New technologies and methods for research synthesis

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Summary

• Information systems assist in many stages of systematic reviews
• This presentation focuses on two new areas of development
  – Text mining: to improve the discovery and description of research in reviews
  – Thematic coding: to synthesise qualitative research systematically
Finding and describing research

- The ASSERT Toolkit
- Developed by the National Centre for Text Mining, UK
- Demonstrator available at: http://www.nactem.ac.uk/assert/
- Technologies:
  - Document clustering (Lingo)
  - Term extraction (Termine)
  - Query expansion (based on Termine)
  - Document summarisation
Physical activity patterns in adults with severe mental illness.

Although physical inactivity is a leading cause of death and the Surgeon General recommends regular moderate physical activity, many Americans are inactive. Because of their increased burden of obesity and diabetes, people with severe mental illness (SMI) especially may benefit from physical activity, yet little is known about the prevalence and types of physical activity in people with SMI.

We surveyed outpatients with schizophrenia and affective disorders at two psychiatric centers in Maryland and compared physical activity patterns in an age and gender-matched national sample (National Health and Nutrition Examination Survey 111) of the general population.

We found that people with SMI are overall less physically active than the general population, although the proportion with recommended physical activity levels was 20.9%.

The participants with SMI were more likely to walk as their sole form of physical activity.

Within the SMI group, those without regular social contact and women had higher odds of being inactive.

Summary of Quality of Life

- **RESALE**: Predictive factors for work capacity, such as ability to undertake activities, quality of life and fitness on exercise, were identified as important independent factors.
- **RESALE**: The life activities and participation scores were strongly associated with exercise, better continuity of annual surveillance, higher use of physical therapy, and a better quality of life for the 171 patients in private care.
- **Hyperactivity**: A reduction of more than 3 mm in H. Activity in the general population, an increase in fruits and vegetable consumption in 8.1% vs. 85.1% for alcohol consumption (71.4% vs. 16.6%), and a decrease in obesity (21.4% vs. 17.4%) was found.
- **Reduction**: The benefits of exercise for people with serious depression and anxiety conditions.
- **Prevention**: Antidepressive changes in lifestyle and diet therapy for treatment of hyperactivity in France between 2003 and 2014.
- **Trial**: Patients with panic disorder with or without agoraphobia who participated in our group cognitive behavioral treatment programs were admitted to the Medical Outcomes Study (Trials). Health Survey and the Work, Home, and Leisure Activity Scale.
- **Other well-known factors**: i.e., gender, age, education, pain and earlier sickness certification periods, were also identified.
User example

- Systematic review of qualitative research on ‘becoming a mother’
- > 13,000 studies identified in searches
- How can text mining help?
  - Document clustering
  - Term identification
  - Document classification
Clustering: Targeted Youth Support

Rapid evidence assessment (review of systematic reviews) in these areas:

- Youth offending / anti-social behaviour
- Drug or alcohol misuse
- Under-18 conceptions and poor sexual health
- Poor outcomes for teenage parents and their children
- 16-18 year-olds not in education, employment and training (NEET)
- Low attainment
- Running away and youth homelessness
- Poor mental health
Synthesising qualitative research

- A frequently debated subject
- The value of using qualitative research in reviews is increasingly recognised
- Methods are still under development
- Thematic synthesis: one way of applying systematic principles to qualitative synthesis

Thematic synthesis

- Data extraction: results from primary studies
- Line-by-line coding of the themes described in the data extraction
  - descriptive codes
- Similarities and differences among descriptive codes are identified in order to group them
  - descriptive themes
- Further analysis of descriptive themes: in the light of the review question
  - analytical themes
Line-by-line coding

Axial coding

Children did not identify friends as an influence on their healthy eating.

You are logged in as: James Thomas
Role: Children and Healthy Eating: A systematic review of barriers and facilitators
Publisher: EPPI-Centre

Diickey et al (2001)

Conclusions: 463 to 870

Children were aware of the relationship between diet and health, in particular the health consequences of not eating healthily and identified as junk-foods, although a strictly defined concept. Although some children were aware of the importance of healthy eating so that they could do things like “move and run about”, few described foods as children’s perceptions of fruit and vegetables. The children do not, for instance, identify fruit and vegetables as being important for their health.

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Visualisation of descriptive themes

Sensitivity analysis
**IT systems in thematic synthesis**

- The use of line-by-line coding:
  - gave us confidence that we were extracting themes in a consistent and systematic way
  - enabled us to be explicit about the process by which themes were taken from the primary studies
  - enabled us to reflect critically on the process of translating themes between studies
  - begins the process of synthesis
  - provides a permanent record of the decisions we made
- Splitting the thematic analysis into two (descriptive and analytic) is a transparent way of distinguishing between ‘data driven’ and ‘theory driven’ approaches
- It is possible to stop after the descriptive themes have been generated
- Software enables us:
  - to conduct sensitivity analyses easily
  - to transfer themes across the different types of study
  - depict and explore our findings visually

**Conclusions**

- Producing systematic reviews is a time consuming process
- Competing priorities:
  - Systematic and comprehensive
  - Need to inform policy & practice in a timely way
- Information systems can help:
  - New ways of coming to terms with a rapidly expanding evidence base
  - Ways of being transparent and explicit during an interpretive process
References


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