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Association of somatoform disorders with anxiety and depression in women in low and middle income countries: A systematic review

RAHUL SHIDHAYE[1,2], EMILY MENDENHALL[3], KETHAKIE SUMATHIPALA[4], ATHULA SUMATHIPALA[5,6] & VIKRAM PATEL[7,2]

[1]*Indian Institute of Public Health, Hyderabad, Andhra Pradesh, India,* [2]*Centre for Mental Health, Public Health Foundation of India, New Delhi, India,* [3]*Developmental Pathways for Health Research Unit, University of Witwatersrand Medical School, Witwatersrand, South Africa,* [4]*Department of Primary Care and Population Health, Primary Care Mental Health Group, University College London, UK,* [5]*Institute for Research and Development, Battaramulla, Sri Lanka,* [6]*Institute of Psychiatry, Kings College, London, UK, and* [7]*London School of Hygiene and Tropical Medicine, UK*

Abstract

Background: Across cultures, women are more likely than men to report somatoform disorders (SD), depression and anxiety. The aim of this article is to describe the co-morbidity of SD with depression/anxiety and to investigate the possible mechanisms of this relationship in women in low and middle income countries (LMIC). *Methods:* We reviewed two databases: MEDLINE and PsycINFO from 1994 to 2012 for studies which assessed the association between any SD and depression/ anxiety in women from LMIC. Our focus was on community and primary healthcare based studies. Both quantitative and qualitative studies were included. *Results:* A total of 21 studies covering eight LMICs were included in our analysis. Our findings suggest a strong association between SD and depression/anxiety (with odds ratios ranging from 2.5–3.5), though we also observed that the majority of women with SD did not have depression/anxiety. The likely mechanisms for this association are multidimensional, and may include shared aetiologies, that both conditions are in fact variants of the same primary mental disorder, and that one disorder is a risk factor for the other. Anthropological research offers a number of frameworks through which we can view these mechanisms. *Conclusion:* The current evidence indicates that service providers at the primary care level should be sensitized to consider SD in women as variants of CMD (Common Mental Disorders) and address both groups of disorders concurrently. Further research should explicitly seek to unpack the mechanisms of the relationship between SD and CMD.

Background

Across cultures, women are more likely than men to report somatoform disorders and depression, and anxiety (Kessler et al., 2003; Mirza & Jenkins, 2004). Somatic presentations are the rule in routine clinical practice, and when physicians cannot find a pathological basis for them they are referred to as somatization, somatoform disorders, medically unexplained symptoms, and functional somatic symptoms (Barsky & Borus, 1999; Mayou, 1993). Wessely et al. defined a functional somatic symptom as one that, after appropriate medical assessment, cannot be explained in terms of a conventionally defined medical disease (Wessely et al., 1999). At least one third of all physical symptoms in the general population (Kroenke & Price, 1993) and in general medical care settings (Kroenke et al., 1994) are medically unexplained. Different medical specialities tend to define their own variants of such somatic syndromes,

for example, irritable bowel syndrome, premenstrual syndrome, chronic pelvic pain, fibromyalgia, non-cardiac chest pain, hyperventilation syndrome, chronic (post-viral) fatigue syndrome and atypical facial pain (Wessely et al., 1999). In this paper, we refer to these syndromes collectively as somatoform disorders (SD).

Although SD appears to be a heterogeneous group of conditions (Creed, 2009; Creed & Barsky, 2004; Henningsen et al., 2003), they often-exist with depression and anxiety and other somatoform disorders (Lieb et al., 2007). While depression and anxiety are widely accepted as distinct sub-categories of CMD in contemporary classifications, there is debate around the classification of SD. Contemporary classifications prefer to categorize SD as a separate diagnosis with variants of SD as further sub- or separate categories. The *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR)

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and the tenth edition of the *International Statistical Classification of Diseases and Related Health Problems* (ICD-10) have classified depression, anxiety and SD in three different major diagnostic categories. In DSM-IV-TR, SD are further sub-classified into seven sub-categories. There is a close overlap with ICD-10, though there are some significant differences especially related to the classification of dissociative disorders. An alternative view is that SD are essentially variants of other CMDs. Indeed, somatic complaints are the hallmark presentations of depression and anxiety in routine care, in particular in low and middle income countries (LMIC) (Bhatt et al., 1989; Katon & Walker, 1998; Patel et al., 1997). Some authors argue that even the various somatic syndromes are largely an artefact of medical specialization and the differentiation of specific functional syndromes reflects the tendency of specialists to focus on only those symptoms pertinent to their speciality, rather than any real differences between patients (Sharpe & Carson, 2001; Wessely et al., 1999). Furthermore, there is a lack of clear operational criteria for the category of SD and it has been argued that the number and severity of symptoms are better arranged as dimensions rather than categories (Mayou & Sharpe, 1995).

