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# **BURDEN OF ILLNESS**

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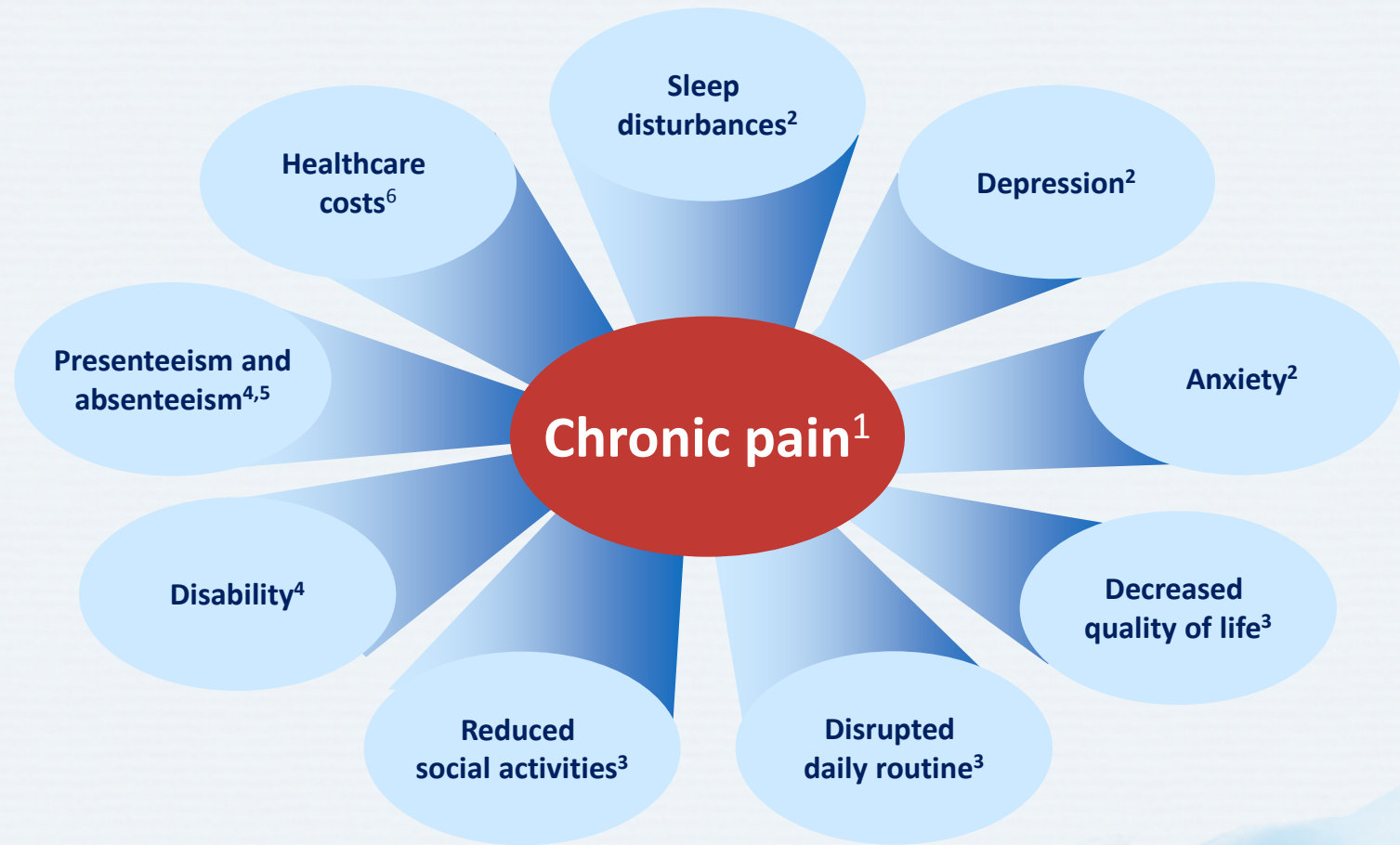
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# Overview

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# Impact of Chronic Pain

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1. Douglas C et al. *J Neurosci Nurs* 2008; 40(3):158-68; 2. Tang NKY et al. *J Sleep Res* 2007; 16(1):85-95;  
3. Hawker GA et al. *Osteoarth Cartil* 2008; 16(4):415-22; 4. Munce SE et al. *J Occup Environ Med* 2007; 49(11):1206-1211;  
5. Stewart WF et al. *JAMA* 2003; 290(18):2443-54; 6. Ritzwoller DP et al. *BMC Musculoskelet Disord* 2006; 7:72-81.

# Burden of Illness of Fibromyalgia

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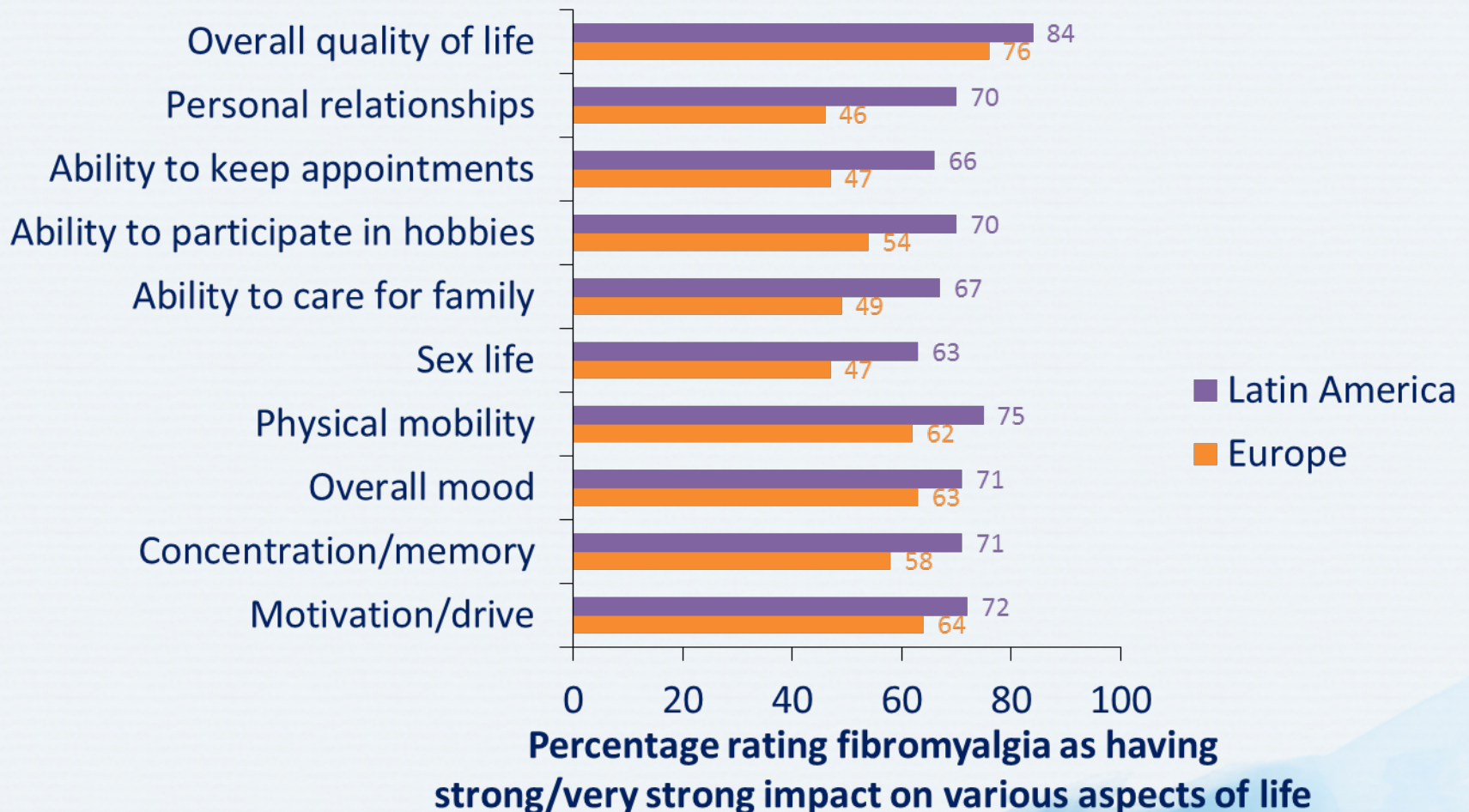
- An estimated 75% of people with fibromyalgia remain **undiagnosed**
- Imposes large economic burdens on society
- Significant adverse effects of patients' quality of life

