The Epidemiology of Chronic Pain

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Dr. Stewart is the principal investigator of the following grants to the Geisinger Center for Health Research

- Johnson and Johnson funded RCT of primary care management of low back pain using an expert care system
- Glaxo funded RCT of primary care management of headache using an expert system of care
- Pfizer funded retrospective analysis of electronic health record (EHR) data on patterns of care among primary care patients with low back pain
- Merck funded retrospective analysis of EHR data on patterns of care among primary care patients with migraine
- Centecor and UCB funded retrospective analyses of EHR data to model disease progression among Rheumatoid Arthritis patients
Focus on chronic pain epidemiology with emphasis on the common recurrent pain disorders

• AKA Chronic pain disorders with episodic manifestations

Chronic pain: Is it the product of a chronic progressive disease process?

Epidemiologic terms

• Prevalence
• Incidence
• Remission
# Chronic Pain State of Knowledge on Epidemiology

| Source of Pain | Common recurrent pain disorders are dominant but neuropathic and disease or event (e.g., injury, post-surgical) specific pain are also common. |
| Source of Data | Most of what is known is based on self-reported status and largely focused on single conditions. Extensive condition specific work on the reliability and validity of measurement tools. |
| Source of Costs | A majority of the costs are related to impaired function and limitations to work roles. For some pain disorders, like low back pain, health care costs are substantial. |
| Static versus Dynamic View of Disease | Most of the reported literature on pain disorders and chronic pain is represented by a static or cross-sectional view. Very limited longitudinal data. |
HOW COMMON IS CHRONIC PAIN?

Overall 2.8 fold variation in Prevalence Vs 1.7 fold variation with restricted set
DISABLING CHRONIC PAIN

Overall 2.1 fold variation in Prevalance vs 1.4 fold variation with restricted set.
## PAIN LOCATIONS PREVALENCE, CHRONICITY, AND IMPACT

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>PREVLENCE</th>
<th>DURATION &gt;3 MONTHS</th>
<th>OCCURS ON HALF DAYS+</th>
<th>HIGH IMPACT ON ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEADACHE</td>
<td>40%</td>
<td>66%</td>
<td>16%</td>
<td>11%</td>
</tr>
<tr>
<td>ABDOMINAL</td>
<td>23%</td>
<td>67%</td>
<td>30%</td>
<td>18%</td>
</tr>
<tr>
<td>BACK</td>
<td>39%</td>
<td>81%</td>
<td>45%</td>
<td>32%</td>
</tr>
<tr>
<td>NECK</td>
<td>31%</td>
<td>81%</td>
<td>47%</td>
<td>32%</td>
</tr>
<tr>
<td>SHOULDERTHE</td>
<td>29%</td>
<td>79%</td>
<td>51%</td>
<td>33%</td>
</tr>
<tr>
<td>HAND/WRIST</td>
<td>23%</td>
<td>77%</td>
<td>52%</td>
<td>37%</td>
</tr>
<tr>
<td>HIP/KNEE</td>
<td>28%</td>
<td>83%</td>
<td>55%</td>
<td>40%</td>
</tr>
<tr>
<td>ANKLE/FOOT</td>
<td>17%</td>
<td>80%</td>
<td>61%</td>
<td>42%</td>
</tr>
</tbody>
</table>

Windt et al, 2008
# CHRONIC PAIN: WHO GETS IT?

<table>
<thead>
<tr>
<th>FEATURE</th>
<th>PATTERN</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENDER</td>
<td>MORE COMMON IN FEMALES</td>
</tr>
<tr>
<td>AGE</td>
<td>VARIES BY CONDITION</td>
</tr>
<tr>
<td>EDUCATION &amp; INCOME</td>
<td>INVERSELY RELATED FOR SITE SPECIFIC PAIN DISORDER AND FOR CHRONIC PAIN</td>
</tr>
<tr>
<td>RACE/ETHNICITY</td>
<td>VARIES BY CONDITION, BUT EVIDENCE OF LOWER PREVELANCE IN ASIAN POPULATIONS</td>
</tr>
<tr>
<td>CO-OCCURRENCE</td>
<td>NUMBER OF SITES OF PAIN INCREASES WITH SEVERITY OF CHRONIC PAIN DISORDER</td>
</tr>
<tr>
<td>RISK FACTORS &amp; ASSOCIATIONS</td>
<td>GENDER, STRESS, DEPRESSION, ANXIETY, HIGHER BMI</td>
</tr>
</tbody>
</table>
VARIATION BY GENDER

Many pain conditions are more common in females. Few are more common in males:
- Chronic musculo-skeletal pain
- Multi-site pain
- Migraine

The gender pattern is consistent across cultures and time.

