Comparison of treatment recommendations formulated by APPRAISE-RS/TDApp, a prototype of automated, personalized, participatory recommender system, and clinical practice guidelines in a sample of simulated ADHD patients

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Introduction

Clinical practice guidelines (CPG) have several limitations that undermine their validity and utility in the clinical practice namely: obsolescence, lack of applicability of recommendations to many patients and little patient participation. As a result of these limitations, adherence to CPGs recommendations is low.

Artificial intelligence can help to overcome CPG limitations. We haver recently developed APPRAISE-RS/TDApp (www.tdapp.org), an eHealth tool that formulates updated, personalized and participatory recommendations.

Objectives

To determine the degree of disagreement between treatment recommendations formulated by APPRAISE-RS/TDApp, a prototype of automated, personalized, participatory recommender system, and recent CPG in patients with attention deficit hyperactivity disorder (ADHD).

Methods

We have recently designed APPRAISE-RS; a recommender system development methodology that adapts the GRADE heuristic to formulate automated, up-to-date, participatory and personalized therapeutic recommendations. We have initially applied APPRAISE-RS to ADHD (APPRAISE-RS/TDApp). APPRAISE-RS/TDApp was tested on 28 simulated ADHD patients, 20 of which were children or adolescents and 8 were adults, 15 had a severe ADHD, 18 had a comorbid disorder and 6 were receiving concomitant medications.

The treatment recommendations formulated for these patients by 4 recent CPGs (USA, Canada, United Kingdom and Spain) were extracted. We determined the degree of disagreement between APPRAISE-RS/TDApp and CPGs' recommendations by computing the pharmacological distance (minimum and maximum 0,0 and 3,0 respectively) using the NbN2R ontology that was then applied to draw hierarchical clustering dendrograms.

Results

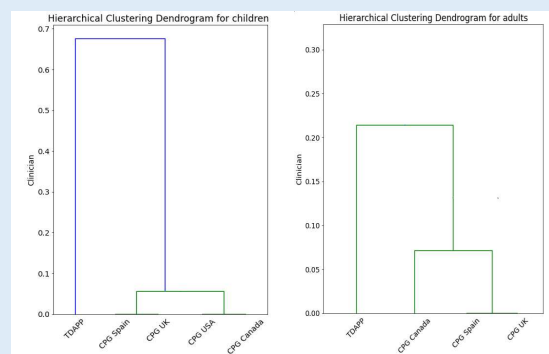|	N
Sample size	28
Children/adolescents	20
Comorbid disorder	18
Oppositional defiant disorder	4
Dyslexia	1
Major depressive disorder	1
Bipolar disorder	1
Autism	1
Tics	2
Borderline personality disorder	1
Anorexia nervosa	2
Tobacco use disorder	5
Cannabis use disorder	1
Epilepsy	1

Figure 1: Dendrograms showing that ADHD CPGs recommendations clustered on one side and APPRAISE-RS/TDApp on the other one in ADHD children (left) and adults (right). Y-axis: NbN2R -based pharmacological distance between CPGs and APPRAISE-RS Tdapp (X-axis).

The number of different recommendations using APPRAISERS/TDApp was 20, 3 using USA CPG, 7 using Canadian CPG and 4 using both the Spanish and UK GPGs.

Discussion

- APPRAISE-RS/TDApp provides treatment recommendations that are different from CPGs' and thus might be a tool for assisting medical decision-making.
- This promising results should encourage the conduction of a clinical study (https://clinicaltrials.gov/ct2/show/NCT04228094).

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