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# Physical Burden

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# Patient-Reported Impact of Fibromyalgia



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# Economic Burden

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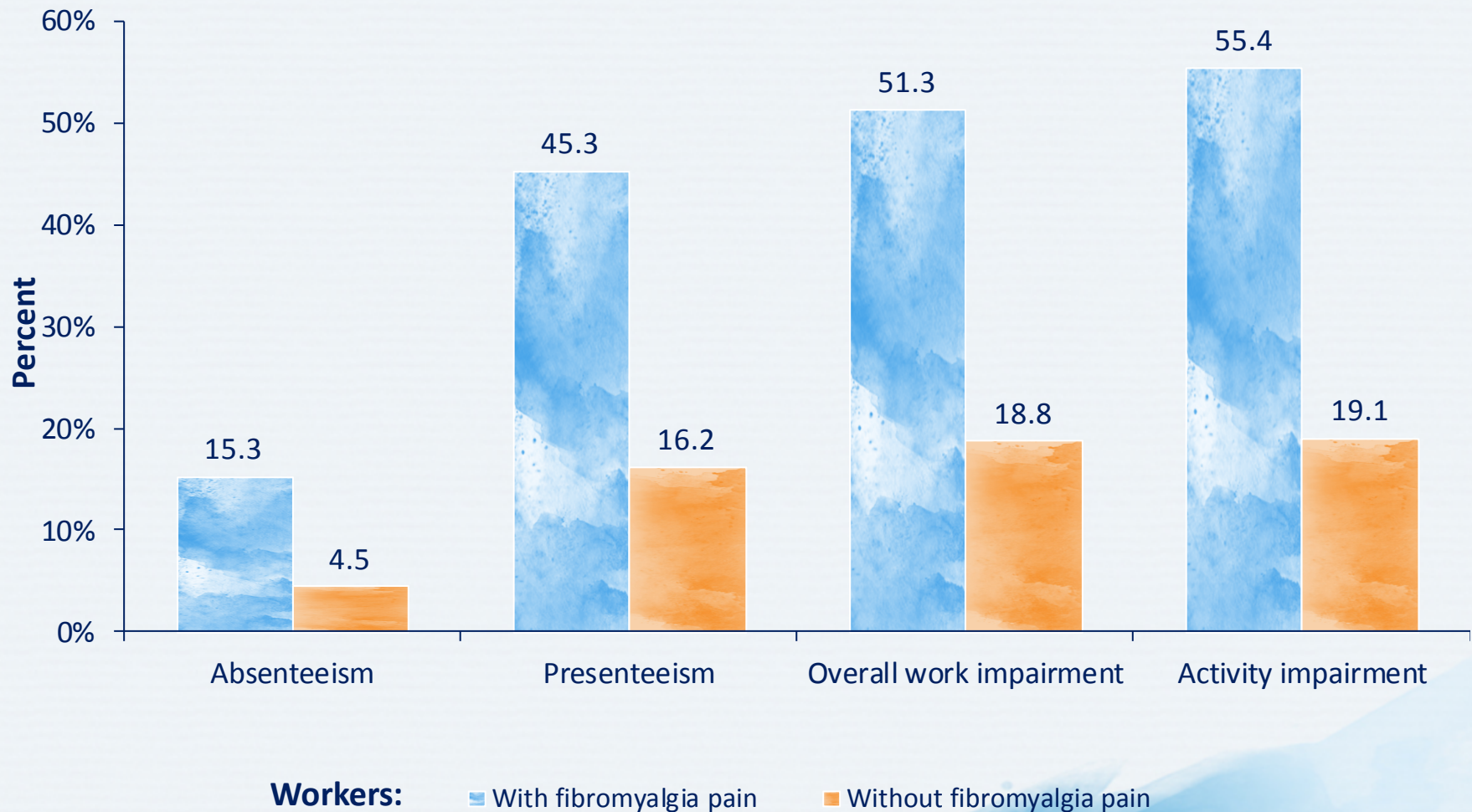
# Workers with Fibromyalgia Pain Have Lower Quality of Life Scores

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Quality of life scores from SF-12v2	Workers with fibromyalgia pain	Workers without fibromyalgia pain
Physical component summary	36.4	50.6
Mental component summary	41.7	47.3



# Workers with Fibromyalgia Pain Have Reduced Productivity



# Workers with Fibromyalgia Pain Have Higher Health Care Utilization

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Resource use in the past 6 months	Workers with fibromyalgia Pain (%)	Workers without fibromyalgia pain (%)
≥1 doctor visit	92.4	72.5
≥1 non-traditional health care visit	41.5	21.8
≥1 ER visit	23.9	11.7
≥1 hospitalization	11.4	6.0
Number of prescription medicines	9.0	1.9

ER = emergency room

Source: National Health and Wellness Survey (NHWS) 2008.

