Systematic review of the role of gender as a health determinant of hospitalization for depression

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Objectives: To conduct a systematic review of selected health determinants, including gender, and their impact on hospitalization rates for depression. Depression includes both depressive and bipolar disorders. Selected health determinants were gender, age, sex, family structure, education, and socioeconomic status.

Methods: Systematic search of conventional and fugitive literature sources. All reports of primary data, systematic reviews, and meta-analysis of primary data were included if they focused on hospitalization for depression and reported data by one or more of the selected health determinants. Two researchers independently evaluated each citation for inclusion and extracted data from the included studies.

Results: There is an important underreporting of health determinants data in studies of hospitalization for depression. No studies examined the role of gender. Age and sex were reported in 83 percent and 80 percent of the 110 included studies. Women showed a higher rate of hospitalization for depression than men ($p < .05$). Age and diagnosis had different effects in men and women. Adult women were significantly more likely than men to report a depressive disorder, whereas men were more likely to report a bipolar disorder ($p < .05$). Little can be concluded on the other health determinants.

Conclusions: The importance of reporting hospitalization data and conducting hospital utilization analysis by sex and health determinants, including gender, must be emphasized.

Keywords: Hospitalization, Affective disorders, Gender, Health determinants

The role that health determinants, including gender, play in affecting hospital services utilization for depression is poorly understood. The term *depression* commonly refers to depressive and bipolar disorders (27). These conditions include ma-

jor depressive, dysthymic, bipolar, and cyclothymic disorders. These disorders are often associated with overwhelming feelings of sadness, hopelessness, apathy, or withdrawal (109).

Depression significantly impacts the health of Canadians. It is estimated that 10–25 percent of the Canadian population suffers from depression at some point during their life (109). A conservative estimate suggests that 121 million people worldwide currently suffer from depression (88). By year

2002, unipolar depression is expected to rank second as the most important cause of disability burden in the world (94). Depression results in poorer quality of life, higher morbidity and mortality, and significant monetary costs (124).

Hospitalization is used in the treatment of depression. It is recommended for psychotic symptoms, severe depression, definite suicidal plan, or suicidal attempts (3;57).

There are important differences ". . . between women and men in their respective profiles of mental health disorders" (49). Women are more likely to be diagnosed with depression, to attempt suicide, and to be hospitalized for depression.

It consistently has been demonstrated that women have higher rates of depression than men. In Canada, data from the 1996/97 National Population Health Survey showed that women were twice as likely as men to be depressed (35). Internationally, when rates of major depression are standardized, in men and women 18 to 64 years of age, the ratio of depressed women to men ranged from 1.6 to 2.6. This finding is based on a review of twelve studies with data from countries including Canada, the United States, Taiwan, Germany, and France (105).

Men and women also differ in their prognosis. Fifteen percent of those with significant depressive illness commit suicide (19). Women make three to four times more suicide attempts than men, but men complete suicide more often. Women also tend to attempt suicide in the later part of a depressive episode while men attempt suicide early in a depressive episode (19).

Within the social model of health, a complex web of factors can be examined to understand patterns of hospitalization for depression. This model emphasizes the importance not only of human physiology and health care but also highlights the role of individual behavioral factors as well as psychosocial, economic, and material factors and the intricate relationships between them (110). These factors have been regrouped under the heading of twelve determinants of health and specifically include gender as one of the determinants (35).

"Gender refers to the array of socially and culturally determined roles, personality traits, attitudes, behaviors, values, relative power, and influence that society ascribes to the two sexes on a differential basis, while sex refers to the basic biological variables that are distinctively male or distinctively female"(35). Gender is a powerful determinant that interacts with health determinants like socioeconomic status, age, education, and sex among others. The inclusion of gender and the importance of looking for interactions between gender and other health determinants, highlight the fact that health determinants, like education, employment, or age, may operate differently for women and men (65).

Differences in health status between men and women are not the results only of ". . . susceptibility and exposure to risks . . . but also, fundamentally, . . . [of] the power of men and women to manage their own lives, to cope with such risks, protect their lives and influence the direction of the health development process"(102).

Based on this gendered health determinants model, factors such as ". . . economic policy, sociocultural, environmental, community and social support, stressors and life events, personal behaviors and skills and availability and access to health services . . ." must be also examined when wanting to understand health differences between men and women (139).

Different measures have been developed to operationalize gender and conduct international comparisons (28;131). The Gender-related development index and the gender empowerment measure are based on life expectancy, educational attainment, income, and participation in politics and decision-making (139). A third index developed by Dijkstra and Hammer focuses on socioeconomic inequality (28).