The primary goal of this article is to contribute to these on-going debates around the taxonomy of SD, particularly in relation to depression and anxiety in LMIC, which predominantly present with somatic features. We have conducted a review of the literature on the association of SD (a category which included medically unexplained somatic symptoms) with depression and anxiety among women in LMIC. We hypothesize that SD and depression and anxiety are closely associated in these studies and that, at least from a public health perspective, the distinction of SD apart from CMD is not useful. Our review does not focus on the somatic presentations of CMD as there is an already existing evidence base for the same. We examine the association of SD with depression and anxiety within primary care and community setting studies as these are the most representative of the general population.

Methods

Search strategy

We reviewed two databases: MEDLINE and PsycINFO from 1994 to 20 June 2012. These databases were searched using the Ovid gateway. In MEDLINE a combination of search strategies using MeSH terms and other search terms (keyword search) were used. In summary, the search covered the following disorders/conditions: somatoform disorders, body dysmorphic disorders, conversion disorder, hypochondriasis, neurasthenia, fibromyalgia, chronic fatigue syndrome, idioms of distress, medically unexplained symptoms, depression and anxiety, and common mental disorder.

In the search strategy we used either the MeSH term or keyword search based on the number of results obtained with each; the preference was given for a more sensitive search and therefore the term which returned maximum results. The search terms relating to SD were first searched separately, followed by an advanced search combining all search fields with the Boolean operator 'OR'. A similar strategy was applied for search terms related to depression and anxiety. The results of these two searches along with the list of LMIC countries were then combined using the Boolean operator 'AND'. The search was limited to studies that included women. The search was repeated for the PsycINFO database by making appropriate modifications to the subject headings and search strategy. Search results were exported to EndNote and duplicates were automatically discarded. The detailed search strategy is reported in the Appendix.

Inclusion and exclusion criteria

The inclusion criteria were:

1. studies that included a measure of association between any SD/somatic symptom and any depression or anxiety,
2. studies that focused on women only, or disaggregated findings by gender,
3. study samples in either community-based, primary healthcare settings or outpatient clinics of general hospitals,
4. published in English or with sufficiently detailed English abstracts.

Studies were excluded if they included:

1. a study sample from a psychiatric hospital-based setting,
2. a study sample from high income countries HIC).

Two independent reviewers (R.S. and E.M.) screened the abstracts of the identified studies to determine whether they would satisfy the selection criteria. Full text articles were retrieved for the selected abstracts. Reference lists of the papers meeting inclusion criteria were hand searched to identify further studies. The retrieved studies were assessed again by two independent authors (R.S. and E.M.) to ensure that they satisfied the inclusion criteria. Any disagreements about selection were resolved through consensus between the reviewers and there was no need for arbitration by the third reviewer (A.S.).

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Analysis

The PRISMA guidelines were followed for reporting the findings of this review (Moher et al., 2009). Data from the articles to be included in the full text review were extracted into a spreadsheet. Information relating to the following characteristics was collected: study characteristics (author, year of publication, country, study design, study sample), SD measures (type of SD studied, method of assessment), depression and anxiety measures (type of disorder studied (depression/anxiety/psychological distress), method of assessment) and analysis (prevalence of SD, prevalence of depression/anxiety/distress, measure of association between SD and depression and/or anxiety). Table 1 depicts the study characteristics such as author of the study, year of publication, country, study design, setting of the study and sample size of all the quantitative studies included in the review. Methods of assessment of SD with depression and anxiety are covered in Table 2.

Table 1. List of quantitative studies assessing the association of SD with depression and anxiety in women in low and middle income countries.

Study	Country	Study type	Setting	Sample size
Ball et al. (2010)	Sri Lanka	Cross-sectional survey	Random sample from population-based twin registry	Total 3820 Female 2056
Deveci et al. (2007)	Turkey	Cross-sectional survey	Randomly selected households in urban area	Total 1086 Female 594
Gulec et al. (2007)	Turkey	Case-control study	Fibromyalgia cases from tertiary care centre, women with fibromyalgia (but not accessing health services) from community and healthy controls from community	Fibromyalgia patients 37 Fibromyalgia non-patients 38 Healthy controls 41
Guven et al. (2005)	Turkey	Case-control study	Fibromyalgia cases from the outpatient clinic of the School of Medicine and healthy controls from relatives of other outpatients	Fibromyalgia patients 53 Healthy controls 54
Hollifield et al. (2008)	Sri Lanka	Cross-sectional survey	Randomly selected households	Total 89 Female 47
Illanes et al. (2002)	Chile	Cross-sectional survey	Women from a public women's health organization and private health institution	Female 171
Kostick et al. (2010)	India	Mixed methods	Random sample of women from an urban slum area	Female 260
Martinez et al. (1995)	Brazil	Case-control study	Fibromyalgia cases from the outpatient clinic of a hospital; controls were patients without acute or chronic muscle or skeletal pain	Fibromyalgia patients 64 Healthy controls 25