# Workers with Fibromyalgia Pain Have Increased Health Care Costs

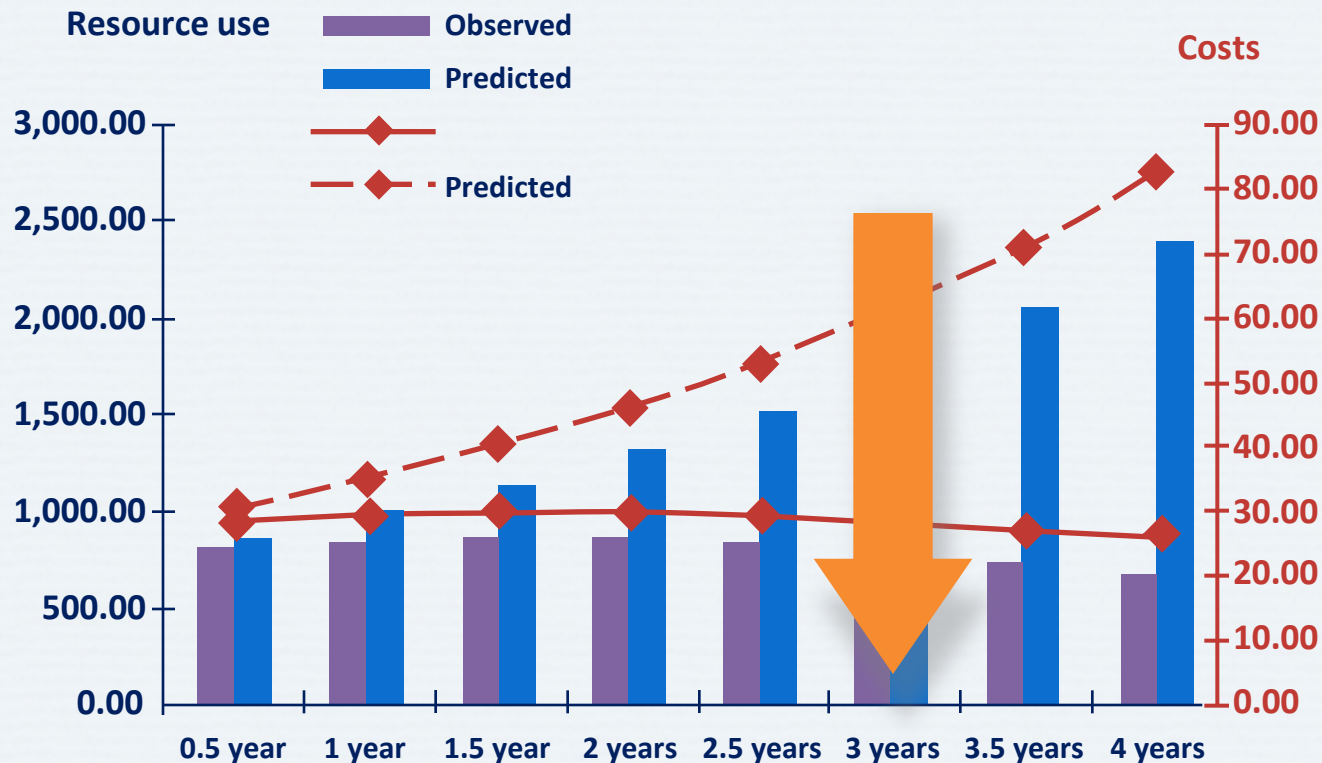
Average annual costs per worker	Fibromyalgia pain	No Fibromyalgia pain
<b>Direct costs</b>		
ER visit	\$594	\$229
Hospitalization	\$3410	\$1431
Physician visit	\$2078	\$777
Total direct costs	\$,082	\$2437
<b>Indirect costs</b>		
Lost income due to absenteeism	\$4760	\$1398
Lost income due to presenteeism	\$11,206	\$4871
Total Indirect costs	\$15,966	\$6269
<b>Total costs</b>		
Direct + indirect costs	\$22,048	\$8706

ER = emergency room

Source: National Health and Wellness Survey (NHWS) 2008.

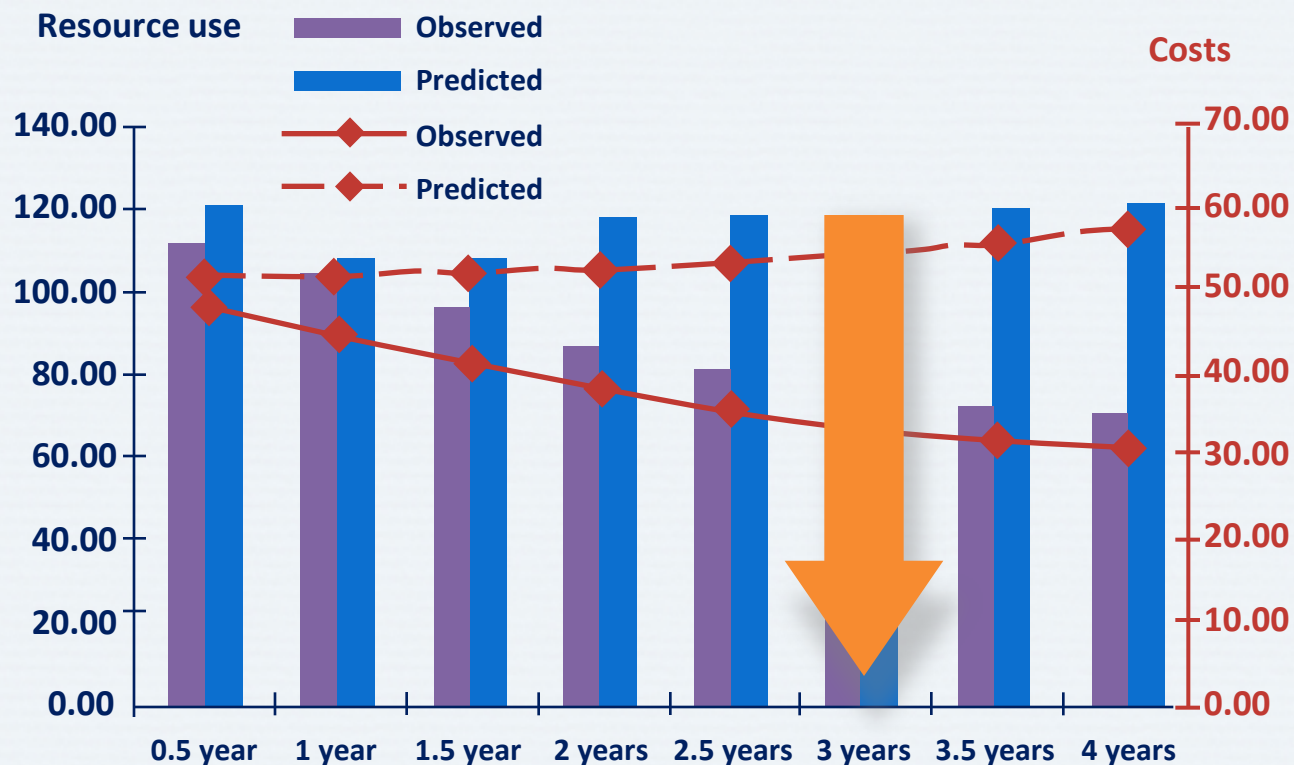
# Health Economic Consequences Related to the Diagnosis of Fibromyalgia