While several studies have looked at the role of health determinants in influencing the incidence or prevalence of depression, we found no study that systematically reviewed the role of these health determinants on patterns of hospitalization for depression.

PURPOSE

The purpose of this study is, therefore, to conduct a systematic review and critical appraisal of the literature on selected health determinants, including gender, and their impact on hospitalization rates for depression. The different effect of these determinants in men and women is of particular interest. The guiding hypothesis is that gender, and the interaction between gender and other health determinants, affect the decision to hospitalize patients suffering from depression. We also hypothesize that these health determinants will operate differently in men and women. Specifically, we examine and summarize the literature looking at the impact of social determinants like age, sex, family structure, education socioeconomic status, and gender on hospital services utilization for depression. Key health systems determinants such as diagnosis, suicidal attempt and suicide ideation, and hospital setting were also examined, as they constitute important clinical confounders of the need for hospitalization but will be reported in a subsequent study. This study is a companion project to a pilot study using the British Columbia Linked Health Data (66).

METHODS

Search Strategy

Using expert search strategies, nine databases were searched from their inception through October 2000. The search of these databases was conducted in three parts: depressive disorders, hospital utilization, and gender-related factors. First, citations referring to depression were identified using medical subject headings and text words such as "affective disorder," "depression," "bipolar disorder," "cyclothymic disorder," "dysthymic disorder," and "depressive disorder."

Second, hospitalization analyses were sought using medical subject headings and text words that included "hospitalization," "hospitals," "hospitals, chronic disease," "emergency service," and "hospital." Third, studies containing data on gender-related factors affecting hospitalization were identified using medical subject headings and text words like "gender," "family characteristics," "sex," "sex factors," "sex characteristics," "gender," "women," "men," "female," "male," "age factors," "education," "socioeconomic factors," "suicide," and "suicide, attempted."

The boolean operator AND was used to combine results from all three parts such that analyses of hospitalization for depression examining the influence of gender and other health determinants such as age, sex, family structure, education, socioeconomic status location, diagnosis, suicide attempts, and suicide ideation as well as hospital setting could be identified.

A "fugitive" literature search was also conducted to identify material not typically indexed in these databases (available upon request). The search used key words similar to those used in the nine databases. The fugitive search included a search of specialized databases, registries and conference proceedings, hand-searching of relevant nonindexed journals, as well as Internet searches. Appropriate researchers and organizations were contacted either by phone, email, or mail to identify relevant material. The reference list of each document that met the inclusion criteria was also scanned for additional citations.

Selection Criteria

Included in the analysis were all reports of primary data, systematic reviews, and meta-analyses of primary data that (i) focused primarily on hospital services utilization (including admission to acute care hospital, psychiatric facility, emergency room, and acute care psychiatric ward whether the data was hospital or population-based), AND (ii) focused on inpatients being treated for depression (inpatient is defined as a patient whose stay in hospital is a minimum of one night), AND (iii) reported hospitalization data by one or more of the following health determinants: gender, sex, age (any age group), family structure, education, socioeconomic status, suicide, and suicide attempts.

Exclusion Criteria

Studies were excluded if they (i) reported hospital services utilization rates as an outcome measure in studies investigating the safety, efficacy, or effectiveness of specific therapeutic interventions (e.g., drug trials); OR (ii) had as its focus a diagnosis other than those specified above (including alcohol dependency, Huntington's disease, burns, cardiac conditions, cancer); OR (iii) had as its focus a dual diagnosis (e.g., alcoholism and a mental health disorder); OR (iv) had as its focus questions of insurance, financing, economics, case costing; OR (v) were a narrative nonsystematic review.

Two researchers independently evaluated each citation to determine whether it met the inclusion or exclusion criteria. Articles that did not meet the inclusion criteria but were thought to provide useful background information were categorized as such. Differences between the researchers were resolved through discussion.

A separate results table was created for each of the selected health determinants and included details on health determinant definition as well as numerator and denominator data by sex. The reliability of the data extraction was evaluated and found adequate.

Statistical Methods

The statistical package within Excel spreadsheet was used to obtain descriptive statistics, to conduct z-tests of mean differences between two-samples, chi-squared analyses of differences in proportions between two samples, analysis of variance analyses for mean differences between more than two samples and chi-square for trends for analyzing multiple categorical data. Meta-analyses of proportions and rates, whenever appropriate, were conducted using RevMan freeware. Statistical significance level was set at a two-tailed α of .05. Yates' corrected chi-squared was used for cells with less than five observations.