McMillan et al. (2010)	China	Case-control study	Cases and controls selected from a general outpatient clinic	Total 400
				  (cases + control)
				Female 254
				  (cases 148, controls 106)

Mumford et al. (1996)	Pakistan	Cross-sectional survey	Population-based random sample of men and women from a rural mountainous area	Total 515 Female 300
Mumford et al. (1997)	Pakistan	Cross-sectional survey	Population-based random sample of men and women from a rural area	Total 664 Female 380
Mumford et al. (2000)	Pakistan	Cross-sectional survey	Population-based random sample of men and women from an urban area	Total 760 Female 359
Patel et al. (2005)	India	Cross-sectional survey	Population-based random sample of women from rural area	Female 2494
Patel et al. (2006)	India	Prospective cohort	Population-based random sample of women from a rural area	Female (at baseline) 2494 Female (at 6 months follow-up) 2316 Female (at 12 months follow-up) 2167
Senturk et al. (2012)	Ethiopia	Prospective cohort	Population-based random sample of pregnant women	Female (ante-natal) 1065 Female (post-natal) 954

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Table 2. Methods of assessment of SD with depression and anxiety in quantitative studies with women in low and middle income countries.

Study	Type of somatoform disorder	Method of assessment	Prevalence of SD	Type of CMD	Method of assessment	Prevalence of CMD	Measure of association of SD with CMD
Ball et al. (2010)	Fatigue	Chalder Fatigue Questionnaire	Abnormal fatigue 28.6% (26.7%–30.5%) Prolonged fatigue 1.0% (0.6%–1.4%)	Depression	CIDI	Not reported	Bivariate correlation of fatigue with lifetime depressive disorder: abnormal fatigue 0.39 (0.32–0.47) prolonged fatigue 0.33 (0.13–0.53)
Deveci et al. (2007)*	Conversion disorder	(CIDI) Somatization subscale	Lifetime prevalence of conversion disorder 5.6%	Depression	DSM-IV SCID-I Clinical Version	Not reported	23% of patients with conversion disorder had depressive disorder
Gulec et al. (2007)	Fibromyalgia	Fibromyalgia Impact Questionnaire (FIQ)	Not reported	Depression and anxiety	Beck Depression Inventory (BDI) Beck Anxiety Inventory (BAI)	Not reported	BDI score: fibromyalgia patients (mean) 21.6 versus fibromyalgia non-patients (mean) 18.6 versus healthy controls (mean) 10.0 BAI score: fibromyalgia patients (mean) 32.5 versus fibromyalgia non-patients (mean) 27.4 versus healthy controls (mean) 16.1
Guven et al. (2005)	Fibromyalgia	Diagnosis based on the American College of Rheumatology criteria	Not reported	Depression	Beck Depression Inventory (BDI)	Not reported	Prevalence of depression: fibromyalgia patients 90% control group 51.8%
Hollifield et al. (2008)	Somatic symptoms	New Mexico Refugee Symptom Checklist (NMSCL-41)	Number of somatic symptoms (mean and SD) 9.8 (9.1)	Depression, anxiety and PTSD	Hopkins Symptom Checklist (HSCL-25) and Post-Traumatic Stress Symptom Scale – Self Report	Prevalence: depression 19.1% anxiety 40.4% PTSD 25.5%	Correlation of somatic symptoms with: depression 0.58 anxiety 0.69 PTSD 0.56
Illanes et al. (2002)	Somatic symptoms	Self-designed questionnaire about somatic symptoms	Not reported	Depression	Center for Epidemiological Surveillance for Depression (CES-D)	43%	OR for association of somatic symptoms with depression 3.2
Kostick et al. (2010)	Vaginal discharge	Patient report	Not reported	Psychosocial stress	30-item scale developed from a qualitative study	Not reported	OR for association of vaginal discharge with general tension 2.5 (0.9–25.3)
Martinez et al. (1995)	Fibromyalgia	Diagnosis based on the American College of Rheumatology criteria	Not reported	Depression and anxiety	Hamilton Depression and Anxiety Scale	Not reported	Prevalence of depression: fibromyalgia patients 80% control group 12%