## Tests and Imaging



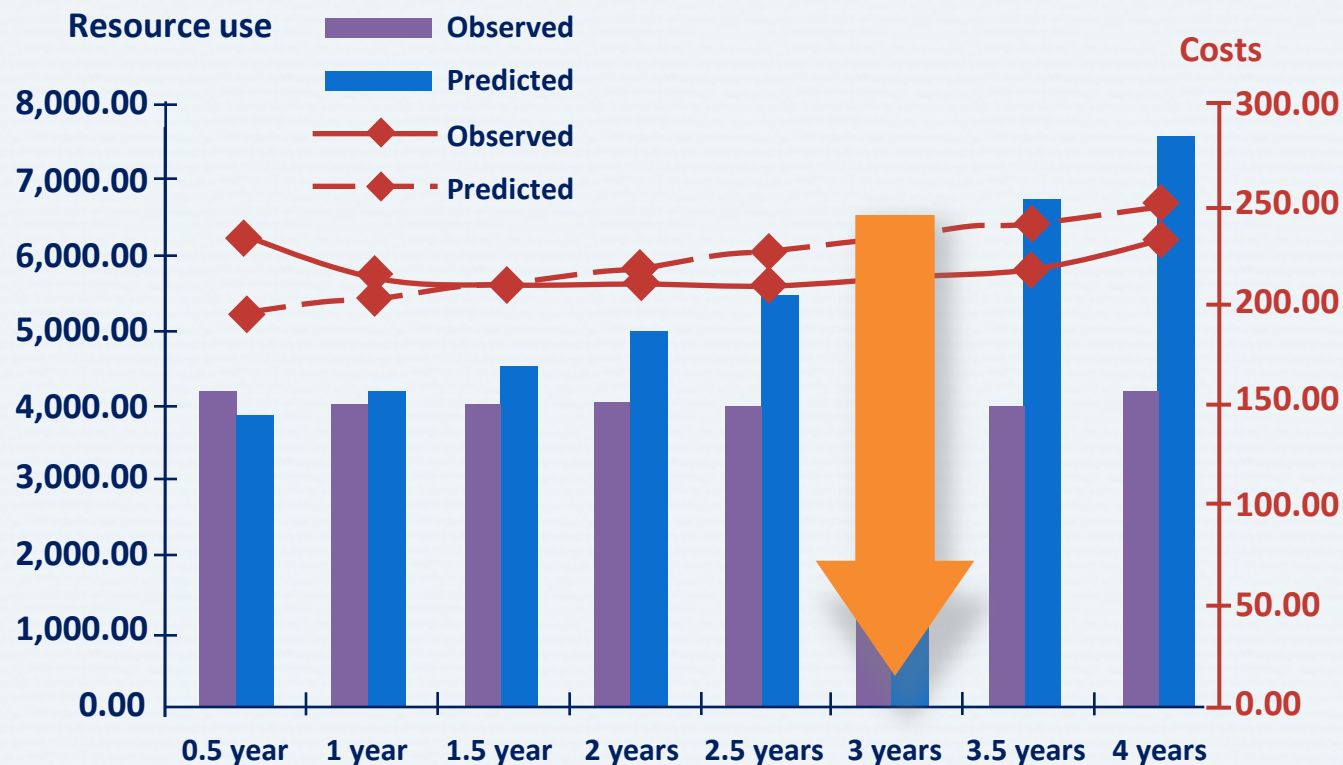
# Health Economic Consequences Related to the Diagnosis of Fibromyalgia