RESULTS

Search Results

The search strategy identified 1,826 unique records. Based on abstract information, 1,469 citations were eliminated and 357 were retrieved for further evaluation. Of the 357 studies retrieved, 110 met the inclusion criteria, 57 were excluded, and 190 did not meet the inclusion criteria but offered valuable background information.

The length of follow-up of the included studies ranged from 3 months to 28 years. The data in the included studies covered the time period from 1966 to 1996. Reported data included number of admissions or discharges, number of individuals admitted or discharged, proportions of men or women admitted, or population rates. Most data were in the form of number of admissions or discharges. American and European studies predominated (44 percent and 31 percent), followed by Canadian (13 percent), Australian-New Zealand (10 percent), and other studies (2 percent).

Categorization of Depression Diagnoses

Several different systems were used to classify depression in the included studies. Eighty-seven percent of the studies used different versions of the International Classification of Diseases (ICD; 56;58;59;84) or Diagnostic and Statistical Manual of Mental Disorders (DSM; 26;27;78) systems. The other classification schemes used were the Schedule for Affective Disorders (52), Research Diagnostic Criteria (73), Classification of Kielhoz (138), Schema of Wurzberger (93),

and Koenig Scale (87). One European study and one U.S. study stated using ICD-based definition of depression but did not specify the version used (16;92). Twelve studies (10.7 percent) did not give information as to which classification scheme was used for the diagnosis of depression. Some articles used more than one classification scheme, so numbers add up to more than the number of included studies.

To analyze diagnosis data, the different classification schemes were regrouped into depressive disorders and bipolar disorders categories based on the ICD and DSM diagnoses reported in the included studies. The categorization key is available upon request. Thirty-five percent of studies did not differentiate between depressive and bipolar disorders in their analyses and were categorized as "mixed." Because some of the articles reported on either or both depressive, bipolar, and/or mixed disorders, numbers again add up to more than the number of included articles.

Health Determinants

None of the included studies examined the effect of gender on hospitalization rates for depression. Sex and age were the most frequently examined health determinants having been reported in, respectively, 80 percent and 83 percent of the included studies. Family status, socioeconomic status, education, and suicide or suicide attempts were significantly less likely to be reported ($p < .05$; Table 1).

Sex

Eighty-eight studies included data on hospitalization by sex (1;4–7;11;14;16–18;20–25;31–33;35–39;41–44;46;50;51; 53–55;61–64;67; 70–74;77;79–83;86;89–93;96–101;103; 104;107;108;111;112;114–117;120–123;125–128;130;133– 138;140;141). Crude hospitalization rates per 100,000 populations were available from nine of these studies (17;21;22; 53–55;61;62;117). These rates vary by country, diagnoses considered, and their grouping, year, and hospital settings ex-

Table 1. Number of Studies and Reported Health Determinants

Type of data by diagnosis	Number of Studies	Percentage of included studies (n = 110)
Gender	0	0%
Sex	88	80%
Age	91	83%
Family status	24	22%
Socioeconomic status	12	11%
Education	8	7%
Suicide/suicide attempts	9	8%

amined. In Canada, these rates vary from 130 to 270/100,000 in women and 78 to 170/100,000 in men ($p < .05$; 54;55;62). These rates are for depressive and bipolar disorders combined. The range of data partly reflects a temporal increase in hospitalization rates for depression in Canada. We suspect the increase also reflects changes in the reporting of depression over time.

International rates for hospitalization for depressive disorders range from 53/100,000 to 97/100,000 in European women ($p < .05$; 17;22;63;117). In men, rates stretch from 31/100,000 to 51/100,000 in Europe ($p < .05$). The diagnostic codes included in the calculation of these rates are important causes of the observed differences. An American study of mental health disorders in youth reported 299 and 252 discharges for depressive disorder per 100,000 youths in women and men respectively ($p > .05$; 21). Another European study of hospital discharges reported rates of 200/100,000 and 101/100,000 in women and men (22). This, however, is based on 1981 data, and there was not enough information provided to relate the diagnoses included in the analysis to ICD or DSM categories.