Study	Somatic condition	Measure	Prevalence	Disorder	Assessment	Prevalence of depression/anxiety	Results
McMillan et al. (2010)	Orofacial pain and widespread pain	Patient questionnaire	Not reported	Depression	Chinese version of the depression and somatization sub-scales of the Symptom Checklist (SCL-90)	Not reported	OR for association of orofacial pain with depression 3.5 (1.9–6.3) OR for association of widespread pain with depression 3.5 (1.6–7.6)
Mumford et al. (1996)	Somatic symptoms	Bradford Somatic Inventory (BSI-21)	Women with BSI scores in middle, high or very high range (BSI scores 14–42) 82%	Depression and anxiety	Psychiatric Assessment Schedule based on present state examination and ICD-10 diagnostic criteria for research	Not reported	Prevalence of depression and anxiety in women with high (21–27) or very high (28–42) BSI scores 60%
Mumford et al. (1997)	Somatic symptoms	Bradford Somatic Inventory (BSI-44) and Self Reporting Questionnaire (SRQ-20)	Women with BSI scores in middle or high range (BSI scores 26–88) 82% Women with SRQ scores in middle and high range (SRQ scores 6–20) 76%	Depression and anxiety	Psychiatric Assessment Schedule based on present state examination and ICD-10 diagnostic criteria for research	Not reported	Prevalence of depression and anxiety in women with middle or high range scores on BSI or SRQ scores 66%
Mumford et al. (2000)	Somatic symptoms	Bradford Somatic Inventory (BSI-44)	Women with BSI scores in middle or high range (BSI scores above 20) 28%	Depression and anxiety	Psychiatric Assessment Schedule based on present state examination and ICD-10 diagnostic criteria for research	Not reported	Prevalence of depression and anxiety in women with middle or high range scores on BSI 25%
Patel et al. (2005)	Vaginal discharge	Patient report	Prevalence of vaginal discharge 14.5% (13.1%–15.9%)	Depression and anxiety	CISR	Prevalence of depression and anxiety 9.9% (CISR cut-off ≥ 8)	OR for association of vaginal discharge with depression and anxiety 2.2 (1.4–3.2)
Patel et al. (2006)	Vaginal discharge	Patient report	Incidence of vaginal discharge 4.0% (3.2%–5.0%)	Depression and anxiety	CISR	Prevalence of depression and anxiety: 9.9% (CISR cut-off ≥ 5)	OR for association of vaginal discharge with depression and anxiety 2.2 (1.4–3.4)

(*Continued*)

Table 2. (*Continued*).

Study	Type of somatoform disorder	Method of assessment	Prevalence of SD	Type of CMD	Method of assessment	Prevalence of CMD	Measure of association of SD with CMD
Senturk et al. (2012)	Somatic symptoms	PHQ	Prevalence of pregnant women who reported one or more PHQ somatic symptoms that bothered them 'a lot': antenatal period 21.7% postnatal period 24.8%	CMD	SRQ-20	Prevalence of depression and anxiety in pregnant women: antenatal period 12% postnatal period 4.6%	Correlation coefficient between somatic symptoms and CMD symptoms: antenatal period 0.606 postnatal period 0.583 Relative risk for prospective association of antenatal somatic symptoms and postnatal CMD 1.12 (1.08–1.16) Relative risk for association of antenatal CMD with postnatal somatic symptoms 1.05 (1.02–1.09)

*The data presented is not disaggregated by gender, but we included it as 86.9% of the individuals with conversion disorder were women.

In our analysis we included any SD or any somatic symptom and looked at the association of this with depression/anxiety/both/common mental disorder/ psychological distress.

There was a wide variation in the study designs, method of assessment of SD and depression and anxiety. Studies reported odds ratios, relative risk and correlation coefficients as measures of association between SD and depression and anxiety. As a result of this heterogeneity it was not possible to pool the data to generate summary estimates.

Results

Selection of studies

Overall 770 references were initially identified from the initial searches (Figure 1), the majority from MEDLINE (614) and the rest from PsycINFO (156). Duplicates (n = 75) were discarded, and after the initial screening 42 articles were retrieved for full text review. We included three additional papers from the hand search of the reference list of these 42 articles. In the end we included 21 articles in our analysis; 14 of them had used quantitative methods, four were qualitative studies, two were reviews and one used mixed methods. In the case of the study with mixed methods (Kostick et al., 2010) the quantitative and qualitative findings are reported under respective sections, which has resulted in the description of 15 quantitative studies and five qualitative studies.

Studies with quantitative methods

Study characteristics. Three studies each were reported from India, Pakistan and Turkey, two studies were conducted in Sri Lanka, and one each was reported from Brazil, Chile, Ethiopia and China.