## Referrals



# Health Economic Consequences Related to the Diagnosis of Fibromyalgia

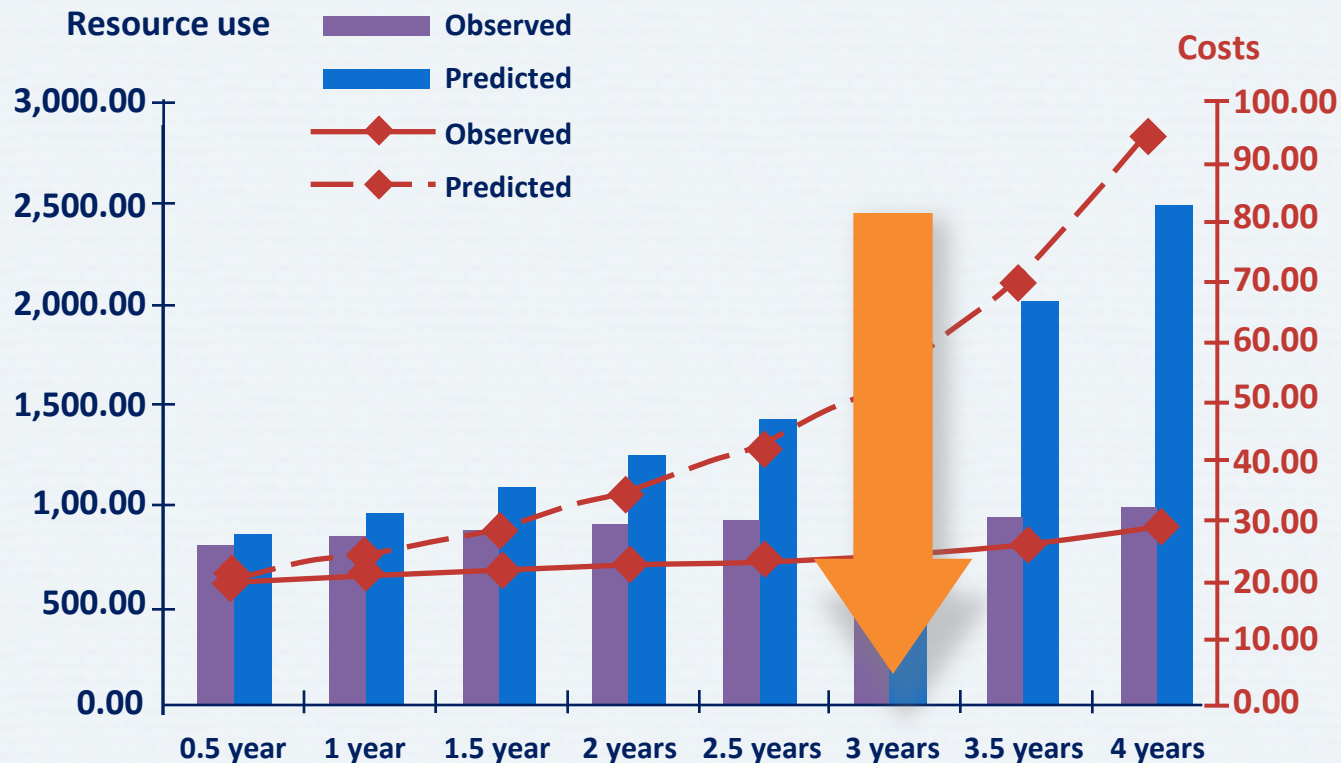
## General Practitioner Visits





# Health Economic Consequences Related to the Diagnosis of Fibromyalgia

## Drugs



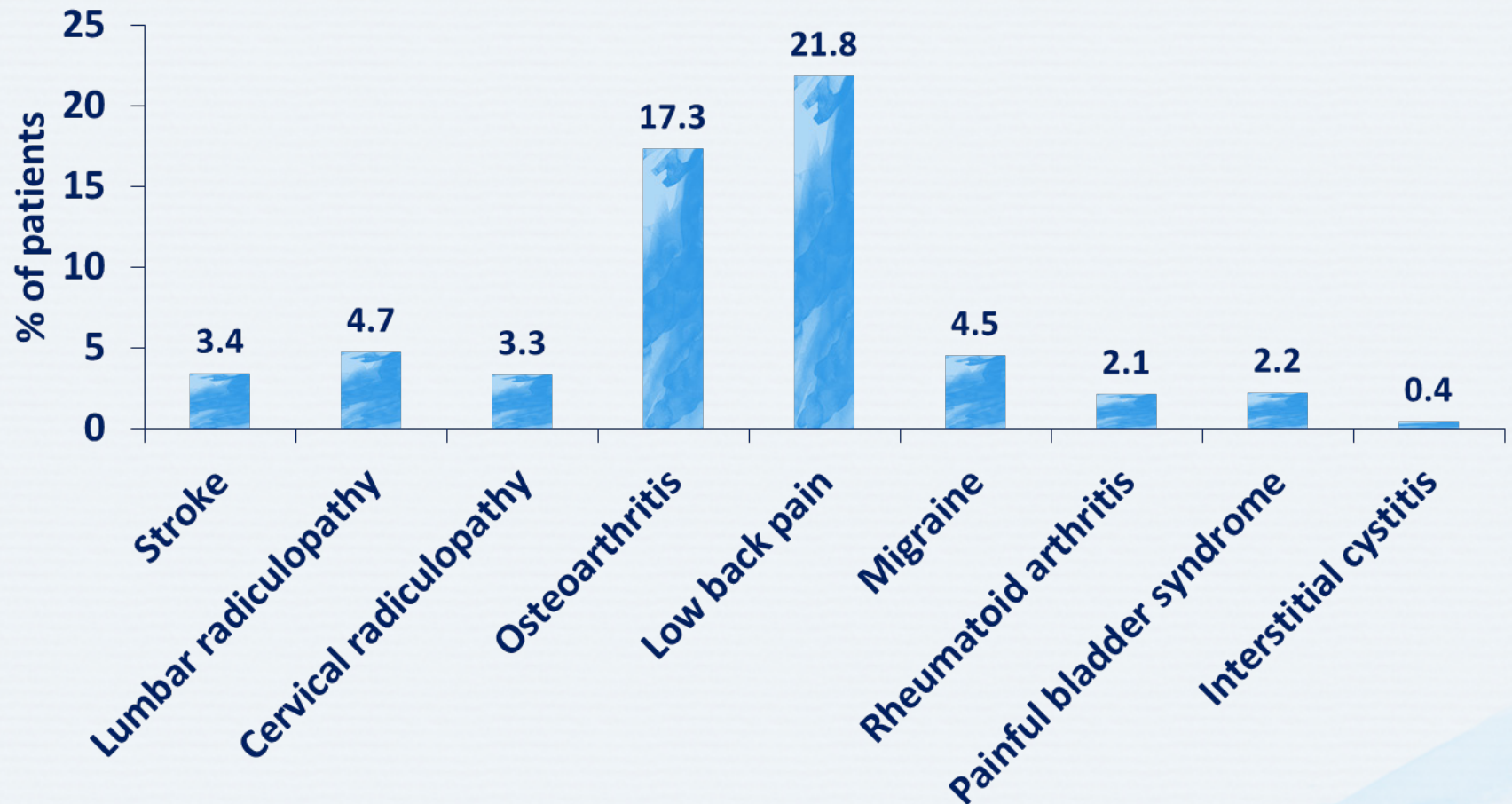
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# Comorbidities

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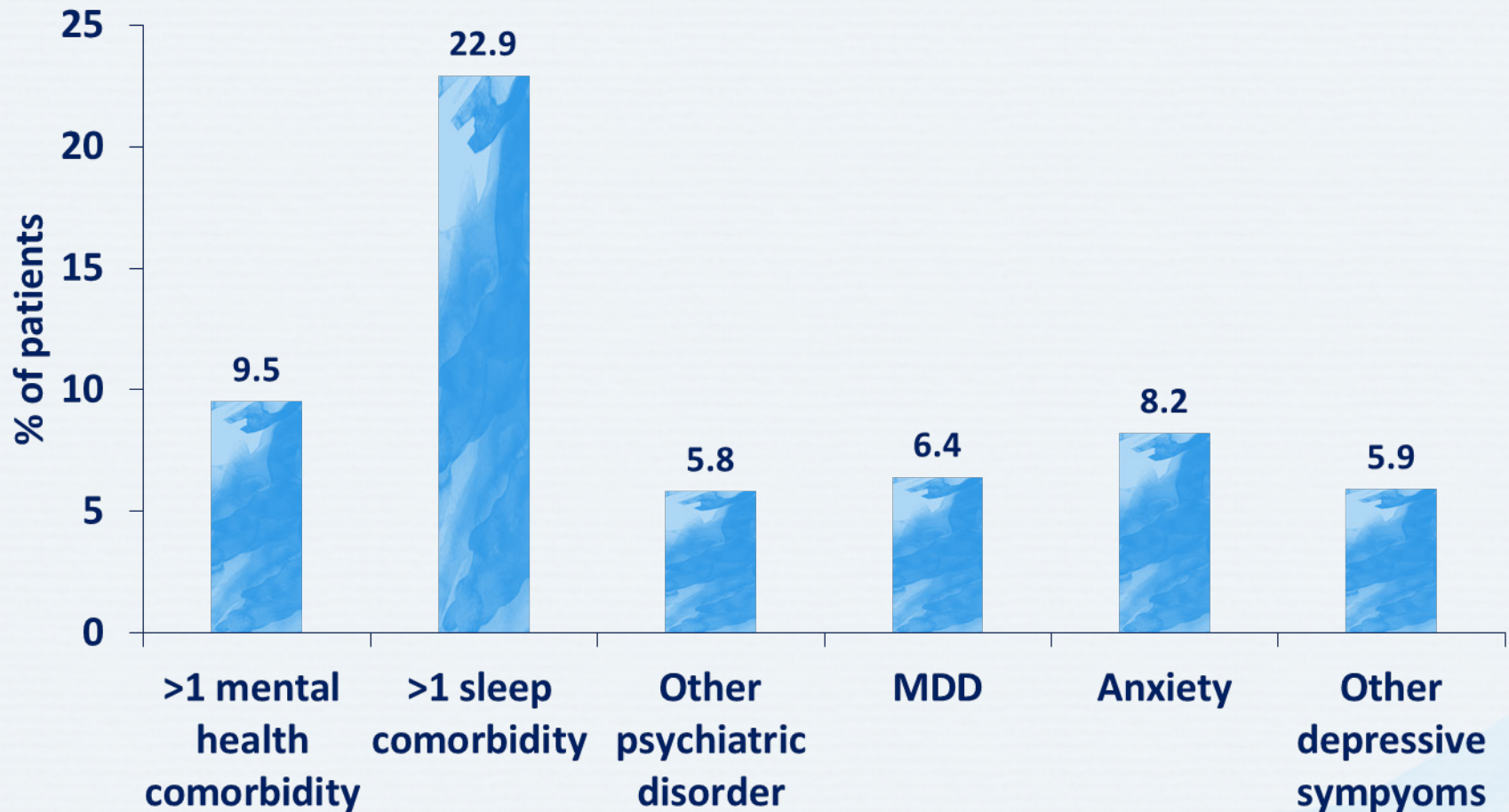
# Pain Comorbidities of Fibromyalgia



**Notes:** Infrequent comorbid conditions were omitted from the chart.

Davis JA *et al. J Pain Res* 2011; 4:331-45; Dworkin RH *et al. J Pain* 2010; 11(4):360-8; Riley GF. *Med Care* 2009; 47(7 Suppl 1):S51-5.

