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Short communication

Development of Opioid Overdose Knowledge (OOKS) and Attitudes (OOAS) Scales for take-home naloxone training evaluation☆

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ABSTRACT

Aims: To develop an Opioid Overdose Knowledge Scale (OOKS) and an Opioid Overdose Attitudes Scale (OOAS) to evaluate take-home naloxone training.
Methods: Psychometric instrument development study conducted in England using convenience samples. Forty-five items were selected for the OOKS organised in four sub-scales (risks, signs, actions and naloxone use). The OOAS was formed initially of 32 items grouped in three sub-scales (competence, concerns and readiness). Both scales were administered to 42 friends and family members of heroin users and 56 healthcare professionals to assess internal reliability and construct validity. The Brief Overdose Recognition and Response Assessment (BORRA) and the General Self-Efficacy Scale (GSE) were also administered to family members to test concurrent validity. Family members completed the OOKS and OOAS on a second occasion to assess test–retest reliability.
Results: The OOKS and OOAS were internally reliable (Cronbach's alpha = 0.83 and 0.90, respectively). Retest was completed by 33 participants after 14 (SD 7) days (OOKS, ICC = 0.90 and OOAS, ICC = 0.82) with sub-scale item sets from each measure falling within the fair-to-excellent range (ICC = 0.53–0.92). Professionals reported significantly higher scores on both scales than family members. The OOKS total score was positively correlated with the BORRA's Overdose Recognition ($r = 0.5$, $P < 0.01$) and Naloxone Indication sub-scales ($r = 0.44$, $P < 0.05$), but the total score on the OOAS was not associated with the GSE ($r = 0.02$, NS).
Conclusion: The 45-item OOKS and 28-item OOAS are suitable as outcome measures of take-home naloxone training for friends and family members of opioid users.

1. Introduction

Administration of naloxone, a short-acting opioid antagonist, is a standard procedure in emergency management of opioid overdose (Clarke et al., 2005). Take-home naloxone (THN) is a novel prevention approach in which appropriately trained heroin users and family members are provided with naloxone supplies for emergency use in the event of witnessing an opioid overdose (Strang et al., 1996, 1999; Baca and Grant, 2005). Proximal, post-THN training outcome measures logically relate to knowledge of opioid overdose and specific competencies of trainees to respond to an emergency overdose situation and administer naloxone to the victim (Strang et al., 2008a).

Previous research among those who have witnessed an opioid overdose has investigated knowledge of risk factors, signs of opioid overdose, the effects of naloxone and its administration, and explored attitudes towards naloxone use and the likelihood of intervening in an overdose event (Strang et al., 2008a; Wagner et al., 2010; Piper et al., 2008; Tobin et al., 2009). To date, research measures in this field have been ad hoc, with the Brief Overdose Recognition and Response Assessment (BORRA) the only standardised scale available to THN training evaluators (Green et al., 2008). The BORRA contains items on overdose signs and naloxone use in a range of scenarios, but does not address overdose risk factors, general overdose management, or include items on the effects of naloxone.

Accordingly, we developed a knowledge and an attitudes scale for a THN research and training evaluation. This report summarises the development, validity and reliability assessment of the Opioid Overdose Knowledge Scale (OOKS) and the Opioid Overdose Attitudes Scale (OOAS).

☆ Supplementary material can be found by accessing the online version of this paper. Please see Appendix A for more information.

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Table 1
Contrast of family members and professionals on the OOKS and OOAS.

	Family members ($n = 42$) Mean (SD)	Professionals ($n = 56$) Mean (SD)	*P*-value	Mean difference between samples (95% CI)
OOKS total	34.03 (5.07)	40.02 (3.19)	0.001	−5.99 (−7.81, −4.18)
Risk	7.50 (1.47)	8.00 (1.03)	0.06	−0.50 (−1.04, −0.38)
Signs	7.23 (1.51)	8.75 (1.27)	0.001	−1.53 (−2.09, −0.97)
Actions	10.18 (0.81)	10.48 (0.66)	0.04	−0.31 (−0.61, −0.01)
Naloxone use	9.13 (2.77)	12.77 (1.67)	0.001	−3.64 (−4.63, −2.66)
OOAS total	105.69 (10.95)	116.95 (15.52)	0.001	−11.26 (−17.01, −5.52)
Competence	34.21 (6.67)	39.14 (9.35)	0.006	−4.92 (−8.42, −1.43)
Concerns	29.71 (4.32)	33.45 (4.15)	0.001	−3.74 (−5.56, −1.92)
Readiness	41.76 (3.96)	44.36 (4.17)	0.004	−2.60 (−4.35, −0.86)

2. Methods

2.1. Design

This was a psychometric instrument development study using data gathered from two independent convenience samples of family members and friends of opioid users ('family members' herein for economy) and healthcare professionals working in addiction treatment services and THN training programmes in England. The study protocol was approved by the Joint Institute of Psychiatry and South London and Maudsley NHS Foundation Trust Ethics Committee (Study: 08/H0807/58).

