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bulletin 80

When musculoskeletal conditions and mental disorders occur together

Summary

- Musculoskeletal conditions and mental disorders cause few deaths but much pain, disability and distress. Both are common and are recognised as major health concerns. Their occurrence together in the same person (known as *comorbidity*) complicates their treatment and management.
- This bulletin presents the most reliable, robust and up-to-date estimates of the number of people with both musculoskeletal conditions and mental disorders; estimates that are important in assessing the need for integrated care.
- More than 6.1 million Australians aged 16–85 years suffer from a musculoskeletal condition at a point in time (38% of that population) and 3.2 million (20%) experience a mental disorder in a 12-month period.

(summary continued overleaf)

Contents

- Over 1.5 million people (10% of Australians aged 16–85 years) had at least one musculoskeletal condition and one mental disorder in the preceding 12 months. The number of females experiencing this comorbidity (862,000) was greater than the number of males (671,000).The extent of comorbidity increased sharply in each successive age group until 45–54 years, after which it decreased sharply.
- There were 470,000 more Australians who had both a musculoskeletal condition and a mental disorder in 2007 than would be expected if occurrences of the two conditions were independent of one another.
- Published studies suggest that causal pathways are more likely to be from musculoskeletal conditions to mental disorders than the reverse, although the latter can also occur. Overall, in 2007, 25% of people with a musculoskeletal condition also had a mental disorder, the most common of which were anxiety disorders.
- The clear association between musculoskeletal conditions and mental disorders found in this study emphasises the need for health-care providers to be aware of and provide for a multidisciplinary approach to the management of this comorbidity.

Introduction

Musculoskeletal conditions and mental disorders can be both severe and persistent illnesses, contributing significantly to levels of ill health. Musculoskeletal conditions, which include arthritis, osteoporosis and back pain, result in few deaths but cause significant pain and disability. They severely limit a person's ability to perform everyday tasks at home and at work (AIHW 2008). Mental disorders include the common disorders of anxiety and depression, as well as less common or low-prevalence disorders, such as schizophrenia. Although fewer deaths are attributed to mental disorders (other than their high association with suicide) than other leading health problems, they are the cause of much distress and disability in the population (AIHW 2010).

The occurrence together of musculoskeletal conditions and mental disorders in the same person, known as *comorbidity*, often complicates treatment and management plans. While some issues remain specific to each condition or disorder, the standard treatment of mental disorders may need to be modified in view of the physical changes associated with a musculoskeletal condition or with the medication used for its treatment. Similarly, the management of musculoskeletal conditions may need to be modified in the presence of a mental disorder.

Since the clinical management of people with comorbid conditions can be more complex and time consuming than for those with single conditions, information about the prevalence of comorbidity should help assess the need for more integrated care. This bulletin documents the comorbidity of musculoskeletal conditions and mental disorders in Australia with that aim in mind.

The nature of musculoskeletal conditions

Musculoskeletal conditions are common and varied. They are characterised by high prevalence, generally late age of onset, long duration and low fatality. They are also significant contributors to physical disability.

There are more than 200 forms of musculoskeletal conditions, including various types of arthritis, which affect the joints, bones, muscles and their attachments to each other. Their symptoms and problems may arise from the overuse of joints, congenital anomalies, metabolic or biochemical abnormalities, infections, inflammation, trauma and cancer.

The most commonly occurring musculoskeletal conditions are back pain and various forms of arthritis. Other well-known conditions include osteoporosis, slipped disk, gout, systemic lupus erythmatosus (SLE or lupus), 'frozen shoulder' and scoliosis. A brief description of some common musculoskeletal conditions is given in Box 1.

Box 1: Common musculoskeletal conditions

Arthritis	A group of conditions involving inflammation of the joints, causing pain, stiffness, deformity and disability. More than 100 different forms of arthritis are recognised, prominent among which are osteoarthritis, rheumatoid arthritis and gout.
Osteoarthritis	The most common form of arthritis, caused mainly by the accumulated wear of the cartilage in joints. This wear and tear disrupts the normal function of the joint, causing pain and functional limitations. The condition affects mainly the hands, spine, and weight-bearing joints, such as the hips, knees and ankles.
Rheumatoid arthritis	A chronic, inflammatory, autoimmune disease in which the immune system attacks the tissues lining the joints. The inflamed joints often cause pain, heat and swelling, and can lead to functional limitations and severe disability.
Gout	Gout is characterised by painful swelling in various joints, in particular the great toe. The condition, resulting from poor handling of uric acid by the body, affects the entire body but manifests chiefly in joints.
Back pain	Pain coming from the spine, muscles, nerves or other structures in the back. It mostly arises as a direct result of disease or injury involving spinal tissues. However, the pain arising from disease or injury of tissues and organs outside the spine can also be perceived as coming from the back (referred pain).
Osteoporosis	A condition where the bone density thins and weakens, resulting in an increased risk of fracture—sometimes described as 'porous bones'. Osteoporotic fractures are common among the elderly, with the spine, hip and wrist being common sites.

Symptoms and complications

A key symptom in musculoskeletal conditions is pain (acute or chronic). Acute pain lasts a few seconds or longer but wanes as healing occurs. Chronic pain, on the other hand, such as that seen in people with arthritis and back pain, ranges from mild to severe, and can last weeks, months, years, or a lifetime. The pain may originate from different sources, such as inflammation of the tissue that lines the joints, the tendons and the ligaments, muscle strain and fatigue. A combination of these factors may contribute to the intensity of the pain. Another common presentation of musculoskeletal conditions is stiffness, occurring more commonly with rheumatoid arthritis.

