Systematic review on the use of Achenbach's Child Behavior Checklist in the field of pediatric neurology

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INTRODUCTION

Background: The incidence of behavioral disorders is increased in patients followed in pediatric neurology, compared to that observed in the general population. The incidence of behavioral comorbidities is also higher in chronic neurological conditions than in other chronic pediatric conditions (Anderson et al. 1999). The spectrum is broad, concerning epilepsy (Lin et al. 2012; Law et al. 2015), neuromuscular pathologies, cerebral palsies (Romeo et al. 2010), acute infections or inflammatory episodes affecting the central nervous system. Behavioral comorbidities also concern patients at risk of neurodevelopmental disorders due to early neonatal or perinatal conditions, such as prematurity, perinatal stroke, infectious or inflammatory episodes, or antenatal or postnatal exposure to toxicants (Sood et al. 2001). While psychiatric comorbidities are frequently reported in pediatric neurology, they remain underestimated, poorly phenotyped and poorly managed (Ott et al. 2003). However, behavioral disorders are a major functional complaint and contribute to the child's disability.
Objectives: We conducted here a systematic review of the published works using the "Child Behavior Checklist" (CBCL) screening scale in the pediatric neurology field in order to determine 1) which diseases have been explored for behavioral comorbidities, and 2) what was the purpose of the use of this screening scale.

METHODS

Methods. We carried out a Pubmed search combining the items "pediatrics" and "Child Behavior Checklist", a self-administered questionnaire given to parents to describe emotional and behavioral dispositions from 18 months to 18 years.
Inclusion criteria. To be included, the article had to focus on the behavioral comorbidities of a neurodevelopmental disorder or a known risk factor for developing such a disorder, such as prematurity, exposure to antenatal toxicants or the occurrence of an acute infection or inflammatory episode of the central nervous system.
Exclusion criteria. Were excluded articles on less than 5 subjects, on behavioral comorbidities of chronic non-neurological diseases, on child psychiatric diseases in which behavioral disorders are at the forefront, public health articles on general populations or on psychometry.

RESULTS

"Pediatrics" AND "CBCL"

n=680 articles screened

n=512 articles excluded

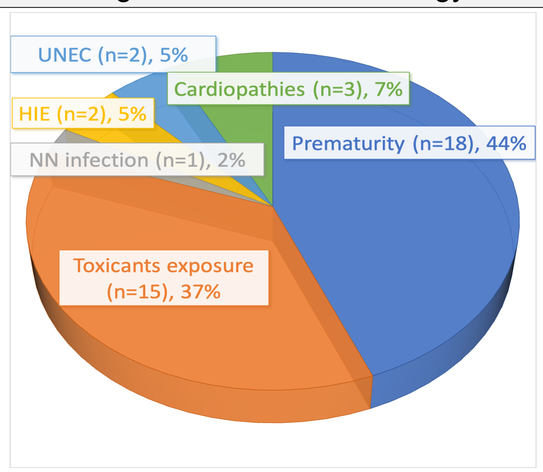
n=168 included

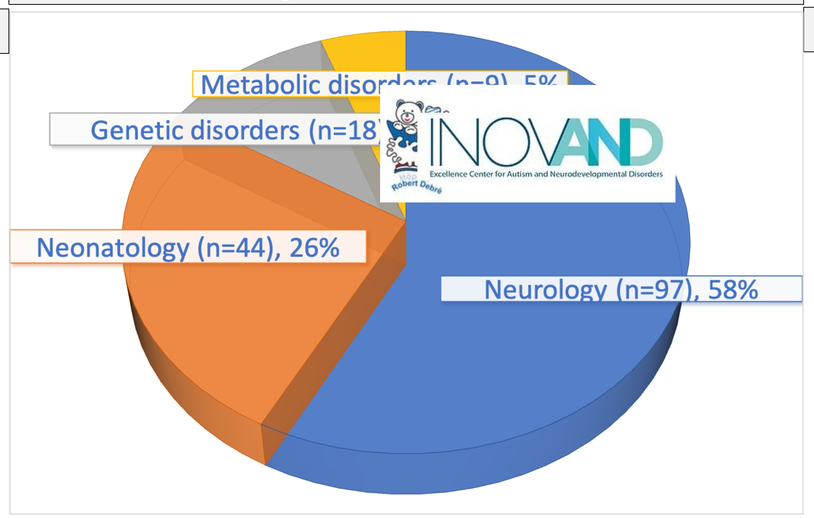
Inclusion:
- Neurodevelopmental trouble

Exclusion:
- Case reports (n<5) (n=1)
- Psychiatry (n=192): ADHD (n=45), ASD (n=25), Perso/mood dis(n=122)
- Chronic diseases (n=161)
- Public Health (n=114)
- Psychometrics (n=24)
- Sleep disorders (eg. narcolepsy) (n= 6)
- Anesthesia (n=5)
- Surgery (n=2)
- Neuroscience (n= 2)
- Functional disorders (eg. Headeaches, migraines), (n=5)

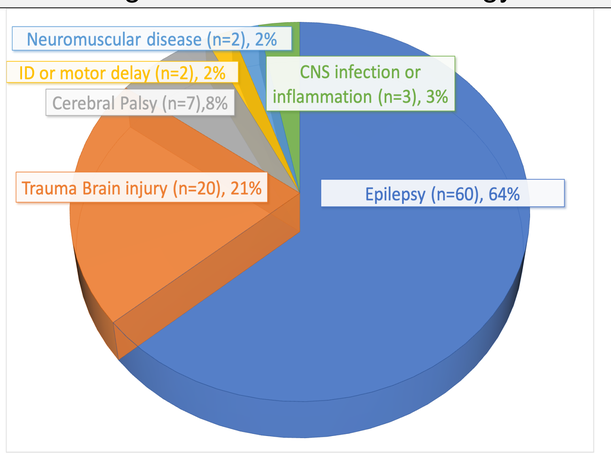
Main etiologies of CBCL pediatric articles