Most of the studies were cross-sectional (n = 9), four used case-control design and the remaining two were prospective cohort studies. Eight studies exclusively sampled women and seven surveyed a mixed sample for which data on the association of SD with depression and/or anxiety for women were extracted from the overall results.

Findings. All of the studies focused on a specific type of SD: six focused on somatic symptoms, three each on fibromyalgia and vaginal discharge and one each on conversion disorder, fatigue and oro-facial/ widespread pain. Six studies measured depression and anxiety, five studies measured depression, three studies measured CMD, while one study reported depression, anxiety and post-traumatic stress disorder (PTSD) measures.
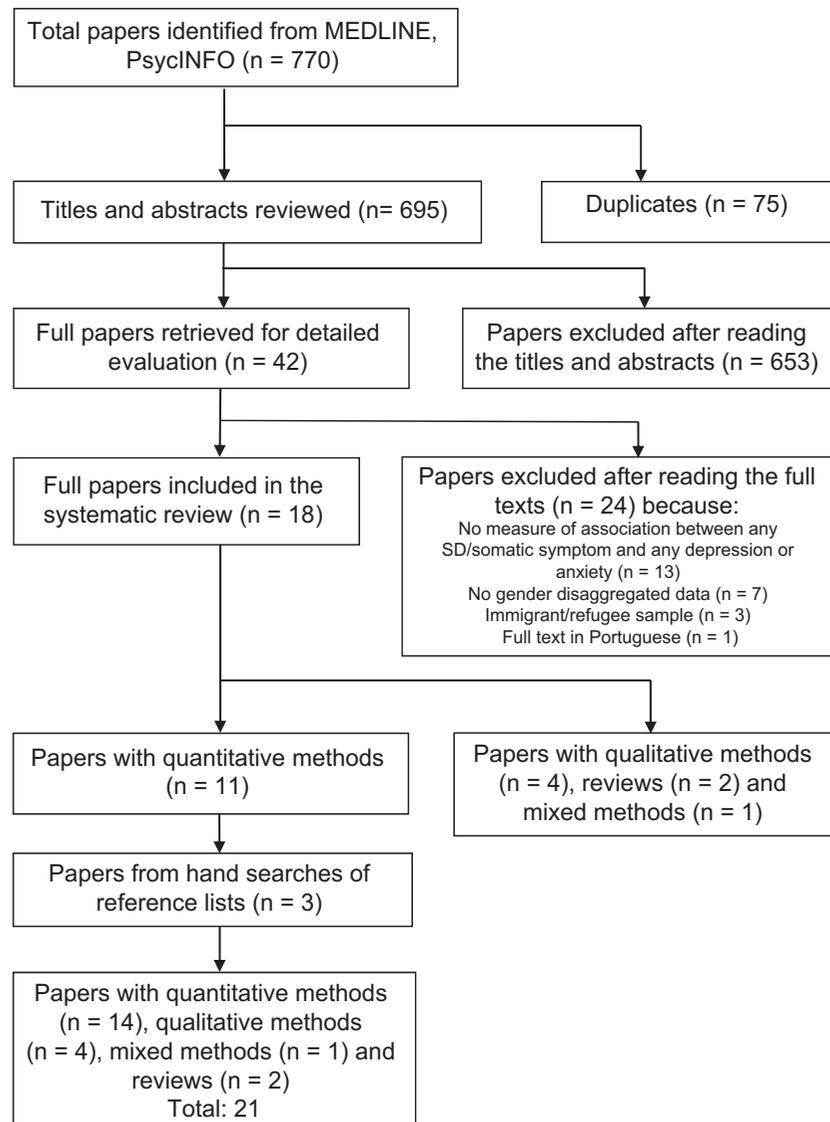
Total papers identified from MEDLINE, PsycINFO (n = 770)

Titles and abstracts reviewed (n= 695)

Duplicates (n = 75)

Full papers retrieved for detailed evaluation (n = 42)

Papers excluded after reading the titles and abstracts (n = 653)

Full papers included in the systematic review (n = 18)

Papers excluded after reading the full texts (n = 24) because:
No measure of association between any SD/somatic symptom and any depression or anxiety (n = 13)
No gender disaggregated data (n = 7)
Immigrant/refugee sample (n = 3)
Full text in Portuguese (n = 1)

Papers with quantitative methods (n = 11)

Papers with qualitative methods (n = 4), reviews (n = 2) and mixed methods (n = 1)

Papers from hand searches of reference lists (n = 3)

Papers with quantitative methods (n = 14), qualitative methods (n = 4), mixed methods (n = 1) and reviews (n = 2)
Total: 21

Figure 1. Study selection process for systematic review of studies of the association between SD and depression and anxiety in women in low and middle income countries.