What is very consistent worldwide, however, is the ratio of women to men (Figure 1). When crude hospitalization
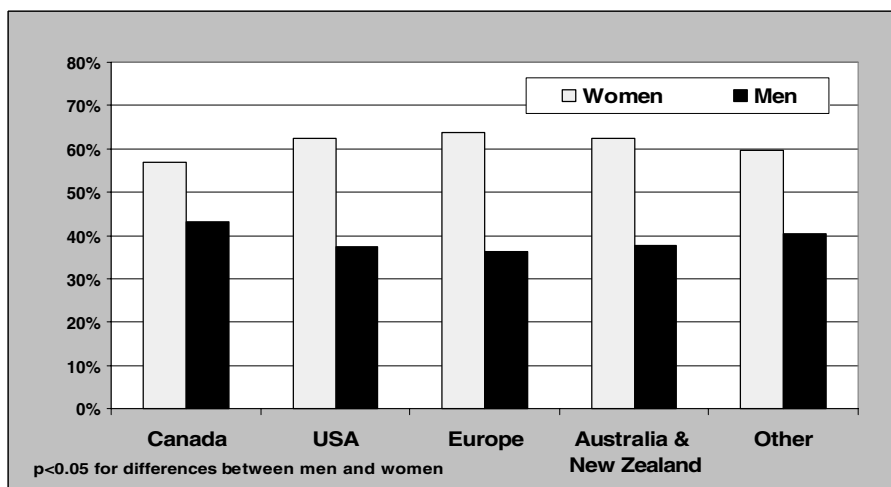
Figure 1. Mean proportions of men and women hospitalized for depression by country.

rates are examined, the ratio of women to men range from 1.56 to 2.13 with a mean of 1.77 and a standard deviation of 0.17. In fact, sixty-nine of the seventy-nine included studies that reported data on the number of hospital discharges for depression by sex found that a higher proportion of those hospitalized for depression were women. These sixty-nine studies include one study of hospitalization for depression among women war veterans (77) and six studies of postpartum depression (31;73;91;100;125;134).

When the veteran and postpartum studies were excluded, women represented 50 percent to 79 percent of those hospitalized for depression. Figure 1 shows the mean percentages of women and men hospitalized for depression by country. For each country, there were significantly more women hospitalized for depression than men ($p < .05$). There were no statistically significant differences between countries in the proportion of women hospitalized for depression ($p > .05$). These findings remain true whether the data analyzed were number of individuals or number of admission or discharges.

Ten studies reported a higher proportion of men hospitalized for depression. These reports included three studies on men war veterans (36;37;61) and three studies on adolescents (20;46;99). The three studies on adolescents were all American studies. The reasons for the significantly higher incidence of hospitalization for depression in adolescent boys ($p < .05$) are unclear. A Finnish study, which followed a birth cohort to 28 years of age, also found a higher proportion of men hospitalized for depression (80).

Three other studies of hospitalization for bipolar disorders reported that 53 percent, 53 percent, and 68 percent (39;135;137) of those hospitalized were men, although the differences in two of these studies between men and women were not statistically significant (39;135). The third study was not based on a random or complete sample and the authors raise concerns about a potential sampling bias (135). The tenth study to report a higher proportion of men hospitalized for depression was published in German (93). Although summary information was extracted for this study, language limitations prevented us from fully understanding the reasons for the findings of this study.

Internationally, no difference in incidence or prevalence of bipolar disorders in men and women has been reported. The World Health Organization estimates that, at any one time, 0.9 percent of men and 1 percent of women worldwide are affected by bipolar disorders (129). Kessler and colleagues also found no differences between men and women in the incidence of bipolar disorders (71). When admission and discharge data for all the included studies were pooled, we found no statistically significant differences in the proportion of men and women hospitalized for bipolar disorders ($p > .05$). The pooling of data, however, may hide an age-effect as most of the included studies were conducted in adults.

Age

Ninety-one of the 110 included studies (83 percent) reported hospitalization data by age (1;2;4–7;11;13;14;16;18;20–25;30–39;41–45;47;48;50–54;60;62–64;67;70;72;74–76;79–83;85–87;89–92;97–101;103;104;107;108;112–115;117–119;121;122;127;134;135;137;138;140;141). This count included nine studies that solely reported mean age (11; 24;38;46;79;91;103;121;141) and one study that reported age at first episode (70). This group also included three studies that looked at men war veterans (36;37;63) and three studies of postpartum depression (30;100;134).

Overall, thirty-three studies reported admission or discharge data by sex and age. To summarize these studies, we grouped the age-related findings into three categories: child and adolescent (0–19 years), adult (20–64 years), and elderly (65+ years). Studies combining both adolescent and adult data were included in the adult category.

There were statistically significant differences in the age distribution of men and women hospitalized for depression. Eight percent, 77 percent, and 15 percent of women hospitalized for depression were in the child and adolescent, adult, and elderly categories, respectively, compared with 5 percent, 81 percent, and 14 percent for men ($p < .05$ for all age categories; Table 2). While both men and women were significantly more likely to be adults ($p < .05$), a greater proportion of women than men were in the child and adolescent category.