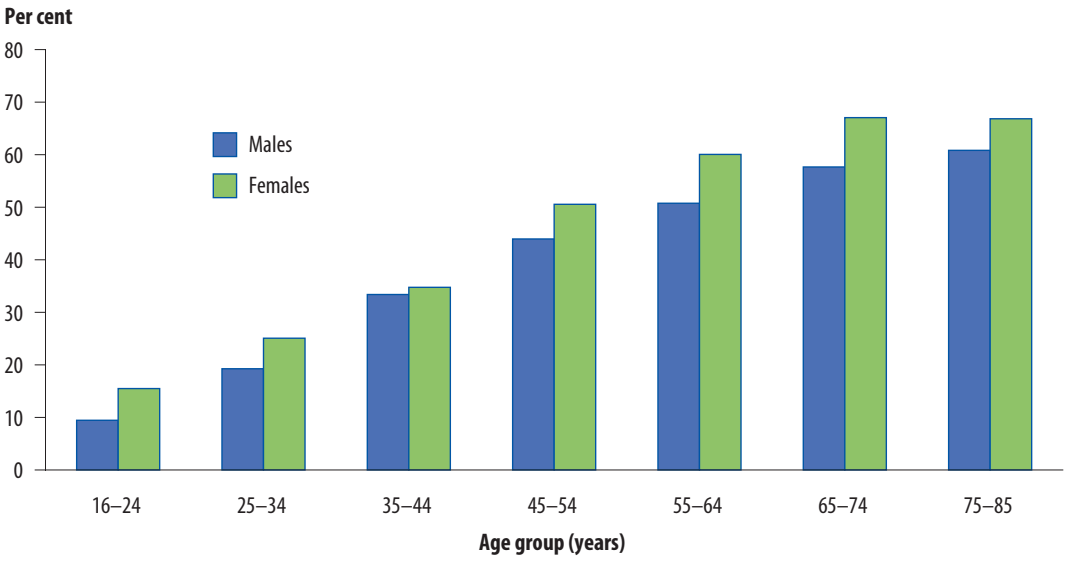
Musculoskeletal conditions can affect various organs of the body and can lead to a variety of non-musculoskeletal complications. Poor health outcomes, such as osteoporotic fractures, deformities and inability to move around, can add to the physical limitations.

Age of onset

The age of onset of musculoskeletal conditions ranges from childhood to old age, depending on the specific condition. While the onset of juvenile arthritis is by definition limited to persons younger than 16 years, osteoarthritis and osteoporosis mostly begin in older adults. Rheumatoid arthritis on the other hand tends to develop usually around ages 25 to 45 years, while most cases of osteoporosis commence at ages 45 years and over.

Prevalence

Over 38% (6.1 million) Australians aged 16–85 years have a musculoskeletal condition. Prevalence is lower at younger ages and increases steadily in older ages. Overall prevalence is higher among females than males in each age group (Figure 1).



Source: AIHW analysis of ABS 2007 Survey of Mental Health and Wellbeing CURF.

Figure 1: Prevalence of musculoskeletal conditions, by age and sex, 2007

Different groups of musculoskeletal conditions have quite different age distributions, reflecting differences in their age of onset, variation in incidence and their relatively low death rates. While back pain and disc disorders are common among young adults and continue to remain prominent through mid-life, osteoarthritis is the major musculoskeletal condition in the older age groups. Osteoporosis is most prominent in ages 55 years and over.

In view of their differing age distributions and prevalence, as well as available data, musculoskeletal conditions are broadly grouped into two categories for this report, as follows:

- arthritis, rheumatism and gout
- back and neck problems.

The nature of mental disorders

Mental disorders affect the perceptions, emotions, behaviours and resulting wellbeing of individuals. There are several types of mental disorders with varying degrees of severity. Use of the term 'mental disorder' implies the existence of a clinically recognisable set of symptoms or behaviours, associated in most cases with distress and interference with personal functions (WHO 1992). Mental disorders often require treatment, including hospitalisation, to alleviate the symptoms and for rehabilitation (AIHW 1998).

Major types of mental disorders

Some of the major types of mental disorders in Australia are anxiety disorders, depression, schizophrenia and substance-use disorders. These are described in Box 2. The more common types of mental disorders, namely anxiety, affective and substance-use disorders, were included in the 2007 Australian Bureau of Statistics (ABS) National Survey of Mental Health and Wellbeing and are thus covered in this report.

Box 2: Major types of mental disorders

Anxiety disorders, characterised by symptoms of anxiety, fear and avoidance behaviour, include panic disorders, phobias, obsessive–compulsive disorder and post-traumatic stress disorder. Anxiety disorders have a lifetime adult prevalence rate of more than 26% in Australia (ABS 2008).

Depression is a mood disorder characterised by feelings of sadness, loss of interest or pleasure in nearly all activities, feelings of hopelessness and suicidal thoughts or self-blame. It is one of the most common mental disorders in the community. Depression, along with dysthymia *(a mild form of depression)* and bipolar affective disorder, collectively referred to as affective disorders, have a lifetime adult prevalence rate of 15% in Australia (ABS 2008).