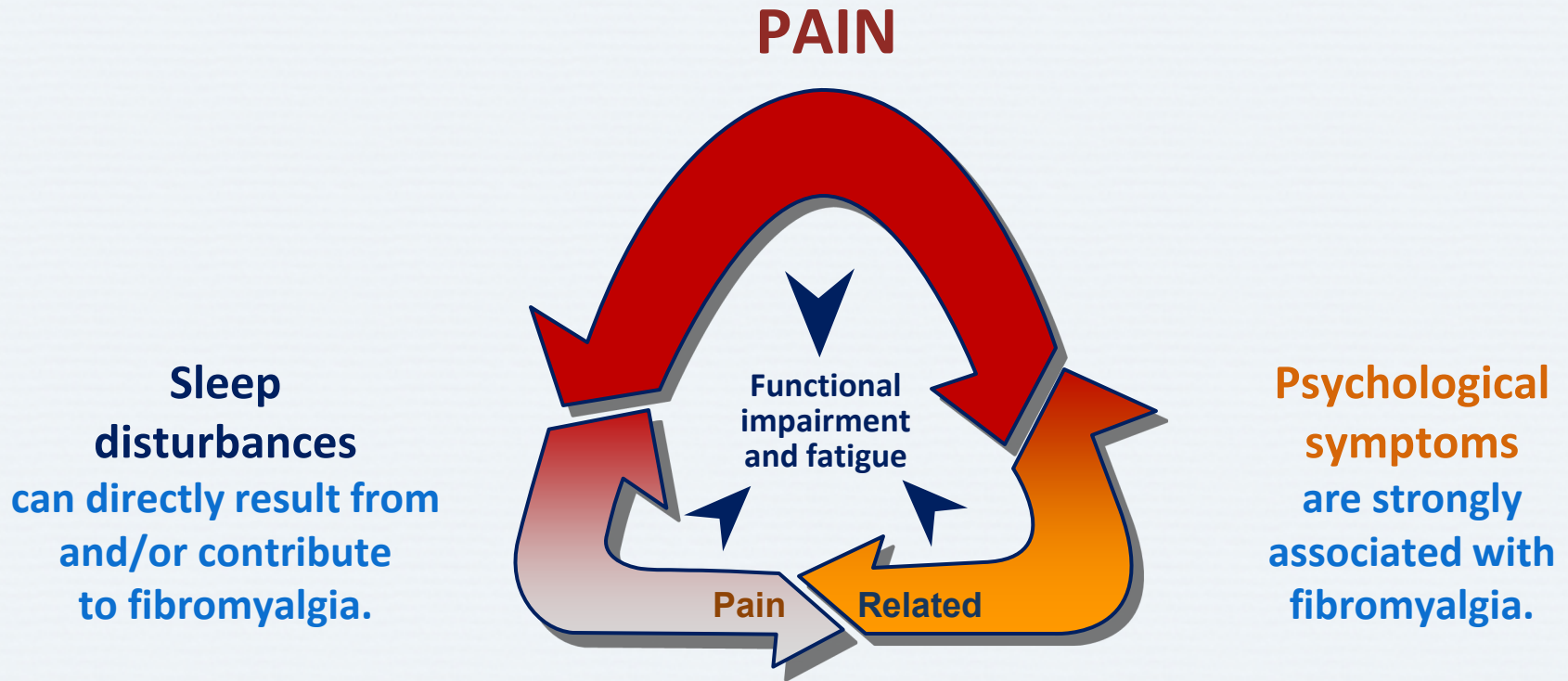
# Sleep and Mental Health Comorbidities of Fibromyalgia



**MDD = major depressive disorder**

Bijl RV et al. *Health Aff (Millwood)* 2003; 22(3):122-33; Davis JA et al. *J Pain Res* 2011; 4:331-45;  
Ram S et al. *Sleep Breath* 2010; 14(1):63-70; Riley GF. *Med Care* 2009; 47(7 Suppl 1):S51-5.

# The Paradigm of Pain: Interrelationship Among Pain, Sleep Disturbance and Psychological Symptoms



Management strategy for fibromyalgia patients is to **improve overall patient functionality.**

# Many Fibromyalgia Patients Have Cognitive Complaints: “Fibro Fog”

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- Compared to those without the condition, patients with fibromyalgia complain more often of:<sup>1</sup>
  - Mental confusion
  - Memory decline
  - Speech difficulty
- Performance on cognitive tests shows they have poorer performance than age-matched controls on tasks involving:<sup>2</sup>
  - Working memory
  - Recognition memory
  - Free recall
  - Verbal fluency
  - Verbal knowledge

# Sleep Disturbances and Fibromyalgia

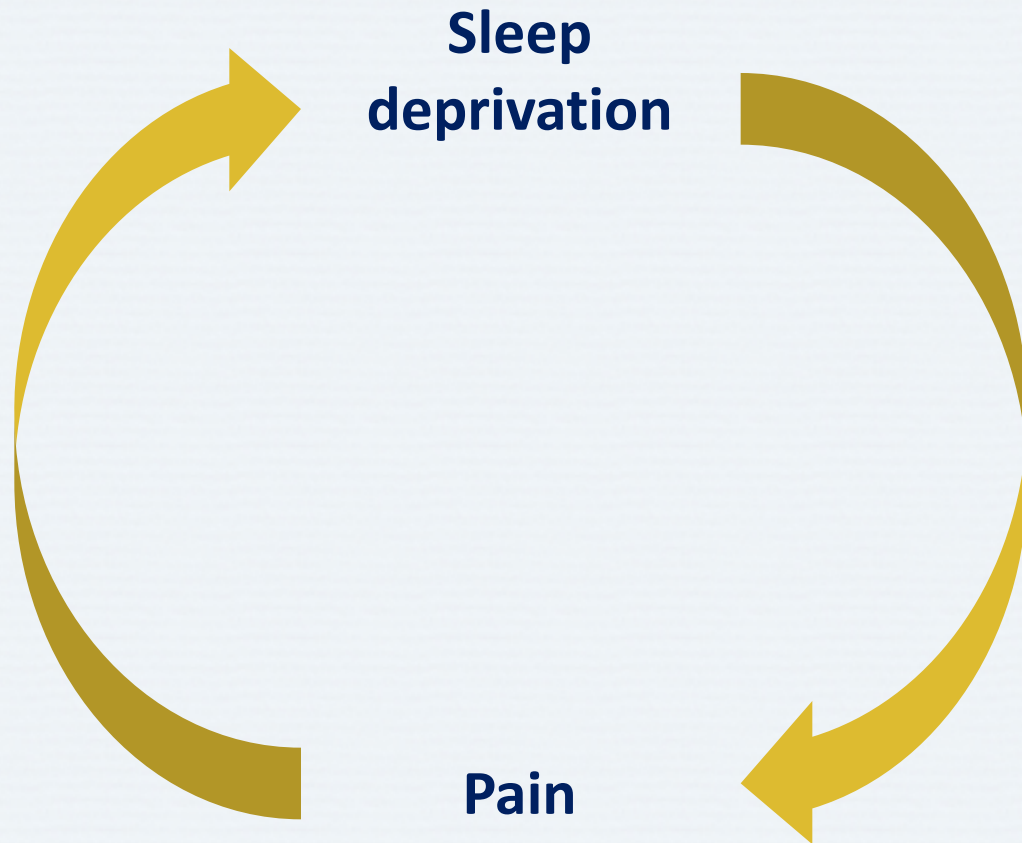
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- Fibromyalgia patients may complain of:
  - Non-restorative sleep
  - Early morning awakening
  - Insomnia
  - Poor sleep quality