There was variation in the way SD and depression and anxiety were measured. Some studies used standardized questionnaires such as the Patient Health Questionnaire (PHQ), the New Mexico Refugee Symptom Checklist-41 (NMSCL-41) and the Bradford Somatic Inventory (BSI) for measurement of somatic symptoms, the Chalder Fatigue Questionnaire for fatigue, the Composite International Diagnostic Interview (CIDI) (somatization subscale) for conversion disorder, and the Fibromyalgia Impact Questionnaire (FIQ) for assessment of fibromyalgia. In two studies diagnosis of fibromyalgia was based on the American College of Rheumatology criteria, while patient report was used for detection of vaginal discharge and pain symptoms in the rest of the studies.

In terms of measurement of depression and anxiety, the Clinical Interview Schedule Revised (CISR) and the Self-Report Questionnaire (SRQ-20) were used for measuring CMD, and depression and anxiety were assessed using CIDI, DSM-IV SCID-I Clinical Version, the Beck Depression Inventory (BDI) and the Beck Anxiety Inventory (BAI), the Hamilton Depression and Anxiety Scale and the Chinese version of the depression and somatization sub-scales of the Symptom Checklist (SCL-90).

Cross-sectional studies reported a wide variation in overlap of depression and anxiety in women presenting with SD or somatic symptoms (from 23% to 66%). Three community-based epidemiological surveys from Pakistan estimated that 25% to 66% of women suffered from anxiety and depressive disorders whereby the complaints predominantly were somatic in nature (Mumford et al., 1996, 1997. 2000). A community-based study in Turkey determined that 23% of patients diagnosed

with conversion disorder had some form of depressive disorder (Deveci et al., 2007).

Two case-control studies have reported a higher prevalence of depression and anxiety in cases diagnosed with SD compared to healthy controls. Depression and anxiety were diagnosed in 80% (Martinez et al., 1995) and 90% (Guven et al., 2005) of women who were diagnosed with fibromyalgia as compared to 12% and 51.8% in control groups respectively.

Odds ratio as a measure of association between SD/symptoms and depression and/or anxiety were reported by four studies; three cross-sectional (Illanes et al., 2002; Kostick et al., 2010; Patel et al., 2005) and one case-control (McMillan et al., 2010). All these studies show a statistically significant association with odds ratios in the range of 2.5–3.5.

Only two prospective studies have assessed the association of CMD with SD. Presence of CMD was significantly associated with incidence of abnormal vaginal discharge in women (odds ratio (OR) 2.2, 95% CI 1.4–3.4) in a population-based cohort study in Goa, India (Patel et al., 2006). An Ethiopian study assessing the impact of perinatal somatic and CMD symptoms on functioning in Ethiopian women found that antenatal CMD was associated with postnatal somatic symptoms, though this association was not very strong (risk ratio (RR) 1.05, 95% CI: 1.02–1.09) (Senturk et al., 2012).

Studies with qualitative methods

Study characteristics. Our search yielded five qualitative studies which described the association between SD and depression and anxiety. Four studies were from India and one was from Sri Lanka.

These studies involve both general SD (Nambi et al., 2002; Sumathipala et al., 2008) and more specific somatic symptoms such as vaginal discharge (Kostick et al., 2010; Patel et al., 2008; Pereira et al., 2007).

Findings. Patients with somatic complaints do not usually attribute this to psychological distress. Women locate their distress in the social disadvantages in their daily lives and offer a range of causes for their somatic complaints (Patel et al., 2008). In a community study in Goa, women attributed abnormal vaginal discharge to economic difficulties, worries about children, family and health, reproductive and gynecological problems, excessive work load, trouble with in-laws, marital conflict, housing problems and trouble with neighbours (Pereira et al., 2007). Although women give a very different weighting to the constellation of causal factors, so that 'tension' is not included in their explanations, their narratives clearly contain references to psycho-

social distress (Patel et al. 2008).Vaginal discharge is experienced as a symptom, not of an underlying biological condition, but as part of a larger nexus of women's psychosocial, economic and somatic problems (Kostick et al., 2010). In another study from India, the complaint of abnormal vaginal discharge is an idiom linked to weakness, psychological morbidity, and social adversities, and represents a culturally valid model of explaining such experiences (Patel et al., 2008). Experiencing abnormal vaginal discharge is one way a woman can communicate to her husband and household her concerns for increased understanding and/or relief from certain aspects of life she sees as arduous or dissatisfying (Kostick et al., 2010). It is one of the few ambulatory conditions that can legitimate women's limitation in performing certain roles and obligations and allow her to move out of the house to seek treatment for the condition from public and private allopathic and non-allopathic practitioners (Kostick et al., 2010).