When data on hospitalization by sex and age were analyzed by hospitalization diagnosis, both men and women were more likely to have been admitted for mixed disorders. Of adult men and women hospitalized for depression, significantly more women had depressive disorder (28 versus 25 percent; $p < .05$) and significantly more men had bipolar disorders (6 percent versus 7 percent; $p < .05$). Of elderly men and women hospitalized for depression, women were significantly more likely to have been hospitalized for depressive disorder than man (21 percent versus 18 percent; $p < .05$). Reported data did not allow us to distinguish between depressive and bipolar disorder in 65 percent of women and 70 percent of men ($p < .05$; Table 3). Care, therefore, should be taken in interpreting these results.

Differences between men and women, however, were more striking among children and adolescents. In this group,

Table 2. Number of Admissions or Discharges by Sex and Age Groupings

Age group	Women (%)	Men (%)
Child and adolescent	13,545 (8%)	4,867 (5%)[a]
Adult	132,449 (77%)	73,556 (81%)[a]
Elderly	25,994 (15%)	12,960 (14%)[a]
Total	171,938	91,383

[a] $p < .05$ for differences between men and women.

Table 3. Diagnostic Categories by Age Groupings and Sex

	Bipolar disorders		Depressive disorders		Mixed		Total	
	Women (%)	Men (%)	Women (%)	Men (%)	Women (%)	Men (%)	Women (%)	Men (%)
Child and adolescent	1,023 (8%)	1,122 (23%)[a]	9,406 (69%)	395 (8%)[a]	3,116 (23%)	3,350 (69%)[a]	13,545 (8%)	4,867 (5%)
Adult	8,071 (6%)	5,051 (7%)	36,849 (28%)	18,577 (25%)[a]	87,529 (66%)	49,928 (68%)	132,449 (77%)	73,556 (81%)
Elderly	327 (1%)	101 (1%)	5,345 (21%)	2,311 (18%)[a]	20,272 (78%)	10,548 (81%)	25,944 (15%)	12,960 (14%)
Total	9,421 (5%)	6,274 (7%)	51,600 (30%)	21,283 (23%)	110,917 (65%)	63,826 (70%)	171,938 (100%)	91,383 (100%)

[a] $p < .05$ for differences between men and women.

the data show important differences in the hospitalization diagnosis. Women were at substantially greater risk of depressive disorders (69 percent versus 8 percent; $p < .05$), whereas men were more likely to have had bipolar disorders (8 percent versus 23 percent; $p < .05$; Figure 2).
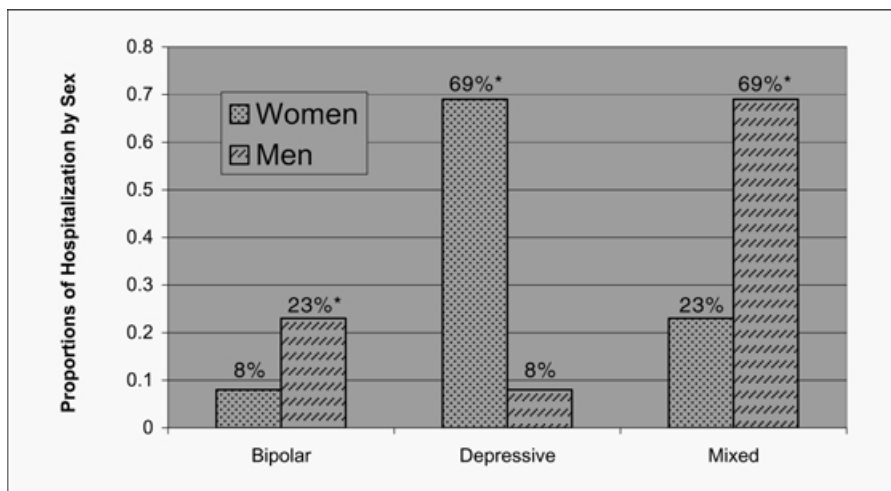
Family

Twenty-four studies reported family structure characteristics for those hospitalized for depression (1;7;11;13;14;18;23;32; 36–39;63;67–70;79;80;87;100;138;140;141). This count included one postpartum (100), three veteran (36;37;63), and one adolescent study (80). The most common categories used to report family data were single, married, divorced/ separated, and widowed. Variations of the single category included living alone. One study divided subjects into "never married" and "ever married or defacto." For this analysis, the "never married" were considered single and "ever married or defacto" were counted as married. The data from three studies were not included, as the reported data could not be assigned to any family structure categories (13;80;100). Only one study examined the effect of children (13). It found a significant but weak correlation between the presence of children under 5 and hospitalization for mixed disorders (15).