# Sleep Deprivation and Pain

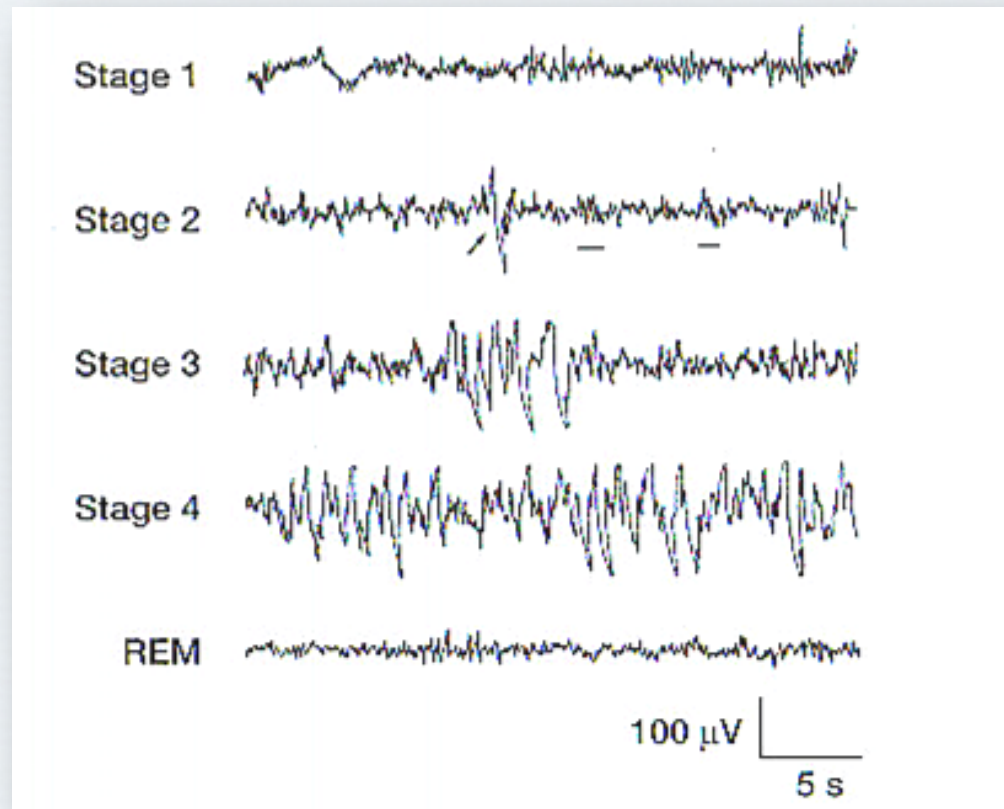
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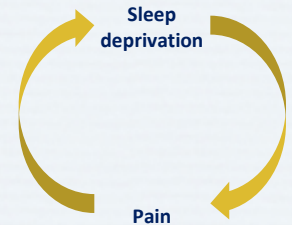
# Pain Disrupts Sleep

Noxious pain stimuli → Arousal → Delta waves decrease  
Alpha waves increase



# Pain Disrupts Sleep: Clinical Evidence

- Several longitudinal studies have suggested pain intensity prospectively predicts sleep disturbances
- However, prospective studies did not confirm sleep disturbances predict pain intensity
- May explain:
  - Lack of significant analgesic effects of hypnotics
  - Lack of association between cognitive behavioral therapy for insomnia and pain reduction

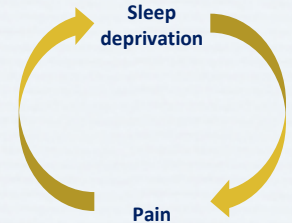




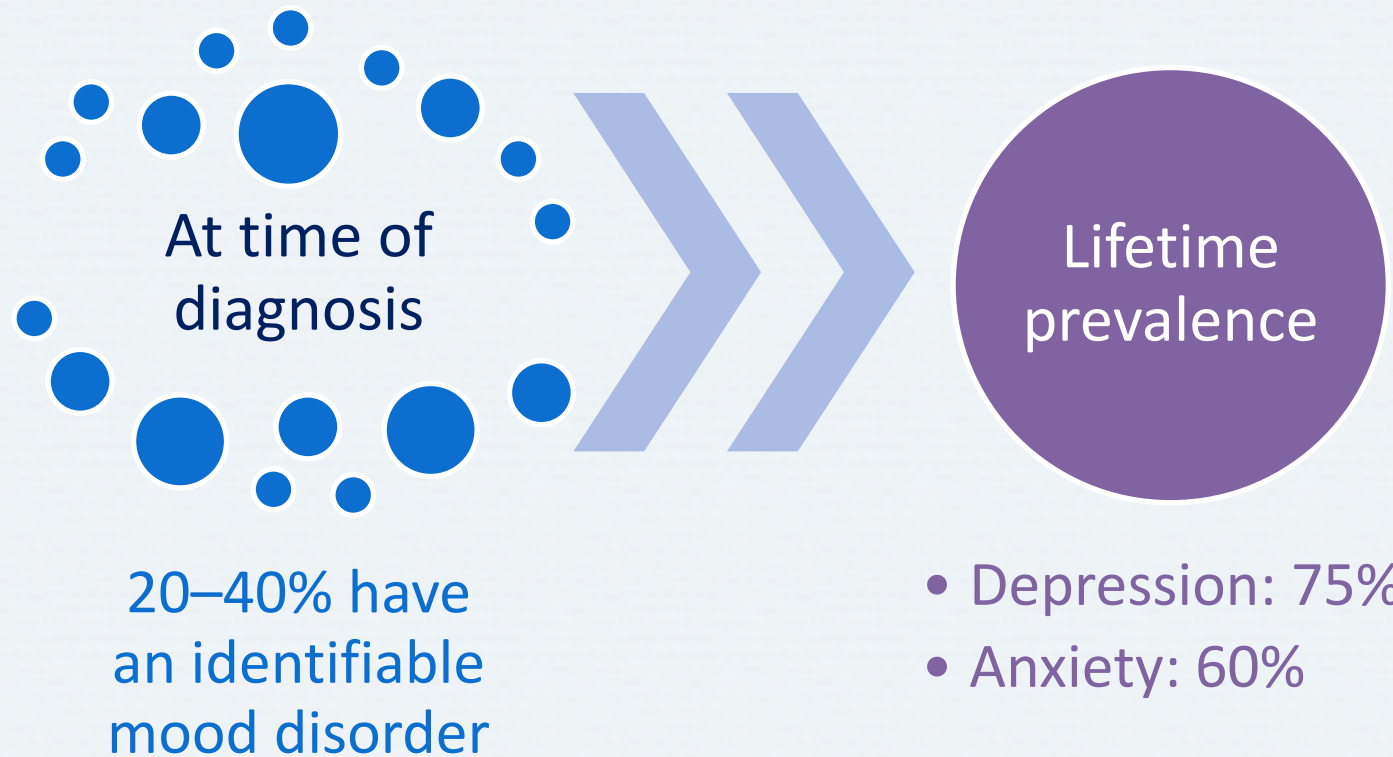
# How Sleep Disruption Contributes to Pain

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- Sleep deprivation leads to hyperalgesia
- Relationship between pain and sleep appears to be reciprocal
- Deprivation or disruption of slow-wave sleep and sleep continuity disturbances may be associated with hyperalgesia
- Concurrent management of disturbed sleep and pain may break the vicious circle and alleviate both problems



# Mood Disorders and Fibromyalgia



In many cases, depression or anxiety may be the result of chronic pain.