Substance-use disorders result from harmful use or dependence on drugs and/or alcohol. Their lifetime prevalence rate in Australian adults is around 25% (ABS 2008).

Schizophrenia is a group of severe psychiatric disorders that are characterised by major disturbances in thought, emotion and behaviour. The symptoms may include delusions, hallucinations, and disorganised thoughts and behaviours. Schizophrenia usually starts in late adolescence or early adult life, and occurs in less than 1% of the adult population.

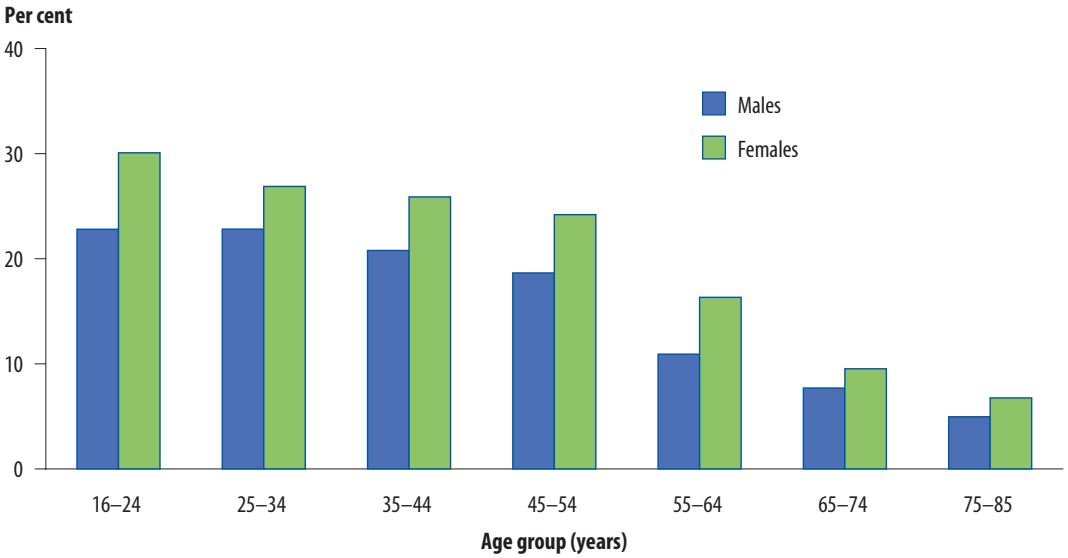
Age of onset

Many mental disorders begin in childhood or adolescence, with approximately half of all mental disorders starting in mid-teens and three-quarters by the mid-20s (Kessler et al. 2007; Scott et al. 2008). Certain anxiety and affective disorders have the earliest age of onset. The median age of onset of some anxiety disorders is 7–11 years; for affective disorders it is a bit later in adulthood. Substance-use disorders often start in early adulthood (18–29 years).

Early age of onset of mental disorders is often associated with greater severity, persistence and lack of treatment response (Kessler & Wang 2008).

Prevalence

Twenty per cent (3.2 million) of Australians aged 16–85 years have mental disorders, with their prevalence higher among females than males at each age group (Figure 2). Unlike the age distribution observed for musculoskeletal conditions, where prevalence increases with age, the prevalence of mental disorders decreases with age. The pattern and symptoms of mental disorders differ between the sexes. While anxiety disorders and affective disorders, including depression, are more common in females, substance-use disorders occur more commonly among males (Klose & Jacobi 2004).



Source: AIHW analysis of ABS 2007 Survey of Mental Health and Wellbeing CURF.

Figure 2: Prevalence of mental disorders, by age and sex, 2007

Comorbidity—its causes and consequences

What is comorbidity?

Comorbidity occurs when a person has two or more health conditions at the same time. In this report, comorbidity refers to the presence of any musculoskeletal condition with one or more mental disorders.

Causes of comorbidity

The simultaneous occurrence of heath conditions can happen by chance alone. Some conditions can coexist in one person by coincidence, without any causal relationship between them. However, often health conditions occur together because of some direct or indirect causal relationships between them.

There is a growing recognition that functional limitations and chronic pain associated with musculoskeletal conditions predispose people to a variety of mental health problems. Long-term functional limitations and activity restrictions may contribute to anxiety, depression and feelings of helplessness. Chronic pain can further add to irritability, insomnia and exhaustion, often accompanied by withdrawal from work and social activities. These factors together may also lead to substance abuse and other socio-behavioural problems.

While the functional limitations and pain aspects of musculoskeletal conditions could be a significant contributory factor in the development or exacerbation of mental problems, there is growing evidence that mental disorders can also have a deleterious effect on physical illness, pain and disability (Moussavi et al. 2007). The pathways are proposed to be through the immune, endocrine and nervous systems, along with behavioural risk factors, such as poor diet, lack of physical activity and substance use.

The evidence so far

Most of the clinical and community studies that have shown credible relationships between musculoskeletal conditions and mental disorders have been between specific conditions and disorders, such as arthritis and depression. Arthritis, in particular rheumatoid arthritis, has been reported to be associated with mood and anxiety disorders (Dickens et al. 2002; Krishnan et al. 2002; Sareen et al. 2006). Studies of chronic back or neck pain have also been shown to be associated with depression (Carroll et al. 2004; Currie & Wang 2004). Most of the reported associations are stronger in particular age segments, such as young people or older persons (Keefe et al. 2002; LeBovidge et al. 2003), and not across the full age spectrum. Limited or no association has been noted between arthritis and substance-use disorders (Brown et al. 1996; He et al. 2008; Shih et al. 2006).