Persistence of pain and pain-related disability tend to be more common in women.

Relevance to Etiology
VARIATION BY AGE FOR COMMON PAIN DISORDERS

Age incidence & prevalence vary among common pain disorders
Impact and cost vary by age
Episodic versus chronic variants of common disorders also differ by age

Figure 2. Percent of female respondents with > 2 hours of LPT per week due to different pain condition by age.
Age-Sex Specific 1-yr. Prevalence: Migraine Headache (USA, n = 20,468)

Stewart, et al., 1992
Prevalence of Chronic Daily Headache Among Females and Males by Age

![Graph showing the prevalence of chronic daily headache by age and gender]
Migraine Prevalence Ratios by Household Income\(^1\) - US Population (n = 20,468; ages 12-80 years)

Stewart, et al., 1992

\(^1\)Adjusted for age, race, urban vs rural, region of US
Low Back Pain Prevalence by Education\(^1\) - US Population (n = 10,404; ages 25 years+)

Deyo & Tsui-Wu, 1987a

\(^1\) Adjusted for age, race and gender, p < 0.0001
Osteoarthritis/Knee Pain Prevalence Ratios by Education¹ – US Population (Women only; n = 3605, ages 25-74 years)

*Adjusted for age, race, smoking, BMI & injury

Hannan et al., 1992
Osteoarthritis/Knee Pain Prevalence Ratios by Education\(^1\) – US Population (Men only; n = 3099, ages 25-74 years)

Hannan et al., 1992

\(^1\)Adjusted for age, race, smoking, BMI & injury
Common recurrent pain disorders are inversely related to income or education (i.e., SES or socio-economic status)

Causal framework

Causal hypothesis

Incidence and remission data support social causation as a dominant mediator of SES gradient

<table>
<thead>
<tr>
<th>Causal Explanation</th>
<th>Incidence</th>
<th>Remission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social causation impact on initial onset</td>
<td>Higher</td>
<td>N/A</td>
</tr>
<tr>
<td>Social causation impact from persistence of stressors or poor access to health care</td>
<td>N/A</td>
<td>Lower</td>
</tr>
<tr>
<td>Downward Drift</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Many pain conditions are more common in females. Few are more common in males
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• Migraine

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Relevance to Etiology
FUNCTIONAL IMPACT

The work role is one of several areas of focus in measuring impact.

Pain is the most prevalent workforce health condition.

Pain is the most costly health problem in impact on lost work time.

Among employed individuals, most of the pain related lost time occurs during work.

Relatively little data on pain related underemployment and unemployment costs.

Employer Costs

Societal Costs

Reduced Performance at Work

Long Term Disability & Unemployment

Short Term Disability

Work Absence

Absenteeism

Presenteeism

\$46.9 Billion

Source: APA 2002
Percent of U.S. Workers with Pain related Lost Productive Time (LPT) and 2+ hours/week LPT

- Arthritis: 2.0% Any Pain, 1.2% 2+ hours/week
- Back pain: 3.2% Any Pain, 2% 2+ hours/week
- Headache: 5.4% Any Pain, 2.7% 2+ hours/week
- Musculoskeletal: 2.0% Any Pain, 1.3% 2+ hours/week
Age-Sex Specific Prevalence of 1+ Pain Condition (of 5 investigated)
(Seattle, WA, n=1016)

Von Korff, et al., 1988
Age-Sex Specific Prevalence of 3+ Pain Conditions (of 5 investigated) (Seattle, WA, n=1016)

Von Korff, et al., 1988
INDIVIDUAL VERSUS MULTI-SITE PAIN EXPERIENCE

Most of health care is organized to diagnose and treat single pain disorders
Most people report multiple symptoms of pain
The number of painful sites increases with severity of a pain disorder
Latent class analysis evidence for defined subtypes of multi-pain disorders
STATIC VS DYNAMIC VIEWS OF PAIN

Most studies of pain disorders are based on cross-sectional surveys
• Static view of a dynamic disease process

Numerous condition specific models to represent dynamic changes in pain status

Do chronic episodic pain disorders have features in common with chronic progressive diseases?

Is there epidemiologic support for chronic persistent pain or multi-site as end-stage disease?