# Depression and Pain

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Prevalence of pain in depressed patients is 15–100%



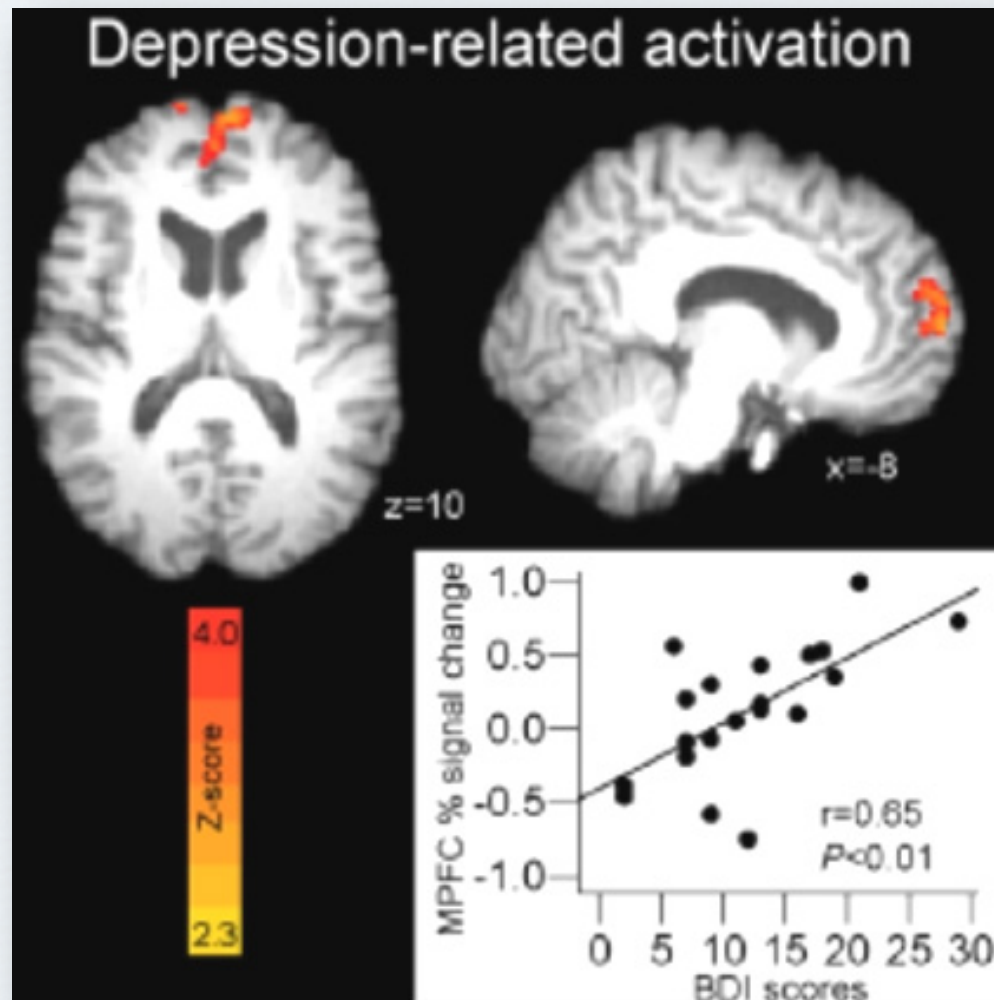
- Depressive symptoms rather than major depressive disorder
- Mostly musculoskeletal pain

Prevalence of major depressive disorder in patients with chronic pain is 15–50%



- Mostly in patients with multiple pain symptoms

# Pain Stimuli Activate Brain Areas Related to Depression

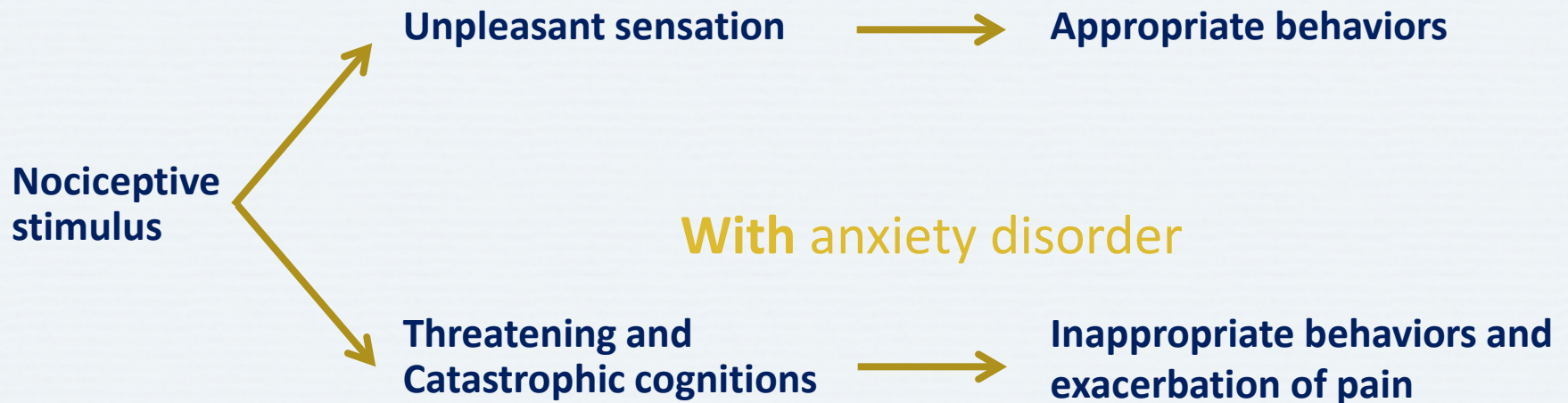


BDI = Beck Depression Inventory; MPFC = medial prefrontal cortex

Schweinhardt P *et al. Neuroimage* 2008; 40(2):759-66.

# Fear-Anxiety-Avoidance Model

**Without** anxiety disorder



**Anxiolytics or cognitive behavioral therapy are useful adjuvant treatments for patients with chronic pain**

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# Summary

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# Burden of Illness of Fibromyalgia: Summary

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- Fibromyalgia affects every aspect of a patient's life:
  - Activities of daily living
  - Ability to work
  - Sleep
  - Psychological well being
- Fibromyalgia represents a significant burden on health care resources
- Fibromyalgia is associated with sleep and mental health comorbidities
- Sleep disruption can exacerbate the symptoms of fibromyalgia