HKU finds ADHD drug use increase in Hong Kong and 13 different countries
Safety and efficacy of ADHD drugs monitoring indispensable

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Professor Ian Wong
Lo Shiu Kwan Kan Po Ling Professorship in Pharmacy
Department of Pharmacology and Pharmacy
Li Ka Shing Faculty of Medicine, The University of Hong Kong

Dr Patrick Ip
Clinical Associate Professor
Department of Paediatrics and Adolescent Medicine
Li Ka Shing Faculty of Medicine, The University of Hong Kong
Attention-Deficit Hyperactivity Disorder

• Neurodevelopmental disorder that most often occurs in children
• Though begins in childhood, ADHD can continue through adolescence and adulthood

Inattentive  Hyperactive  Impulsive
6.4% of children and adolescents are affected by ADHD in Hong Kong.

73% of children and adolescents (below 18) receiving HA's psychiatric services are affected by Autism or ADHD in Hong Kong.
ADHD have significantly negative educational, economic, medical and social outcomes

- Increased risk of drug use/addictive behaviours
- Antisocial behaviour and criminal behaviour
- Poor academic and occupational outcomes
- Reduced social functioning
- Low self-esteem
- High risk of accident
- Obesity
- Increased use of health, social and criminal justice service
Evidence of benefits of pharmacological treatment

• Results from our HKU previous study:
  • Reduce accident and emergency use
  • Reduce the likelihood of suicidal behaviour

• Results from other groups:
  • Reduce criminality
  • Reduce ADHD symptoms
  • Improve family relationship
  • Improve academic results
Potential side-effects

- Increased heart rate and blood pressure
  - Our current research does not show long-term health issues
- Reduced appetite
  - Require adjustment of dose to allow better food intake
- Reduced height
  - Only marginally but usually will catch up

** Very important to monitor the treatment by healthcare profession**
Number of all new cases and rate for completion of assessment within six months by Hong Kong Department of Health child and adolescent mental health services

<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017 (provisional figure)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of new cases referred to CAS</td>
<td>8,773</td>
<td>8,775</td>
<td>9,494</td>
<td>9,872</td>
<td>10,188</td>
<td>10,438</td>
</tr>
<tr>
<td>Rate for completion of assessment for new cases within 6 months</td>
<td>90%</td>
<td>89%</td>
<td>83%</td>
<td>71%</td>
<td>61%</td>
<td>55%</td>
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</tbody>
</table>
Background – rationale

Understanding medication utilisation is important

To understand the variability across countries
To enable drug safety assessment of rare events
To support new insights into burden of disease, potential etiology and treatment avenues
Study Objective

To estimate the prevalence of ADHD medication use in children and adults across countries and time.
Methods – Design and data sources

- Common protocol method
  - Developed by The University of Hong Kong
  - Same study protocol for 15 participating sites

- Databases from Asia, Australia, Europe, North America with national/defined coverage

- All data sources were generated from the automated capture of patient-level electronic data from either administrative clinical records or administrative claims

- Records
  - Available years between 2001-2015
  - Age group 3-5, 6-11, 12-16, 17-18, 19+ years
  - Annual prevalence – denominator
    - registration dates, census or population data
15 sites from 13 participating countries
The largest ADHD study ever been published

- Norway, Denmark, Sweden, Finland, Iceland, France, Spain, UK
- Japan, Hong Kong, Taiwan
- United States, Canada (Quebec)
- Australia

Total coverage of 154.5 million individuals
Results
Prevalence (per 100) of ADHD medication in 3 to 18 years old

Canada, Taiwan, Norway, Sweden, Denmark, Spain, Australia

Hong Kong, Finland, Japan, France, UK

Two US sites, Iceland

Hong Kong
Prevalence (per 100) of ADHD medication in 3 to 18 years old by gender

Male-to-female ratio: 2.0-6.3 to 1

Hong Kong
Drug use increase:
Regional estimates in children aged 3-18 at 2010

North America: 4.48% 95%CI (2.86-6.10)

Northern Europe: 1.95% 95%CI (1.47-2.44)

Asia and Australia: 0.95% 95%CI (0.35-1.56)

Western Europe: 0.7% 95%CI (0.31-1.10)

Overall estimates: 1.95% 95%CI (0.76-3.13)
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Hong Kong: 0.57% 95%CI (0.55-0.58)
Overall estimates: 1.95% 95%CI (0.76-3.13)