Main etiologies of CBCL neonatology articles





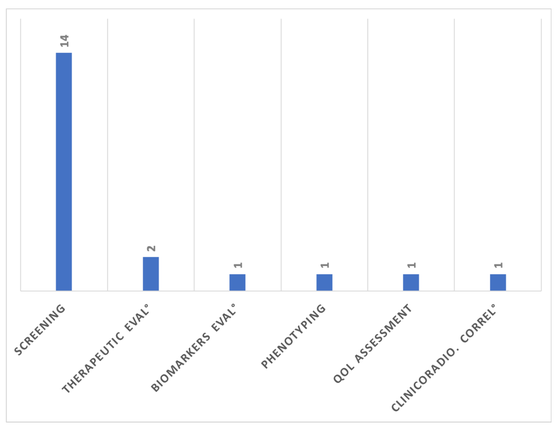
Main etiologies of CBCL child neurology articles



DISCUSSION

Focus on the use of CBCL in papers on prematurity: CBCL as a screening tool

Main aims of articles on prematurity



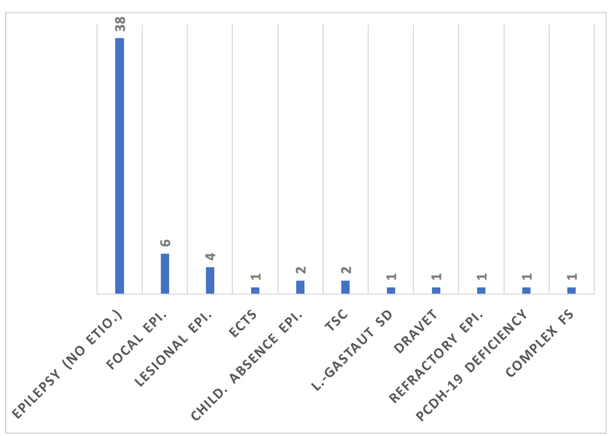
Aims of articles on exposure to toxicants

Similarly to the articles on prematurity in which most of papers aimed at screening behavior disorders, all articles on antenatal or perinatal exposure to toxicants had a screening objective.

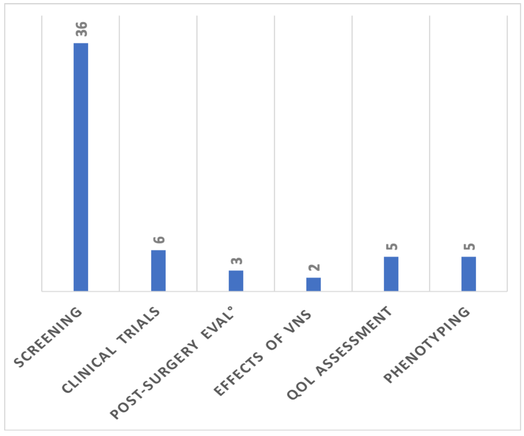
Only two scales compared to CBCL in neonatology articles were found recurrently:
Teacher Report Form (n=4), Q-CHAT (n=3). Many other scales were found (eg. Neuromotor status, ASQ, NCIU, Maternal stress index, BDI, KABC, Amiel-Tison, Preschool QoL, TNO-AZL, HSCS-PS, DASS, BRIEF, Conners, SSIS, Index of empathy)

Focus on the use of CBCL in pediatric epileptology: CBCL as a screening tool mainly

Main etiologies of pediatric epilepsy articles



Main aims of CBCL epileptology articles



Main scales compared to CBCL: Parenting stress index (n=4); Teacher Report Form (n=4); BRIEF (n=4), Vineland (n=3); Conners (n=1), STAI (n=2), CDI (n=1), BASC (n=1), HASS (n=1), CHQPF (n=1), QOLCE (n=1), TAND (n=1)

Highlighting the diseases in which behavioral disorders seem to be under-studied

This systematic review shed light on the fact that very few articles have been using CBCL to screen behavior disorders after an inflammatory affection of the CNS or in the context of cerebral palsy, chronic neuromuscular disorders, or of intellectual deficiency.

Limitations of the study

Articles were collected only from the search engine « Pubmed ».
Many other scales exist to screen behavior disorders, which were not studied here.

CONCLUSION

We carried out a systematic review crossing the items "Pediatrics" and "CBCL" on the search engine "Pubmed". 174 articles could be included out of 680 screened. This research has shown that the main etiologies in which behavioral comorbidities are explored are epilepsy and trauma brain injury in the field of pediatric neurology, and prematurity and antenatal exposure to toxicants in the field of neonatology. The other pathologies with neuropediatric entanglement that have been explored in terms of behavioral comorbidities *via* the CBCL scale are metabolic diseases and genetic syndromes responsible for a neurodevelopmental disorder. This study highlighted that the CBCL scale is mainly used 1) for screening purposes, with an apparently good sensitivity and 2) for clinical trials, especially to assess the tolerance of antiepileptic drugs. It emerges also from this systematic review that behavioral disorders seem to be under-detected in several child neurological chronic diseases, such as in cerebral palsy, in neuroinflammatory and neuromuscular pathologies.

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