No broad-level population-based studies of comorbidity between the musculoskeletal conditions and mental disorders have previously been reported in Australia. This possibly reflects concern that any study of association at this level of assessment would have limited

public health relevance because of the limited overlap between the ages of onset of the two sets of conditions and their very different life courses. While most of the mental health problems and disorders arise early in life but have low prevalence in older age groups, the bulk of musculoskeletal conditions arises and persists in older age groups. This makes comorbidity difficult to quantify through community-based population surveys alone.

This report

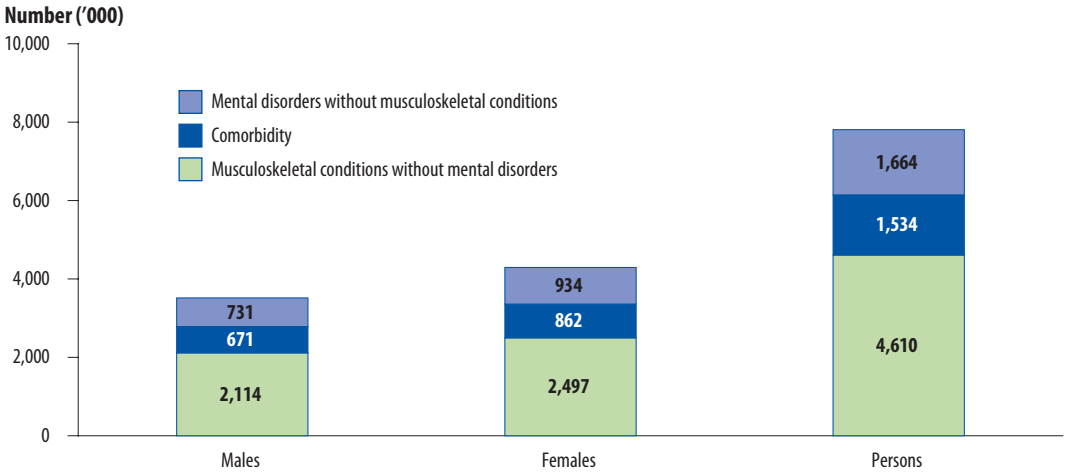
The report examines the current extent of comorbidity in Australia between musculoskeletal conditions and mental disorders. Estimates are presented by age group, and for males and females separately. The observed prevalence rates of comorbidity are compared with those that might be expected to occur purely by chance alone.

The estimates in this report are derived from the Confidentialised Unit Record File (CURF) of the National Survey of Mental Health and Wellbeing conducted by the ABS from August to December 2007. The survey collected information from approximately 8,800 Australians aged 16–85 years.

Unless otherwise stated, the prevalence of people with musculoskeletal conditions relates to those with a long-term condition at the time of the survey, and prevalence of people with mental disorders relates to the 12-month period prior to the interview.

Prevalence of comorbidity

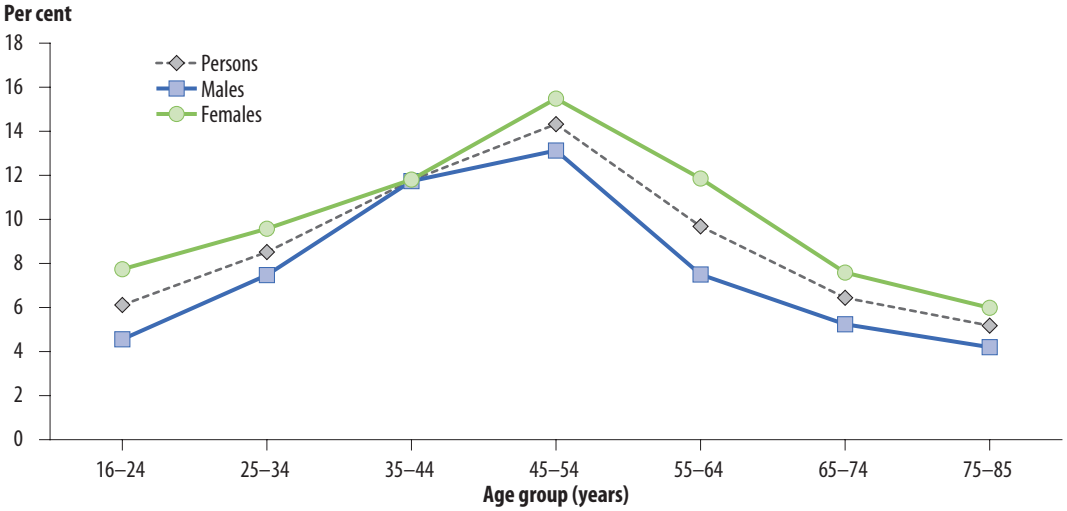
During 2007, over 1.5 million people (10% of the population aged 16–85 years) had at least one musculoskeletal condition long term and at least one mental disorder in the previous 12 months (Figure 3 and Table A1). The number of females experiencing this comorbidity (862,000) was greater than the number of males (671,000).



Note: The estimates are for people aged 16–85 years.
Source: AIHW analysis of ABS 2007 Survey of Mental Health and Wellbeing CURF.