In patients with SD, the significant worry about the illness is a major determinant of distress and medical consultations. Only one participant in a Sri Lankan primary care study gave a psychological explanation for the symptoms while the majority gave a physical explanation and some did not offer any 'diagnosis' (Sumathipala et al., 2008).Similarly, a study from South India which assessed the explanatory models and CMD in patients with unexplained somatic symptoms attending a primary care facility reported that half of the patients attributed their problems to physical illness and believed that specific organs were affected (Nambi et al., 2002).The common thing in both the studies was that the patients felt that their problems were serious and feared disability or death.

Reviews

Both the reviews obtained from the search were narrative reviews; one conducted by authors from Pakistan (Minhas & Nizami, 2006) and the other from China (Parker et al., 2001). The review from Pakistan looked at the epidemiology of somatic symptoms with a specific focus on the Bradford Somatic Inventory (BSI) scale, discussing the diagnostic dilemma around somatic and psychological symptoms and suggested management strategy for SD (Minhas & Nizami, 2006). The key finding of this paper was that 66% of women suffered from anxiety and depressive disorders whereby the complaints predominantly were somatic in nature. The Chinese paper focused on Chinese subjects and reviewed original studies and literature reviews considering emotional distress, depression, neurasthenia, and somatization (Parker et al., 2001). This literature

review supports the concept that Chinese tend to deny depression or express it somatically. The authors conclude that this may be due to the stigma associated with the label of depression as well as the tendency of this population to link emotional problems with physical symbols and metaphors.

Discussion

The findings of this review demonstrate an association between SD and depression and anxiety in women in community and primary healthcare settings. Most studies showed an association of SD with depression and anxiety alone or together; some studies demonstrated this relationship with somatic symptoms, while others specified a category of SD, such as fibromyalgia, conversion disorder, or chronic fatigue syndrome. About a quarter to a third of women who present with SD/somatic symptoms were diagnosed with depression and/or anxiety. However, these studies also show that a significant proportion of women with SD do not have a CMD. The qualitative studies demonstrate how women attribute social and economic problems as the causes of their somatic symptoms, although they do not attribute SD to depression or anxiety. Our findings are consistent with the results of studies from high income countries (Wessely et al., 1999), suggesting that the association of SD with depression and anxiety among women is cross-cultural. For example, the Epidemiological Catchment Area (ECA) study reported 11 times higher probability of major depression in respondents with a lifetime diagnosis of DSM-III somatization disorder (Swartz et al., 1990). A community-based study involving 3,021 adolescents and young adults found significant association between the sub-syndromal diagnostic category of somatization disorder and anxiety and depressive disorders (Lieb et al., 2000). However, apart from a few studies such as these, there is a relative lack of epidemiological data about patterns of co-morbidity of SD with depression and anxiety in the general population (Lieb et al., 2007).

Much of the evidence in our review is based on cross-sectional studies, hence it is difficult to ascertain a causal inference. We can hypothesize a number of possible mechanisms. The first possibility is that SD and depression and anxiety are essentially variants of the same underlying mental disorder. In support of this hypothesis is the fact that the relationship between SD and depression and anxiety is both strong and universal, demonstrated in a range of settings and countries. There is robust literature, from LMIC and HIC, that patients possess awareness of psychological symptoms but choose

to present only somatic symptoms or somatic components of psychological symptoms when seeking help (Parker et al., 2001; Patel et al., 1995, 1997, 1998).

The second plausible mechanism is that the association is explained due to shared risk factors. This would imply that the two disorders are distinct, but frequently co-exist because of their shared etiologies. There is certainly strong evidence to support this hypothesis with both CMD and SD being associated with similar risk factors, for example, female gender, low socioeconomic status and adverse life events, and difficulties. Women who experience stress due to social difficulties, such as economic difficulties and conflict with family members, are much more likely to experience somatic symptoms characteristic of both SD and depression (Patel et al., 2008).

Finally, there is the possibility that one disorder is a risk factor for the other. We found one study which clearly showed that CMD was associated with incident SD (Patel et al., 2006) while a second prospective study found an association between antenatal CMD with postnatal SD, although this study did not measure the incident SD (Senturk et al., 2012). We did not find any study that assessed the relationship between SD leading to incident depression and/or anxiety. However, a prospective longitudinal study from Europe demonstrated that depression predicted the first onset of secondary SD (Lieb et al., 2002). The analysis of the retrospective cohort study, however, has shown a different causal direction for this association. More than three quarters (78%) of the respondents with a concomitant lifetime depression and SD reported that the SD had an earlier onset than the depression and SD was reported as the primary condition in 75% of those cases with co-morbid depression (Frohlich et al., 2006).