2.2. Procedure

Informed by a review of the literature and our prior research experience with THN, indicating that clinicians and clients present a range of training needs when managing opioid overdose events (Strang et al., 2008a,b; Mayet et al., 2011), we created an initial pool of 28 and 39 items for the OOKS and OOAS, respectively. Items for the OOKS were grouped into four sub-scales labelled: *risks*, *signs*, *actions* and *naloxone use*. The OOAS was adapted from the structure of the Drug and Drug Problem Perception Questionnaire (Watson et al., 2007), with items grouped into three sub-scales relating to overdose management: *competence*, *concerns* (about intervening) and *readiness* (willingness to intervene).

The study was implemented in two phases. First, 14 family members of heroin users who were in contact with UK National Health Service (NHS) addiction services in South London took part in a semi-structured, 45-min personal interview (administered by author A.W.). The interview explored their experience of witnessing and managing an opioid overdose, their attitudes towards overdose intervention, and to give feedback on the face validity (clarity and relevance) of the candidate items and advise on additional items. Secondly, 20 clinicians working in THN training programmes across England completed an email questionnaire on the face validity of the item pool for the two scales and were invited to advise on any additional items needed.

Modifications were made to the wording of the items following completion of this first step, with 17 items added to the OOKS and seven items removed from the OOAS. Field versions of the measures were constructed as follows. The OOKS items used a 'yes/no or don't know'; or 'true/false or don't know' response format (each correct answer scored one and 'don't know' and incorrect responses scored zero; total score range, 0–45). Responses to the OOAS were anchored by a five-point Likert-type scale (completely disagree, disagree, unsure, agree, and completely agree), scored 1–5. Items were randomly ordered for the OOAS, but to maintain a logical flow, it contained a sequence of three positively worded and three negatively worded items. For the present analysis, negatively worded items were reversed scored at data-entry (total score range, 32–160). Total scores were the primary outcomes and the sub-scales were the secondary outcomes.

In the second phase, an independent sample of 42 family members (recruited via family member support groups and addiction services from SE London) and 56 healthcare professionals working in these addiction treatment services were recruited to gather data on the internal reliability and construct validity. Concurrent validity and seven-day test–retest reliability were tested among family members only. It was also expected that family members with higher scores on the OOKS would have higher scores on the OOAS.

2.3. Statistical analysis

The internal reliability of the OOKS and OOAS was assessed by Cronbach's alpha ($\alpha \geq 0.60$), with items with low item-total correlations excluded. A random-effects, repeated measures analysis of variance was used to compute intra-class correlation coefficients (ICC) for a test–retest administration of the OOKS and OOAS, with the retest planned for seven days after test completion. The minimum threshold for re-test was an ICC of 0.40 (Streiner and Norman, 1989).

The number of participants required for test–retest reliability assessment was judged on the basis of a target 0.80 (excellent) ICC for the pair of total scores on each measure against an ICC of 0.50 (fair). On this basis, we estimated that at least 31 participants would be needed to reject the null hypothesis with 90% power (one-tailed, 5% test) (Kraemer and Thiemann, 1987).

Construct validity was evaluated by comparing the professionals' and family members' scores (the hypothesis being that OOKS scores would be higher among the former sample), and concurrent validity by comparing the OOKS with the BORRA (Green et al., 2008) and the OOAS with the General Self-efficacy Scale (Schwarzer and Jerusalem, 1995) using standardised scores.

3. Results

3.1. Internal and test–retest reliability

Four items from the OOAS were removed due to low item-total correlations. Items removed were as follows: "If I had to assist someone who was overdosing, I would be concerned of virus contaminations (such as HIV or hepatitis); "I would prefer not to help someone who has overdosed, because I'd feel responsible if they died; "I would like to keep a naloxone supply with me all the time; "Someone who has overdosed should only be treated by a doctor or a paramedic". No items were deleted from the OOKS.

The final versions of the OOKS and OOAS demonstrated good internal reliability $\alpha = 0.83$ and 0.90, respectively. Thirty-three family members (85%) completed the retest. The mean time between test and retest was 14 days (SD = 7, range 7–34 days). The total score for the OOKS had a high level of test–retest reliability (ICC = 0.90), and the *risks*, *signs*, *actions* and *naloxone use* sub-scales fell in the fair-to-excellent range (ICC = 0.87, 0.69, 0.53 and 0.83, respectively). The overall test–retest reliability of the OOAS was good (ICC = 0.82), with the *competence*, *concerns* and *readiness* item score totals falling in the fair-to-excellent range for test–retest reliability (ICC = 0.92, 0.55 and 0.65, respectively).

3.2. Construct and concurrent validity

The OOKS and OOAS were positively correlated ($r = 0.51$; $P < 0.001$). Professionals presented significantly higher knowledge and positive attitudes than family members in both scales and in most domains. The greatest difference was observed in the *naloxone use* item set in the OOKS and in the *competence* group of items in the OOAS (Table 1).

Finally, we examined correlations between the OOKS with the BORRA and OOAS with the GSE. The OOKS total score was significantly positively correlated with the BORRA's Overdose Recognition ($r = 0.5$, $P < 0.01$) and Naloxone Indication sub-scales ($r = 0.44$, $P < 0.05$). However, the total score on the OOAS was not positively correlated with the GSE ($r = 0.02$, NS). The final versions of the OOKS and OOAS are shown in Supplementary Tables S1 and S2[1].

[1] Supplementary material can be found by accessing the online version of this paper. Please see Appendix A for more information.