Figure 3: People with musculoskeletal conditions, mental disorders and their comorbidity, by sex, 2007

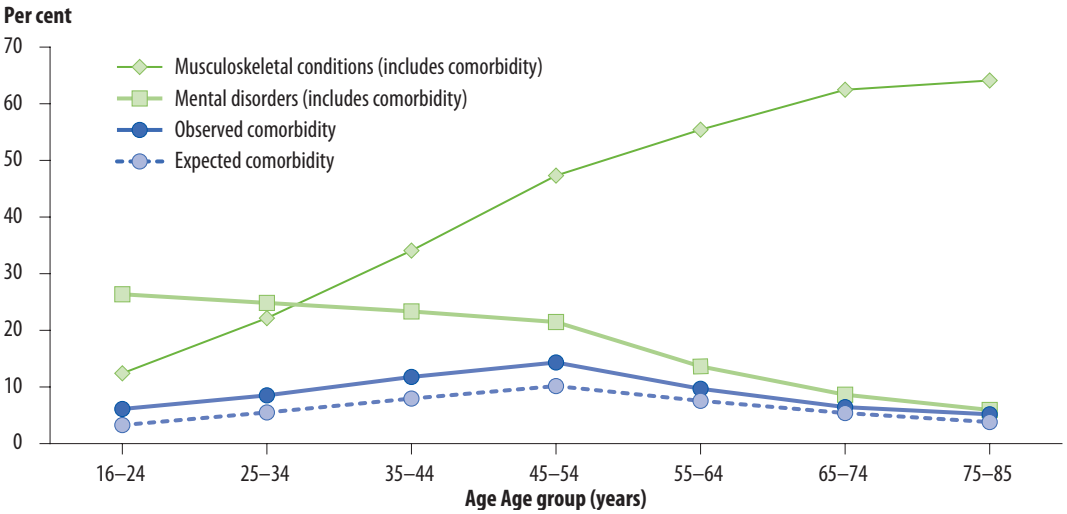
The age-specific prevalence rate of comorbidity increased sharply in each successive age group until 45–54 years, after which it decreased sharply. Rates were generally higher in females than in males but the patterns over the entire age range were similar (Figure 4).



Source: AIHW analysis of ABS 2007 Survey of Mental Health and Wellbeing CURF.

Figure 4: Age-specific prevalence rates of comorbidity between musculoskeletal conditions and mental disorders, by sex, 2007

The reason for this pattern is shown in Figure 5. The prevalence of musculoskeletal conditions is lower in the younger age groups and greater in the older age groups, while the reverse is true for mental disorders. The prevalence of comorbidity reflects the increasing prevalence of musculoskeletal conditions in younger age groups and the decreasing (and lower) prevalence of mental disorders in older age groups.



Source: AIHW analysis of ABS 2007 Survey of Mental Health and Wellbeing CURF.

Figure 5: Age-specific prevalence rates of musculoskeletal conditions, mental disorders and their comorbidity, 2007

Observed and expected prevalence of comorbidity

Musculoskeletal conditions and mental disorders may occur together by chance. Under the assumption that the occurrence of musculoskeletal conditions and mental disorders are independent, the expected comorbidity rate is estimated by multiplying the two observed prevalence rates together. For example, in Table 1, the observed prevalence rates for musculoskeletal conditions and mental disorders for ages 16–24 years are 12.4% and 26.4% respectively. Multiplying these together gives an expected comorbidity rate of 3.3%. This compares with an observed rate of 6.1%, a difference of 2.8%, which is equivalent to 72,000 people (2.8% of 2,545,000, see Table A1). The difference between the observed and expected numbers of people with both musculoskeletal conditions and mental disorders is labelled 'excess comorbidity' in Table 1. This calculation was performed for each age group and summed across the age groups.

In 2007, the observed comorbidity between musculoskeletal conditions and mental disorders was greater than that expected at each age group and totalled 470,000 people overall (Table 1). The higher than expected comorbidity suggests an association between the two conditions.

Table 1: Observed and expected comorbidity, musculoskeletal conditions and mental disorders