When data from the remaining twenty-one studies were combined, family structure significantly affected the risk of hospitalization for depression ($p < .05$). Widowed families had the lowest risk of hospitalization for depression with widowed composing 8 percent of those hospitalized for depression. Using widowed family as the reference category, married/living with someone, single/living alone, and divorced had increasing risks of hospitalization with odds ratios of 3.4, 3.7, and 12.75, respectively ($p < .05$; Figure 3).

Only two studies provided data on family structure by sex (1;138). These studies were combined as they used compatible categorization of family structure. For both men and women, family structure significantly affected hospitalization for depression. In both sexes, hospitalizations for depression were significantly more likely for both married men and women ($p < .05$) (Figure 4). Widowed women were at significantly greater risk than widowed men (14 percent versus 1 percent; $p < .05$).

Socioeconomic Status

Twelve studies reported on the socioeconomic status of those hospitalized for depression. A wide range of variables was used to examine socioeconomic status. These variables

Figure 2. Proportions of hospitalizations of depression in child and adolescent by diagnosis. * $p < .05$ for differences between men and women.
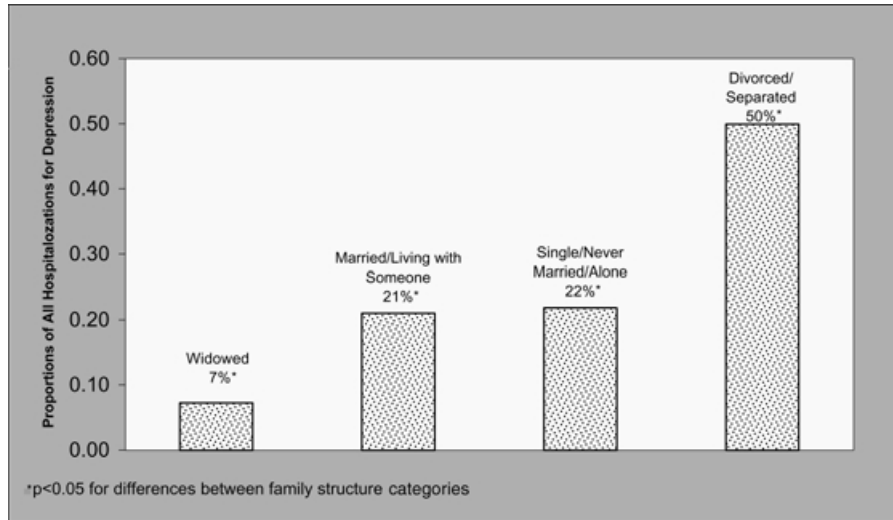
Figure 3. Proportions of all hospitalizations for depression by family structure categories.

included use of Medicare/Medicaid, public assistance, employment status, and housing conditions. The diversity of variables used made comparison across studies difficult.

Medicaid was the most frequently used measure. It was reported in three of the twelve studies (18;21;25). Its main advantage being that it is standardized across the United States. Callahan and Wolinsky examined a sample of 7,527 individuals 70 years of age and older from the Longitudinal Study on Aging (18). The study concluded that being on Medicaid was not a significant risk factor for hospitalization for depression. Davis and colleagues and the study from the Virginian Health Department did not provide enough data to determine whether those on Medicaid were at higher risk of hospitalization for depression (21;25). These studies re-

ported that in elderly, 10.5 percent of those hospitalized for depression were on Medicaid (25), whereas 3 percent of child and adolescent hospitalized for depression were on Medicaid (21) ($p < .05$).

Employment status was used as socioeconomic indicator in three studies (7;38;90). Frank and Brookmeyer reported a rate of hospitalization for depression of 4/1,000 in American adults (38). This finding is higher than internationally reported rates and significantly higher than European rates (maximum European figures of 1.48/1,000 for men and women combined; $p < .05$; 17;22;61;117). No comparable American data were available.

