (Govender and Penn-Kekana, 2008). To date, this aspect has had minimal investigation in the trauma research context (Sethuraman et al., 2014). Some research has shown that female physicians are more patient-centred in their communication with patients and have longer visits compared to male physicians. Moreover, patients of female doctors spoke more and disclosed more biomedical and psychosocial information (Roter and Hall, 2004). The degree of intimacy in a clinical situation was found to be predictive of same-sex nurse preferences and it appears that patients are less concerned about the sex of the nurse when technological expertise is required (Chur-hansen, 2002). Further research is needed to confirm if this evidence also applies in hip fracture care.

There is limited evidence of gender bias in research and management of clinical care for hip fracture. The following section argues that few studies pay attention to gender and there is some evidence of differences in hip fracture care between women and men.

Few studies pay attention to gender

Hip fractures have been studied extensively in white women and fewer studies focus on outcomes for men. In addition, men are poorly represented in the study samples, which could be explained by their lower incidence of hip fracture (Orwig et al., 2006). This bias may cause incorrect assumptions that there is no difference between women's and men's experience of having a fractured hip when in some aspects bias is present. For example, although men have a lower incidence of hip fracture and are younger, they are less healthy and have higher mortality compared to women (Abrahamsen et al., 2009). Potential reasons for the increased mortality in men are still poorly understood. Some studies suggested that their higher risk of pre-hip fracture comorbidities may contribute to mortality (Hawkes et al., 2006; Holt et al., 2008). Also, after surgery, men were more likely to

suffer complications compared to women (Endo et al., 2005; Hawkes et al., 2006). Although comorbid conditions do not fully explain the mortality difference between the sexes (Nimann-Kannegaard et al., 2010), deaths related to infections (pneumonia, influenza and septicaemia) seem to be other important factors responsible for men's mortality (Wehren et al., 2003).

In quantitative studies questions and concerns related to women's and men's lives are not included or used to interpret the findings. Furthermore, gender analysis is generally not performed and little data provide insights into how gender interacts with other social hierarchies (ethnicity, social class, etc.) to impact on the hip fracture experience (Balka, 2003; Geusens and Dinant, 2007). Qualitative research presented patients' experience of having a fractured hip as a complex, traumatic but gender-neutral experience that usually involved changes in relation to their body, to others and to their entire life situation (Borkan et al., 1991; Huang et al., 2014; Ziden et al., 2008). Men's perspectives were not represented. Some studies examined women's experiences of having a hip fracture and the findings provide some clues about the characteristics of gendered roles. For example, after a hip fracture women found that their ability to fulfil usual roles was threatened (Robinson, 1999) and some women recognised that the roles they had during their lives (e.g. taking care of the family) had an effect of putting their own needs into the background (Ziden et al., 2008).

In summary, gender-specific research in hip fracture (Orwig et al., 2006) and trauma care (Sethuraman et al., 2014) has become an increasing priority and more research is needed to understand the interrelationship between social and biological factors in hip fracture experience and its differences or/and similarities among older women and men.

Evidence of sex differences in hip fracture care

Despite the abundance of data supporting gender biases in healthcare, the impact of gender on hip fracture care is not well understood and research is limited. There is some evidence of sex differences in hip fracture care. For example, one study reported that women received a hip replacement rather than internal fixation more often than men with the same fracture type and preoperative status. There is, however, a need for more research to understand the assumptions that underline the choices of surgical methods made by providers (Samuelsson et al., 2009). In Israel, the sex of the patient did not

affect the length of stay in the orthopaedic surgery department or the length of hospitalisation for rehabilitation (Lieberman and Lieberman, 2004). However, after surgery, men were more likely to receive institutional care in Scotland (Holt et al., 2008), New Zealand (Fransen et al., 2002) and Finland (Osnes et al., 2004). In contrast, in Sweden gender had no influence on return home after a hip fracture, which could be explained by differences in healthcare systems (Samuelsson et al., 2009) and the availability of institutional after-care.

In osteoporosis treatment after a hip fracture there is some evidence of gender bias and men are less likely to be screened and significantly less likely to receive osteoporosis treatment (Antonelli et al., 2014). For instance, Kiebzak et al. (2002) found that only 6.8% of men compared with 31% of women were given osteoporosis treatment at hospital discharge. At 1-5 year follow-up, 27% of men were receiving osteoporosis treatment in contrast to 71% of women. Evidence from primary care also identified that, following a prior fragility fracture, men were less likely to be referred for bone densitometry compared to women (Hippisley-Cox et al., 2007). Gender differences may therefore exist in hip fracture care and an awareness of this may enable clinical staff to reflect on and develop current care practices to ensure equality of care.

Conclusions

Understanding the complexity of hip fracture from a gendered perspective may help provide better care for this patient group. The gendered nature of patients' lives may determine where they fell, their lifestyle and the sorts of help required when planning recovery and discharge from hospital, especially among older people living in socioeconomic deprived areas. The family situation is important; older women often live alone and are older than men when they fracture their hip. They might, therefore, need more support in their recovery. The increasing number and range of co-morbidities suggest that this group requires care skills drawn from the management of chronic conditions that run alongside those focused on recovery from trauma.

The data reviewed suggest a number of areas for further research on the causes of observed gender bias. There may be incorrect assumptions of no gender difference in patient's hip fracture experience; most of the studies focused on white women and men's experiences are poorly represented. Despite men having a lower incidence of hip fracture, they have higher mortality and receive less osteoporosis treatment compared to women.

Research on gender differences and their causes, continuing education and reflection could help to reduce gender gaps and to improve the hip fracture healthcare for an increasing ageing population. Suggestions for practice are:

- To consider hip fracture within the context of gender, ageing and presence of co-morbidity that will require increasing skills developed in gerontological practice.
- To be aware of gendered views that may mean men or women are missing out on some aspects of care.
- To think about the type of support that patients may need in light of their gender and social circumstances.
- To reflect on how investigation for and treatment of osteoporosis might be reframed within the context of gender and healthy ageing.
- To be aware of differences in incidence of hip fracture in relation to sex, ethnicity and socioeconomic status that may influence advice regarding recovery and prevention of future fractures.
- To think about how health promoting messages are conveyed in relation to gender, lifestyle and the environments in which falls occur.
- To reflect on gendered assumptions within your own practice and that of your practice environment.

Conflict of interest statement

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