EE481

A SYSTEMATIC LITERATURE REVIEW OF MODELING APPROACHES IN ECONOMIC EVALUATIONS OF HEALTH INTERVENTIONS FOR ATTENTION DEFICIT HYPERACTIVITY DISORDER

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CONCLUSION

We recommend using parsimonious Markov cohort models to assess the cost-effectiveness of future treatments in ADHD due to their versatility in adopting different types of health states that patients can potentially experience.

Background

- Attention-Deficit Hyperactivity Disorder (ADHD), a clinically heterogeneous neurodevelopmental syndrome, is one of the most common developmental disorder[1,2]
- Globally, approx. 5%-10% of children/adolescents and 1%-6% of the adult population are estimated to be affected by ADHD[1,2]. In 2020, the global prevalence of persistent adult ADHD was estimated to be 2.58%, and that of symptomatic adult ADHD was 6.76%, affecting 139.84 million and 366.33 million cases respectively[2]
- Patients with ADHD reported a higher economic burden driven by higher indirect costs due to workforce productivity loss, income loss, and higher medical costs[3,4]
- Thus, to address the ever-growing burden of mental disorders, there is an unmet need to reconsider the cost of mental disorders, the cost benefits of treatment and preventive interventions, and the need for a comprehensive change in stigmatization. Otherwise, the current underfunding of mental health care is likely to persist[5]

OBJECTIVE

A systematic literature review (SLR) was performed to examine economic modeling approaches utilized in published economic evaluations (EEs) of health interventions for ADHD

Methodology

- The review followed the standard methodology for conducting SLRs as per the guidelines provided by the National Institute for Health and Care Excellence (NICE) and Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)
- The SLR followed a standard two review and quality control process for data collection and extraction
- Key biomedical databases (EMBASE®, MEDLINE®, NHS EED) were searched from database inception to December 2021, while ISPOR database and other conferences were searched for last three years to identify EEs published in the ADHD population, in the English language
- The pre-defined PICOS criteria for study selection are presented in Fig 1

Population
Patients with any type of ADHD (inattentive, hyperactive-impulsive, and/or combination type)

Intervention and Comparator
No restriction on intervention or comparators

Outcomes
Studies reporting model structure outcomes such as economic evaluation type, model design, disease/health states/pathway, cycle length, time horizon, discounting, etc.

Study design
Cost-effective analysis (CEA), cost-utility analysis (CUA), cost-minimization analysis (CMA), cost-benefit analysis (CBA)

Figure 1: Prespecified PICOS eligibility criteria for selection of evidence

- Citation snowballing, grey literature, and Heath Technology Assessment (HTA) reports were searched to gather comprehensive evidence
- Predefined extraction forms were used to capture (i) study characteristics (e.g., year of publication, time frame, country), (ii) modeling approaches; (iii) costs, utilities, and benefits; and (iv) discounting

RESULTS

- After screening 7,528 publications from the biomedical database, conference searching, and HTA submissions, 35 publications were included describing model structure in patients with ADHD. After linking, 30 studies were finally included
  - ✓ **Adult patients with ADHD:** Eight studies of 10 publications (Five journal publications and three HTA submissions); **Child and adolescent ADHD population:** 22 studies of 27 publications (16 studies and six HTA submissions)
- The flow of publications through the entire SLR process is depicted in the PRISMA diagram (Fig 2)