Two studies examined the correlation between hospitalization for depression and various social determinants
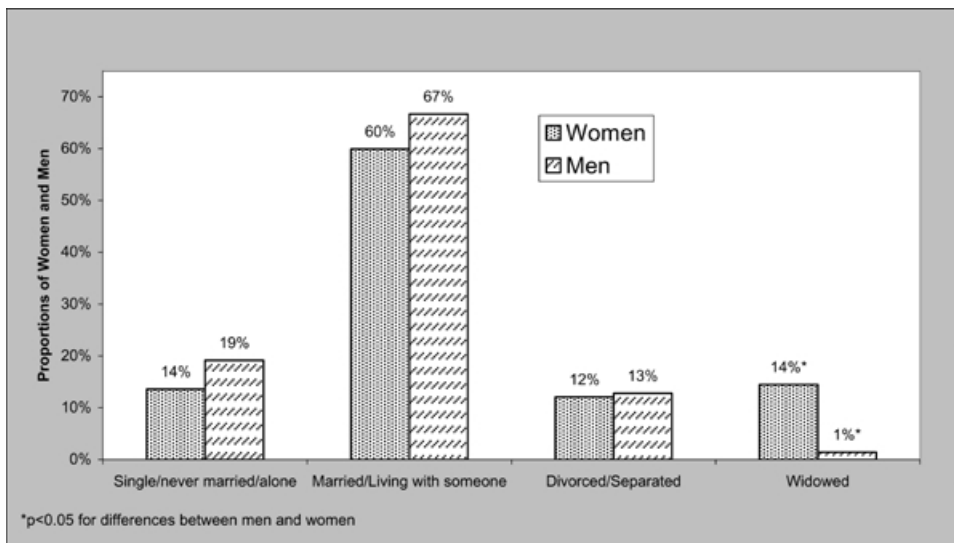
Figure 4. Proportions of women and men hospitalized for depression by family structure.

(13;47). Harrison and colleagues found a statistically significant but weak correlation between moving houses within the past year and crude hospitalization rate for bipolar disorders ($p < .05$). It found no correlation between hospitalization and ethnicity, overcrowding in household, employment status, family structure, socioeconomic group (10), standardized mortality ratio or the Underpriviledged Area Score (UPA; 47). These results are at odds with the findings of Broadman and coworkers (13). In this latter study, significant moderate to strong correlations were found between hospitalization for depressive and bipolar disorders and most social determinants studied. These included UPA score, Townsend score, change of residence, overcrowding, elderly living alone, ethnicity, houses with no car, long-term disease, living in one room, and unemployment. All these determinants were associated with higher age-standardized rates of hospitalization for depression ($p < .05$). Owning houses was also associated with a reduced risk of hospitalization for depression ($p < .05$; 10).

Only one of the twelve studies examined combined the effect of sex and socioeconomic factors (51). It found no significant difference in the proportion of hospitalized depressed males and females that were homeless ($p > .05$).

Education

Education was the least reported health determinant with eight studies providing data on the education level of those hospitalized for depression (4;7;18;32;67;68;87;141). Three of these studies reported mean years of education (18;67;141). Callahan and Wolinsky found no statistically significant differences in mean education level of elderly hospitalized and not hospitalized for depression (9.7 years versus 10.1; $p > .05$; 18). The two other studies did not provide enough data to compare hospitalized and nonhospitalized patients. They reported mean education levels of 11.4 and 12.3 years amongst the 219 and118 individuals hospitalized (67;141). Insufficient data were also provided to determine the comparability of these study samples. Finally, Meldon and colleagues found no significant association between education and hospitalization for depression in the seventy patients included in his study (87).

Only one study compared education levels by sex (4). This report was a population-based study reporting hospitalization data on mental disorder from all Finnish mental and general hospitals. This study found a statistically significant increased risk of hospitalization for depressive disorders in women with basic education ($p < .05$). In men, a higher education was associated with an increased risk of hospitalization for bipolar disorders ($p < .05$). In both basic and high-education level groups, women were at significantly greater risk of hospitalization than men for both depressive and bipolar disorders ($p < .05$) (4).

Other studies reported on the proportion of subjects with specific levels of education. One study found that 46 percent of the 168 inpatients had less than or equal to a secondary education (32), whereas another found that a majority of inpatients had less than 4 years of education (68). These studies provided no further information on education levels. Finally, Barrow and coworkers found no association between education and the risk of hospitalization for depression (7).

DISCUSSION

The link between health status and economy, social support, and employment has been well documented (109). These social health determinants have also been shown to influence mental health. Lower or unequal income levels, disadvantaged social positions, lower education levels, homelessness or unstable housing, poor social support, and poor quality of relationships with friends, neighbors, and family members were all found to be associated with a higher incidence of depression (8;9;12;15;29;40;95;106;132).

While we have gained substantial insights into the social determinants of depression, much less is known about the link between social determinants and hospital utilization for depression. In fact, the results of this systematic review draw our attention to the fact that social determinants are underreported in hospitalization studies of depression. The importance of reporting cross-tabulated data by sex, social determinants, and diagnosis must be emphasized. Gender should also be included in analyses seeking to understand difference in hospitalization between men and women. Depression is not a biologically isolated condition. It arises in the context of society and culture. An understanding of how biology, society, and culture interact in both men and women is required for improved population health.