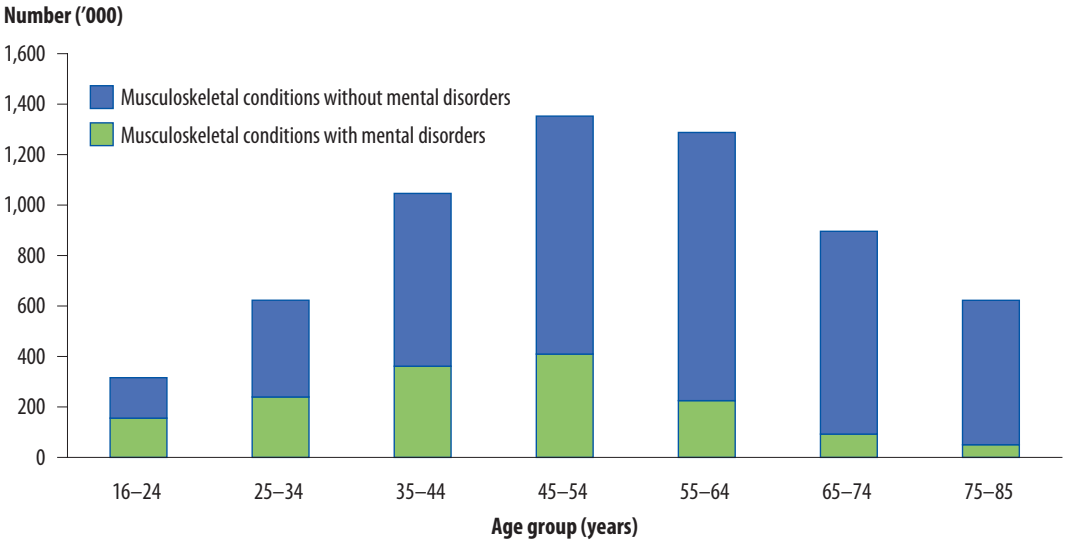
Age group	Musculoskeletal conditions	Mental disorders	Observed comorbidity	Expected comorbidity	Excess comorbidity
		Rate (per cent)			Number
16–24	12.4	26.4	6.1	3.3	72,000
25–34	22.2	24.8	8.5	5.5	85,000
35–44	34.1	23.3	11.8	8.0	117,000
45–54	47.3	21.5	14.3	10.2	119,000
55–64	55.4	13.6	9.7	7.6	49,000
65–74	62.5	8.6	6.4	5.4	15,000
75–85	64.1	5.9	5.2	3.8	13,000
Total	**38.4**	**20.0**	**9.6**	**7.7**	**470,000**

Note: See Table A1 for population numbers. Excess comorbidity is estimated as the observed comorbidity rate x population – expected comorbidity rate x population for each age group. The total is the sum of the age-specific estimates.

Source: AIHW analysis of ABS 2007 Survey of Mental Health and Wellbeing CURF.

Comorbidity among people with musculoskeletal conditions

Figure 6 shows the number of people with musculoskeletal conditions, partitioned into those with mental disorders and those without. At ages 16–24 years, almost one-half (49%) of people with a musculoskeletal condition also had a mental disorder. This proportion decreased to 8% in the oldest age group. Overall, 25% of people with a musculoskeletal condition had a mental disorder.

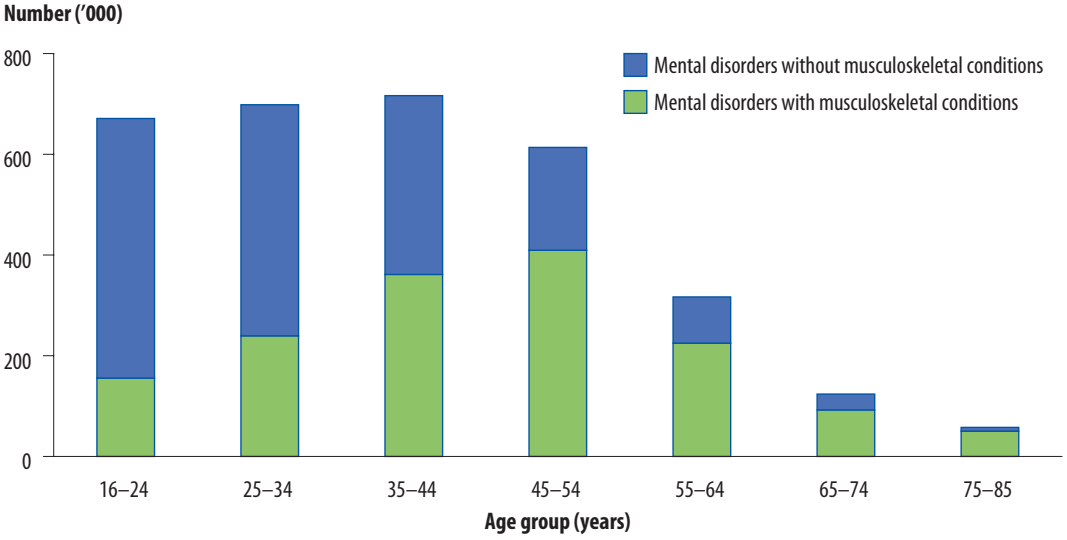


Source: AIHW analysis of ABS 2007 Survey of Mental Health and Wellbeing CURF.

Figure 6: Presence of mental disorders in people with musculoskeletal conditions, 2007

Comorbidity among people with mental disorders

Figure 7 shows the number of people with mental disorders, partitioned into those with musculoskeletal conditions and those without them. At ages 16–24 years, about a quarter (23%) of people with a mental disorder had a musculoskeletal condition. This proportion increased to 87% in the oldest age group. Overall, 48% of people with a mental disorder had a musculoskeletal condition.



Source: AIHW analysis of ABS 2007 Survey of Mental Health and Wellbeing CURF.

Figure 7: Presence of musculoskeletal conditions in people with mental disorders, 2007

Types of mental disorders in people with musculoskeletal conditions

This section examines the prevalence of some broad types of mental disorders in people with broad groups of musculoskeletal conditions and identifies which combinations of musculoskeletal conditions and mental disorders are most common. It only includes people who have both a musculoskeletal condition and a mental disorder. Musculoskeletal conditions are taken as the reference population because the causal pathways are more likely to be from musculoskeletal conditions to mental disorders than the other way around.

As already noted, about 25% of people with a musculoskeletal condition also had a mental disorder (over 1.5 million Australians aged 16–85 years). The prevalence rate of mental disorders was higher in people with back and neck problems (28%) than those with arthritis, rheumatism and gout (21%) (Table 2).