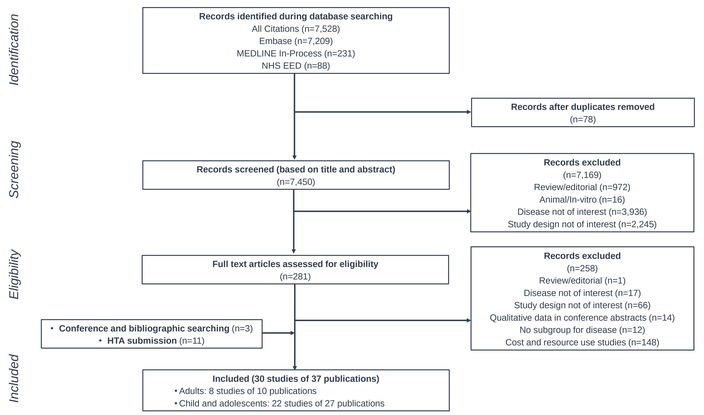

Figure 2: PRISMA diagram for the screening process

- **Economic evaluations:** CUA (n=18), CEA (n=5), and CMA (n=4) (Fig 3)
- **Perspective:** Third party/payer (n=21), societal (n=7), not-reported (n=2) (Fig 3)
- **Model structure:** Markov (n=13), decision tree (n=5), hybrid decision tree-Markov (n=1), no information (n=11) (Fig 3)
- **Time horizon**: range 12 weeks to a lifetime; 50% studies utilized 1-year horizon (Fig 3)
- **Cycle length** of 1 day (n=1), 1 week (n=2), and 1 month (n=1); discounting on cost and benefits (n=6, range 0%-5%)
- **Health states:** Treatment initiation, tolerate, unable to tolerate, response (normal to mild), no-response (moderate to severe), and treatment discontinuation were the most common health states. Table 1 provides heath states across economic evaluations

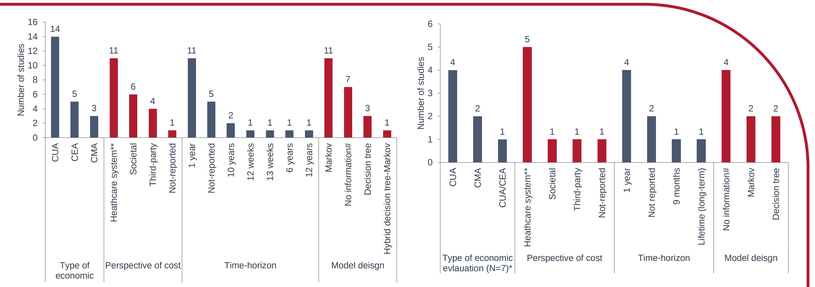

Figure 3: Characteristics of included economic evaluations among child and adolescent (left) and adult (right) patients with ADHD

*One study providing conceptual framework of long-term model was excluded; **Included HTA submissions; #Included cost-minimization analysis

Table 1: Summary of health states across the economic evaluations in patients with ADHD

Study name	Heath states
Adults	
Tockhorn 2015[6]	Treatment initiation, response, and no-response (absorbing state)
Zimovetz 2018[7]	Tolerate, unable to tolerate, response and non-response
SMC 02 (2015)[8]	Treatment initiation, responder, and non responder
Child and adolescents	
Zimovetz 2016[9]	Response, non-response, unable to tolerate
Sikirica 2012[10]	Normal, mild, moderate, severe
Schans 2015[11]	Optimal response, sub-optimal response, discontinued treatment, natural remission
Schawo 2015[12]	Optimal response, sub-optimal response, treatment stopped, remission
Freriks 2019[13]	No delinquency, minor to moderate delinquency, serious delinquency
Joseph 2015[14]	Responder, non-responder
Lachaine 2016[15]	Severe (CGI-S score of "severely ill" or "among the most extremely ill subjects"), moderate (CGI-S score of "moderately ill" or "markedly ill"), mild (CGI-S score of "borderline ill" or "mildly ill"), normal (CGI-S score of "normal")
Lachaine 2014[16]	Treatment response, no response, treatment discontinuation
SMC 2016[17]	Responder, non-responder

Table 2: Economic model recommendations

Element	Recommendations
Intervention & Comparator	Include all relevant medications
Type of EE	CUA
Type of Model	Markov model
Time horizon	1 year
Cycle length	1 month
Discounting	• No discounting in case of small cycle length and time horizon • Discounting is recommended when the time horizon is >1 year or while extrapolating the data beyond the trial follow-up
Key event to model	Tolerability, response rates, severity, and discontinuations

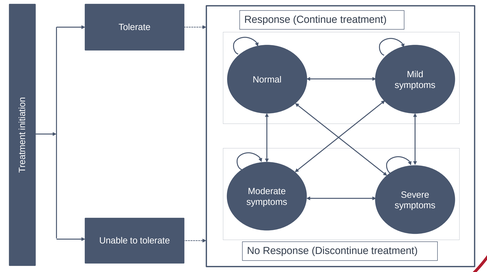

Figure 4: Proposed model structure

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