Northumbria Research Link

The Validity of the Child and Adolescent Intellectual Disability Screening Questionnaire (CAIDS-Q) with children aged six years to seven years, 11 months: A brief report

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Abstract

We examined the performance of the Child and Adolescent Intellectual Disability Screening Questionnaire with 103 young children referred to mental health services. Sensitivity and specificity were over 80% and convergent validity with IQ scores was found, suggesting it could be used for screening with this age group.

1.Introduction

By definition, children with an intellectual disability (ID) experience significant impairments in intellectual and adaptive functioning. They may also experience co-morbid conditions that can make differential diagnosis difficult, such as Autism Spectrum Disorder (Croen et al., 2002), as well as increased levels of mental health problems, challenging behaviour and sleep disturbances (e.g. see Rzpecka et al., 2011). Early diagnosis of ID is crucial to ensure that the child receives appropriate support and intervention to maximise his/her life chances (Guralnick, 2005), however research suggests that diagnosis can often be delayed, into adolescence or even adulthood (Hamilton, 2006) and that this can be a significant source of stress and dissatisfaction for parents (Watson et al., 2011). There are a number of reasons why this might be the case, including limited knowledge, among some health (McKenzie et al., 2000) and education professionals (Rae et al., 2011) about what ID is, and the fact that diagnosis requires professional determination of the individual's intellectual and adaptive functioning. Such assessments can be time-consuming to conduct and score (Winters et al., 2005) and many can only be administered by appropriately qualified professionals (British Psychological Society, 2001).

Screening tools offer one means of providing a quick indication of whether a child is likely to have ID and should be referred on for further diagnostic assessment, and may also serve as a reminder to staff of the areas that children with ID may have difficulty with. The Child and Adolescent Intellectual Disability Screening Questionnaire (CAIDS-Q) is one such tool. This seven item questionnaire was adapted from the adult version, the Learning Disability Screening Questionnaire, which had previously been found to have good psychometric properties with clinical (McKenzie & Paxton, 2006) and forensic populations (McKenzie et

al., 2012a), and to perform well when compared with a short form intellectual assessment (McKenzie et al., In press b). Initially developed for use in child and adolescent mental health (CAMH) services and child ID services, the CAIDS-Q was subsequently successfully piloted in forensic services. It was found to have strong psychometric properties with children aged eight to 18 years, demonstrating good validity psychometric properties (McKenzie et al., 2012b, 2012c). These results suggested that it may represent a useful screening tool to help clinicians identify those children aged eight and over who are likely to have ID. One limitation of the CAIDS-Q, given the importance of early identification of ID, is that it has not previously been evaluated for use with children under eight years old. This brief report presents the results of a pilot study which aimed to explore the convergent and discriminative validity of the CAIDS-Q, in relation to children with and without a diagnosis of ID, as used in CAMH services with children aged 6 years to 7 years, 11 months.

2.Methods

2.1 Ethical approval

Approval for the study was obtained from the Caldicott Guardians from the participating health board areas.

2.2 Power analysis and sample size

Based on previous research with the CAIDS-Q, which yielded large effect sizes (McKenzie et al., 2012b, 2012c), and assuming an alpha level of 0.05 and power of 0.80, minimum sample sizes of 26 per group (i.e. those with and without a diagnosis of ID) and 28 overall were required for an independent t-test and Pearson's correlation respectively.

2.3 Procedure

The following pre-existing routinely collected data were obtained from case notes from four NHS community CAMH and child ID services in Scotland: CAIDS-Q item scores, gender, age, IQ and adaptive functioning scores (where available) and whether the person met the diagnostic criteria for ID of: a significant impairment in intellectual functioning; significant impairment in adaptive functioning; and onset in childhood (American Psychiatric Association [APA], 2000).The latter was based on the independently determined clinical diagnosis as recorded within the case notes. Data were included if the participant was aged between 72 and 95 months inclusive and a standardised assessment had been used to measure intellectual functioning (most commonly the Wechsler Intelligence Scales for Children – fourth edition : Wechsler, 2003). As a range of different measures of adaptive functioning were used, it was not possible to conduct analyses with adaptive functioning scores.

2.4 Measure

The CAIDS-Q has previously been found to have good psychometric properties including inter-rater reliability, construct and criterion validity (McKenzie et al., 2012b, 2012c). It was developed to be used by a range of staff, such as clinical psychologists, psychiatrists, and nursing staff, without the need for a particular professional background or training. It comprises of seven' yes' 'no' items, covering literacy, relationships, schooling and self-care, that yield a percentage score, with a higher score indicating a lower probability of the individual having ID. The ratings can be based on an informant report, for example from a parent, teacher or carer who knows the child well, while some items such as literacy can also be based on direct assessment with the child if required. The CAIDS-Q was originally standardised with two age groups: children aged 96 to 143 months and adolescents/young adults aged 144 to 216 months. It was found to have sensitivity and specificity values of 96.1 to 96.7% and 84.8 to 85.5% respectively, depending on the age of the child, measured against

an independent clinically determined diagnosis of intellectual disability, based on the three

diagnostic criteria. It has strong correlations with intellectual functioning (McKenzie et al.,

2012c) and has also been found to have moderate to strong correlations with the domains of

adaptive functioning (McKenzie et al., in press a), as measured by the Adaptive Behavior

Assessment System-second edition (Harrison & Oakland, 2003). The CAIDS-Q, while being

found to correlate well with measures of both adaptive and intellectual functioning, differs

from them in a number of respects. Firstly, it is designed to be a measure of likely ID and, as

such, is validated against all three criteria of ID. Secondly, it is a screening tool, rather than a

full standardised assessment of a specific domain of functioning e.g. adaptive or intellectual

functioning, and therefore, is much briefer to administer, taking approximately 5-10 minutes

to complete.