This systematic review found that sex and age were the most frequently reported health determinants. Sex was a significant determinant of hospitalization for depression with higher rates of hospitalization for depression in women consistently reported in Westernized countries. Age was also a significant health determinant. Both men and women hospitalized for depression were more likely to be adults. This could reflect the higher incidence of depression in adults. However, the complexity of the issues surrounding the diagnosis of depression make this seem a rather simplistic explanation.

When age, sex, and diagnosis were combined, adult women were more likely to be hospitalized for a depressive disorder, whereas men were more likely to report a bipolar disorder. Elderly women hospitalized for depression were also more likely than men to report a depressive disorder diagnosis. The higher rate of hospitalization for bipolar disorders in men is not consistent with incidence data. Internationally, no differences in the incidence of bipolar disorders between men and women have been reported. Caution is required in interpreting the hospitalization data, however, because of the large proportion of cases in this systematic review where we could not specifically identify the hospitalization diagnosis as bipolar or depressive disorder.

As far as family structure, socioeconomic status and education is concerned, very little can be concluded. Only two studies examined the role of family structure. Together, these two studies found that a significantly greater proportion of those hospitalized for depression were married (men and women combined). This finding could simply reflect the prevalence of married individuals in the population. When analyzed by sex, widowed women were at greater risk of hospitalization than widowed men. In these two studies, women were significantly older or overrepresented in the 60+ age group. This finding could reflect the longer life expectancy of women.

Only one study looked at socioeconomic status by sex and found that homelessness did not put women at greater risk of hospitalization for depression. More needs to be done in this area before any conclusions can be made. One study looked at the effect of education and reported that women of basic education level were at higher risk of hospitalization than men of higher education level. Just as lower education increases the risk of depression, it also seemed to increase the risk of hospitalization for depression.

It is important to note that the vast majority of included studies used hospital admission/discharge data. Only 4 of the 110 included studies provided population-based data (4;118;120;134). Even in these studies, it was not possible to calculate the true risk associated with the health determinants. In all cases, the number of individuals by age, sex, family structure, socioeconomic status, and education with or without depression NOT admitted to hospital was unavailable. The data were also unstandardized, which limited our ability to make comparisons.

Whereas our search strategy identified studies referring to depression, hospital utilization, and at least one of the selected health determinants, data reporting in the included studies was an important limitation. In many cases, the level of data aggregation made the planned data extraction difficult or unsuccessful and limited the use of more powerful statistical tools. Other limitations included small sample sizes in some studies and the lack of uniform systems to report health determinants such as socioeconomic status, education, and suicide-related factors. Family categories were the easiest to compare. However, other useful information that could be collected by sex and diagnosis includes the presence or absence of children. In addition, the relationship of family to work needs to be investigated.

We must also be aware of the issues involved in the diagnosis of depression. "Observations of mental health differences have specific implications for diagnosis and treatment. Many psychological assessment methods, including history taking, have not been constructed to fairly capture and adjust for gender differences, and they often apply to women certain norms and definitions of mental health based on male standards. For example, women are inevitably labeled more anxious and tense than men. The point of reference becomes important in defining what is, and what is not, pathologic, and the implications for diagnosis and treatment" (37).

The issue is about more than evaluating the validity of the diagnostic codes reported in administrative database. It deals with the processes and factors involved in the assignment of diagnoses to individuals. The complexity of the patient-doctor interaction and of the environment within which this interaction takes place also needs to be examined. It would be interesting to contrast women's rates of depression with the higher prevalence of substance abuse and antisocial personality disorders in men (139) within an analytical framework of diagnosis assignment that includes gender.

The effectiveness of hospitalization as an intervention in the treatment of depression should also constitute an integral part of hospital utilization analyses for depression that seek to understand utilization patterns between men and women.

CONCLUSIONS

This systematic review provides a summary of the available research examining the impact of social health determinants on hospitalization for depression. Although the selected social determinants are known determinants of population health, their impact with respect to hospitalization for depression has only partially been evaluated. In particular, the effect of sex, gender, and the interaction between sex, gender, family structure, suicide, socioeconomic status, or education have received limited attention.

This study provides a starting point to guide a comprehensive design and empirical analysis of pattern of hospitalizations for depression and differences between men and women. To ensure the feasibility of this analysis, more standardized definitions of social determinants are required and the importance of reporting data by sex must be emphasized. The contribution of administrative databases to help address important knowledge gaps regarding women's health status and health care utilization should also be considered.

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