Table 2: Types of mental disorders in people with various musculoskeletal conditions, 2007

Musculoskeletal condition	Any anxiety disorder	Any affective disorder	Any substance-use disorder	Any mental disorder
		Number ('000)		
Arthritis, rheumatism, gout	529	220	108	657
Back and neck problems	961	472	274	1,266
Any musculoskeletal condition	1,161	559	326	1,542
		Rate (per cent)		
Arthritis, rheumatism, gout	16.6	6.9	3.4	20.6
Back and neck problems	21.4	10.5	6.1	28.2
Any musculoskeletal condition	18.9	9.1	5.3	25.1

Notes
1. Based on 12-month prevalence.
2. Ages 16–85 years.
3. Numbers and percentages may not add up correctly because more than one musculoskeletal condition and mental disorder may be recorded.
Source: AIHW analysis of ABS 2007 Survey of Mental Health and Wellbeing CURF.

Anxiety disorders are the most common group of mental disorders among people with a musculoskeletal condition, as they are among the general community. All classes of mental disorders (anxiety, affective or substance-use) were more commonly present in people with back and neck problems than with arthritis, rheumatism and gout.

Differences by sex

Overall, prevalence rates of mental disorders are higher in females with a musculoskeletal condition (28%) than males (22%) (Table 3). The higher prevalence of mental disorders among females with musculoskeletal conditions is apparent for both anxiety and affective disorders. However, substance-use disorders are more common among males with musculoskeletal conditions than among females. The pattern in people with musculoskeletal conditions reflects the prevalence in the general community.

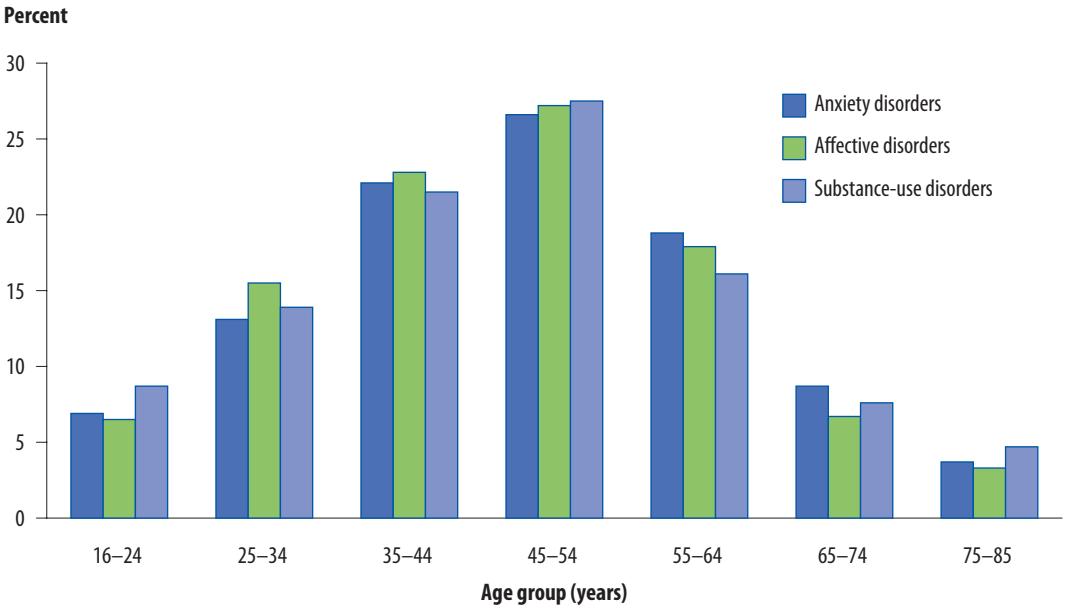
Table 3: Types of mental disorders in people with musculoskeletal conditions, by sex, 2007

Sex	Any anxiety disorder	Any affective disorder	Any substance-use disorder	Any mental disorder
		Number ('000)		
Males	469	222	201	671
Females	697	334	128	862
Persons	**1,165**	**556**	**323**	**1,534**
		Rate (per cent)		
Males	16.8	7.9	7.2	21.9
Females	20.8	9.9	3.6	28.2
Persons	**18.9**	**9.1**	**5.3**	**25.1**

Notes
1. Based on 12-month prevalence.
2. Ages 16–85 years.
3. Numbers and percentages may not add up correctly because more than one musculoskeletal condition and mental disorder may be recorded.
Source: AIHW analysis of ABS 2007 Survey of Mental Health and Wellbeing CURF.

Age distributions

As noted previously, comorbidity between musculoskeletal conditions and mental disorders is most common in the 45–54 years age group (Figure 8). The comorbidity age distributions were broadly similar across all three mental disorder types.



Note: Based on 12-month prevalence.
Source: AIHW analysis of ABS 2007 National Survey of Mental Health and Wellbeing CURF.

Figure 8: Age-specific comorbidity of various types of mental disorders in people with musculoskeletal conditions, 2007

Conclusion

This study shows there is significant comorbidity between musculoskeletal conditions and mental health problems. One-quarter of adults aged 16–85 years with a musculoskeletal condition also had a mental disorder. From the other perspective, nearly half of all people in that age group with a mental health disorder also had a musculoskeletal condition. This results in 1.5 million people (10% of those aged 16–85 years) having at least one musculoskeletal condition and one mental health disorder.