2.5 Participants

Data were included from the case notes of 103 participants (see Table 1 for participant

characteristics). There were no significant differences between the two groups in respect of

gender (χ^2=0.55, *df*=1, *P*=0.814), however the ID group were significantly older than those

without ID (*t*(100.88)= 2.075, *P*=0.040), and had a significantly lower FSIQ (*t*(81.807)= -

13.108, *P*<0.001). Nine of the children with ID, had an additional diagnosis, the most

common being Attention Deficit Hyperactivity Disorder (ADHD: n=4). Thirteen of the

children without ID had a recorded diagnosis, the two most common being ADHD (n=6) and

Autism Spectrum Disorder (n=4).

Insert Table 1 about here

2.6 Data analysis

The data were used to evaluate the convergent and discriminative validity and internal

consistency of the CAIDS-Q with the children aged 6 years to 7 years 11 months.

3.Results

3.1 Internal consistency

High internal consistency of the CAIDS-Q, i.e. the extent to which the individual items all

reflected the same uni-dimensional construct, was indicated by a Cronbach's alpha value of

0.81.

3.2 Criterion validity

3.2.1 Convergent validity

Convergent validity was indicated by a significant Pearson's correlation between CAIDS-Q

scores and IQ scores: FSIQ ($r(96) = 0.521$, $P< 0.001$); Verbal Comprehension ($r(92) = 0.376$,

$P<0.001$); Perceptual Reasoning ($r(79)=0.374$, $P=0.001$); Working Memory ($r(74) = 0.409$,

$P<0.001$) and Processing Speed ($r(79) =0.413$, $P<0.001$), with moderate associations and

medium to large effect sizes.

3.2.2 Discriminative validity

A ROC analysis was used to determine the sensitivity and specificity of the CAIDS-Q. The

area under the curve was found to be 0.884, indicating a significant ability ($P < 0.001$) to

discriminate between those with and without ID.   A cut off score of 36 was considered

optimal and gave a sensitivity of 82.2% and specificity of 82.8%.

3.2.3 CAIDS-Q scores by group

A comparison of the CAIDS-Q scores of those with and without ID found that the latter had significantly higher scores ($t(101) = -9.049$, $P<0.001$), $d=1.80$, indicating a large effect size.

4.Discussion

This brief report examined some of the psychometric properties of the CAIDS-Q with children aged 6 years to 7 years 11 months. The CAIDS-Q was found to have good internal consistency, convergent and discriminative validity, with the latter illustrating both sensitivity and specificity of over 80%%, which exceed values considered to be acceptable for screening of 70–80% for sensitivity and80% for specificity (e.g. Glascoe 2005). While the CAIDS-Q was found to correlate significantly with IQ scores, the relationships and associated effect sizes were smaller than with the older participants with whom the CAIDS-Q was originally validated. This may reflect the greater difficulty in accurately screening younger children due to rapid developmental changes (Bornholt et al., 2004).

The ability of the CAIDS-Q to accurately distinguish between those with and without ID, even in individuals with co-morbid conditions, the short administration time compared with full diagnostic assessments, and the fact the tool can be completed with an informant and that it does not require the user to have a particular professional background or qualification all indicate that the CAIDS-Q offers a potential tool for the early identification of children who are likely to have ID. Routine use by CAMH and ID services at the point of referral may help promote an efficient triage process, facilitating appropriate referral for full diagnostic assessment when required, earlier diagnosis and intervention (Guralnick, 2005). Future research which explores the validity of the tool within education services will also indicate whether routine use of the CAIDS-Q might offer a means for children with ID to be identified at an early stage at key points within the educational process.

The study did, however, have limitations. The data were derived from four National Health Services (NHS) in Scotland and it is unclear how the results would generalise to other countries and cultures. In addition, the range of adaptive assessments used meant that there were insufficient numbers of any one measure to establish the convergent validity of the CAIDS-Q against. Despite this, the CAIDS-Q was validated against the clinical opinion of the diagnosing professional, in the absence of knowledge about the CAIDS-Q cut- off scores and the results suggest that it offers a potentially useful ID screening tool for younger children being referred to CAMH and ID services.

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Table 1: Participant characteristics in the study on validity of CAIDS-Q in children aged

	Participants with ID (*n=45*)	Participants without ID (*n=58*)
Gender: Male/Female (%)	32/13 (71/29)	40/18 (69/31)
Mean age in months (SD: range)	83.4 (6.1: 72-94)	80.9 (7.6: 72-95)
CAIDS-Q mean score (SD: Range)	16.4 (22.6:0-86)	60.5 (25.9:0-100)
Mean WISC IV Full scale IQ and index scores (SD: Range)		
Full Scale IQ	55.7(9.2: 39-69)	91.2 (16.8: 63-133)
Verbal Comprehension Index	69.4(12.7: 44-89)	92.4 (13.6:67-119)
Perceptual Reasoning Index	64.5 (8.1: 53-82)	95.4 (17.8: 71-144)
Processing Speed Index	63 (12.5: 50-97)	90.8 (17.6: 50-140)
Working Memory Index	60.8 (9.8:50-80)	95.3 (18.4: 52-142)