Not with standing the mechanism of the relationship, which is likely to be multidimensional, our findings speak to more than 30 years of anthropological research that has attended to the relationship between somatic symptoms and psychological distress, with a focus on women living in LMIC. This research demonstrates that women use physical idioms to communicate psychological distress, thereby demonstrating a strong association between somatic symptoms and depression and anxiety. Medical anthropologists have used various theoretical frameworks to demonstrate how social and psychological suffering become embodied and identified in somatic symptoms, such as 'cultural syndromes' (Good, 1977), 'idioms of distress' (Nichter, 1981, 2010), and 'somatic modes of attention' (Csordas, 1993). Anthropological studies underscore the common ways in which women use

somatic symptoms to communicate social and psychological problems. For example, in his landmark study, Nichter describes the use of 'idioms of distress' such as menstrual pain, headaches and back pain by Havik Brahmin women in India to communicate social and psychological suffering. Kleinman's research demonstrates the interconnection of physical pain and neurasthenia with depression among women in China (Kleinman, 1986). Oths describes how illness results from a complex biocultural interaction of stressful life experiences with gender, age, and the life cycle in the Andes (Oths, 1999). Kohrt and colleagues demonstrate a strong association between depression and *jhum-jhum*, a form of paraesthesia (subjective numbness or tingling), in rural Nepal (Kohrt, 2005). Similarly, Weller and Baer show a strong association between the idioms of distress *susto* (fright) and *nervios* (nerves), both having physical symptoms, with depression in urban Mexico (Weller et al., 2008). A cross-cultural study of *susto*, *nervios* and *ataque de nervios* involving Spanish and Hispanic American populations demonstrated that people hold multiple models of distress and disorder which influences clinical presentations and help-seeking behaviour (Dura-Vila & Hodes, 2012). Nicaraguan women situate the *dolor de cerebro* ('brainache') in relation to their persistent worries about the impact of death, abandonment, and outmigration on personal and family well-being. Their pain is meaningful primarily as an embodied expression of the distress they experience as they confront the often-overwhelming circumstances of hardship in their local social worlds (Yarris, 2011). A similar study from Peru found that women's attribution of their headache was aligned with individual and shared notions of suffering within larger contexts of social dislocation (Darghouth et al., 2006). These anthropological projects underscore the common ways in which women use somatic symptoms to communicate social and psychological problems. Ultimately, SD may be explained in terms of the way bodily perceptions are processed; symptom perception is, in part, determined by environmental, emotional, and cognitive characteristics, such as specific cognitive illness schemes (Patel et al., 2008; Pereira et al. 2007). Kirmayer and Young have proposed that somatization is a concept that reflects the dualism inherent in Western biomedical practice, whereas in other traditions of medicine such as Chinese and Ayurvedic medicine there is no sharp distinction between 'mental' and 'physical' aspects of health (Kirmayer & Young, 1998). People from traditional cultures may not distinguish between the emotions of anxiety, irritability and depression because they tend to express distress in somatic terms (Parker et al., 2001) or they may organize their concepts of dysphoria in ways different from Western ones.

A main limitation of this review is that only indexed English-language journals were reviewed. It is difficult to make conclusive remarks about the association between SD and depression and/or anxiety because of the heterogeneity of measures used across the studies; as standard terminology are rarely used to describe somatic problems or even mental health problems; and because most studies were cross-sectional. All studies in this review reported a positive association between SD and CMD, suggesting the possible presence of publication bias. However, strong association between SD and depression and anxiety has also been found in studies based on high income countries; there is a large body of ethnographic evidence that supports and explains the mechanism of such an association. We therefore believe that our analysis of the current data communicates the true association between SD and depression and anxiety in women in LMIC.

The question of whether SD and CMD are the same primary disorder remains unanswered. Prospective population-based research with systematic characterization of SD and CMD in diverse settings is needed to address this question. In the meantime, what our review clearly demonstrates is that, in community and primary healthcare studies with women in LMIC, SD are closely linked with depression and anxiety. Twinned with the findings that somatic symptoms are the most common presentations of CMD in LMIC, we suggest that it may not be useful to distinguish SD from CMD at the primary care level. Thus, service providers at the primary care level should be sensitized to recognize the medically unexplained somatic manifestations as expression of underlying CMD. Indeed, there is substantive evidence that the treatments of SD and CMD share similar modalities (Mayou, 2007; Sumathipala, 2007). Such an integrated, 'transdiagnostic' approach may not only greatly simplify the integration of mental healthcare in primary care, but also contribute towards the reduction of the treatment gap – a key goal of global mental health.

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