16
Prevalence (per 100) of ADHD medication in adults

Two US sites, Iceland

Norway, Sweden, Denmark

Australia, Hong Kong, Japan, Taiwan, Finland, France, Spain, UK
Prevalence (per 100) of ADHD medication in adults by gender

Male-to-female ratio: 0.9-2.7 to 1
Prevalence of ADHD Medication Use:
Regional estimates in adults at 2010

- North America: 1.42% 95%CI (1.29-1.54)
- Northern Europe: 0.47% 95%CI (0.31-0.62)
- Western Europe: 0.03% 95%CI (0.01-0.04)
- Asia and Australia: 0.05% 95%CI (0.004-0.10)
- Overall estimates: 0.39% 95%CI (0.31-0.47)
Prevalence of ADHD Medication Use:
Regional estimates in adults at 2010

- North America: 1.42%
  95%CI (1.29-1.54)

- Northern Europe: 0.47%
  95%CI (0.31-0.62)

- Asia and Australia: 0.05%
  95%CI (0.004-0.10)

- Western Europe: 0.03%
  95%CI (0.01-0.04)

- Hong Kong: 0.006%
  95%CI (0.005-0.006)

- Overall estimates: 0.39%
  95%CI (0.31-0.47)
Prevalence (per 100) of ADHD medication in different age groups
## In Hong Kong

<table>
<thead>
<tr>
<th>Year</th>
<th>Children and Adolescents</th>
<th>Adults</th>
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<tbody>
<tr>
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<tr>
<td>2001</td>
<td>0.04% (0.03-0.04)</td>
<td>0.003% (0.002-0.003)</td>
</tr>
<tr>
<td>2015</td>
<td>1.45% (1.43-1.48)</td>
<td>0.01% (0.01-0.02)</td>
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Average absolute change per year:
- +0.1% (0.08-0.12) (ranked 9th out of 15)
- +0.0006% (0.0005-0.0008) (Lowest)

Average % changes per year:
- +24.18 (23.94-24.42) (2nd highest)
- +13.22% (12.41-14.04) (ranked 8th out of 14)

Male-to-female ratio:
- 5.8 to 1 (2nd highest)
- 2.0 to 1 (3rd highest)
Discussion: Hong Kong

- Increases in ADHD medication use in both children and adults in Hong Kong
  - Improved awareness of ADHD
  - Recognition of the importance of effective treatment to avoid long-term problems

- Are we over-diagnosed or/or overtreated?
Over-diagnosed or over-treated?

• Rates are still far below diagnosis rates
  • Unlikely to be over treated
  • Likely to under-recognised ADHD in adults

• Untreated ADHD has adverse effects on family and patients
Effects on clinical services?

• The current clinical services provided by the Hospital Authority is insufficient to address increasing needs of new patients and ongoing care of current patients.
  • Comprehensive diagnosis
  • Non-pharmacological treatments
  • Pharmacological treatments
    • Monitoring
  • Transfer from children to adult services
    • Lack services for adults with ADHD
Recommendations for improvement

• Hong Kong does not have comprehensive guidelines to meet the care of both adult and children with ADHD in terms of the diagnosis, treatment and education needs
  • A working group to develop a comprehensive guidelines
  • Interdisciplinary and interagency
• Avoid unnecessary delay in diagnosis and treatments
• Prevent adverse outcomes of under and over treatments
Discussion International

• Increases in ADHD medication use in both children and adults in world-wide
  • USA is beyond the expected level of medication treatment
  • Some other countries are still far below diagnosis rates

• Wide and persistent disparities in medications use between countries and regions
  • Marked differences in the clinical approach to treating ADHD

• Renewed efforts are needed to improve the consistent identification and treatment of ADHD across the international community and to develop and implement best practice.
Future research

- The University of Hong Kong is a world-leading research team in ADHD and neurodevelopmental disorders in children.
- We will continue to work with international collaborators to evaluate the effectiveness and safety of pharmacological treatments.
- Further studies to investigate:
  - The mental health outcomes of patients
  - The cardiovascular effects of pharmacological treatments
  - Use of new technology to help children and adults with ADHD
Patient and Parent Sharing

• Impact of ADHD
• Treatment of ADHD
Q & A