This also suggests the existence of an underlying relationship between the two conditions, with the observed comorbidity being higher than expected. While the causal directions are not fully understood, their high comorbidity indicates the need for health-care providers to be aware of the complex treatment and management requirements of people with long-term musculoskeletal conditions.

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Appendix: Statistical table and methods

Table A1: People with musculoskeletal conditions, mental disorders and their comorbidity by age and sex, 2007

	Population	Musculoskeletal conditions		Mental disorders		Comorbidity	
Age group	Number ('000)	Number ('000)	Rate (per cent)	Number ('000)	Rate (per cent)	Number ('000)	Rate (per cent)
				Persons			
16–24	2,545	315.9	12.4	671.1	26.4	155.6	6.1
25–34	2,812	622.9	22.2	698.4	24.8	239.5	8.5
35–44	3,070	1,046.2	34.1	716.4	23.3	361.4	11.8
45–54	2,859	1,352.5	47.3	613.7	21.5	409.5	14.3
55–64	2,324	1,287.8	55.4	316.7	13.6	225.0	9.7
65–74	1,434	896.1	62.5	123.8	8.6	92.4	6.4
75–85	971	622.6	64.1	57.7	5.9	50.3	5.2
16–85	**16,015**	**6,143.9**	**38.4**	**3,197.8**	**20.0**	**1,533.7**	**9.6**
				Males			
16–24	1,299	122.9	9.5	296.3	22.8	59.2	4.6
25–34	1,414	272.3	19.3	322.5	22.8	105.6	7.5
35–44	1,534	512.4	33.4	319.0	20.8	180.1	11.7
45–54	1,405	617.8	44.0	262.1	18.6	184.5	13.1
55–64	1,159	588.2	50.8	126.5	10.9	86.9	7.5
65–74	699	403.2	57.7	53.8	7.7	36.6	5.2
75–85	440	268.2	60.8	21.9	5.0	18.5	4.2
Total	**7,952**	**2,784.9**	**35.0**	**1,402.1**	**17.6**	**671.4**	**8.4**
				Females			
16–24	1,246	193.0	15.5	374.8	30.1	96.4	7.7
25–34	1,398	350.6	25.1	375.8	26.9	133.9	9.6
35–44	1,536	533.8	34.8	397.5	25.9	181.3	11.8
45–54	1,453	734.7	50.6	351.6	24.2	225.0	15.5
55–64	1,165	699.6	60.1	190.2	16.3	138.1	11.9
65–74	735	492.9	67.1	70.0	9.5	55.8	7.6
75–85	530	354.4	66.8	35.8	6.8	31.7	6.0
Total	**8,064**	**3,359.0**	**41.7**	**1,795.8**	**22.3**	**862.3**	**10.7**

Notes
Musculoskeletal conditions and mental disorders include comorbidity.
Comorbidity in the occurrence of musculoskeletal conditions and mental disorders together in one person.
Rate is the number as a percentage of the corresponding population.

Source: AIHW analysis of ABS 2007 National Survey of Mental Health and Wellbeing CURF.

Definitions and methods

Prevalence

Prevalence refers to the number or proportion (of cases, instances, etc.) present in a population at a given time. Prevalence data provide an indication of the extent of the presence of a condition and may have implications for the provision of services in a community. The formula for calculating prevalence is:

$$\text{Prevalence} = \frac{\text{Number of existing cases*}}{\text{Population at risk*}}$$

* during specified time period

Most of the information available on the prevalence of arthritis and musculoskeletal conditions is based upon the existence of these conditions long term, that is the conditions have been present or are likely to be present for 6 months or more. Acute, one-off cases, lasting less than 6 months, are excluded from the count.

Age-specific rates

Age-specific rates are calculated by dividing the number of cases occurring in each specified age group by the estimated resident population for that age group. In this publication, the rates are expressed as cases per 100 population (that is, as a percentage).

Excess comorbidity

Excess comorbidity is estimated as the difference between the observed comorbidity and the expected comorbidity, that is:

Excess comorbidity = observed comorbidity – expected comorbidity.

The observed comorbidity is the number of people who had at least one musculoskeletal condition and at least one mental disorder.

The expected comorbidity is the estimated number of people who might be expected to have had at least one musculoskeletal conditions and one mental disorder. Assuming that the occurrence of musculoskeletal conditions and mental disorders are independent, the expected comorbidity is the product of the two observed prevalence rates times the population number.

Note: This method produces a conservative (underestimate) of 'excess' comorbidity.

Worked example

For example, using Table A1:

For persons aged 16–24 years the observed comorbidity is 155,600 (a rate of 6.1%).

The observed prevalence rates are 12.4% for musculoskeletal conditions and 26.4% for mental disorders. Their product is 3.3% which is the expected comorbidity rate. The comorbidity (number) is 3.3% × 2,545,000 = 83,300.

Excess comorbidity = 155,600 – 83,300 = 72,000 (to the nearest thousand).

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Board Chair
Hon. Peter Collins, AM, QC

Director
Penny Allbon

Any enquiries about or comments on this publication should be directed to:

Dr Naila Rahman
National Centre for Monitoring Arthritis and Musculoskeletal Conditions
Australian Institute of Health and Welfare
GPO Box 570
Canberra ACT 2601
Phone: (02) 6244 1057
Email: naila.rahman@aihw.gov.au

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