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# **A modified Drug Attitude Inventory used in long-term patients in sheltered housing**

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## **Abstract**

The self-report Drug Attitude Inventory (DAI), in 30- and 10-item versions, provides unique information of clinical relevance for monitoring treatment adherence among people diagnosed with schizophrenia. The primary purpose of this paper was to evaluate the 10-item version among patients living in sheltered housing. Data were collected among 68 persons living in sheltered housing, most of them (82%) diagnosed with schizophrenia, 6% with non-organic psychoses, and 12% with other diagnoses. The dichotomic response format of the original DAI-10 was replaced by a 4-point Likert scale, in order to improve the resolution of the scale. Over 90% of the participants produced meaningful scores. A factor analysis suggested a 2-factor orthogonal structure: one highly homogenous factor (5 items) reflected wanted effects of the drug and displayed a bimodal distribution; one factor (3 items) reflected side effects. One item concerned the perceived control over one's drug treatment, which is a key clinical issue. One item was conceptually ambiguous and displayed no correlations with the other items. On the basis of the results we suggest cut-off scores which indicate the need for three kinds of adherence-improving interventions.

Summing up, by dropping one item and using a Likert scale response format, the resulting instrument, **DAI-9**, appears to be an easy-to-use self-report instrument for monitoring drug attitudes and to identify needs for treatment adherence interventions among seriously ill patients.

**Key words:** Psychosis; Housing; Medication Adherence; Self-Report.

## 1. Introduction

Following the de-institutionalization phase in psychiatry more patients are cared for as out-patients (Davis et al., 2012). Some patients with more complex needs are cared for by specialized out-reach teams (Burns, 2004). Those in need of continuous support and monitoring may, in accordance with a Swedish law, be referred to subsidized housings (Lindqvist et al., 2011). This type of sheltered housing is aimed at persons with long-lasting, serious mental health problems who need around-the-clock monitoring and support. During the last 15 years almost no studies have addressed the needs of this group (Bitter et al., 2009). The majority of people needing long-term care in psychiatric or social care institutions are diagnosed with schizophrenia (Taylor et al., 2009) and are more likely to suffer from other comorbid conditions (Mitchell and Malone, 2006).

Treatment non-adherence and drug discontinuation are large problems in long-term treatment of schizophrenia (Goff et al., 2010; Uggerby et al, 2011). Many potential predictors of future non-adherence were assessed among first episode patients with schizophrenia in the EUFEST project (Gaebel et al., 2010). An unexpected finding was that a simple instrument assessing patients' attitude towards drug treatment, DAI-30 was the best predictor for continuation of initiated drug treatment, even if the predicting power was low.

In a recent paper we compared the short version (DAI-10) with DAI-30 in long-term schizophrenia in two materials (Nielsen et al., 2012). The two versions were strongly inter-correlated ( $r=.93$ ). In line with the EUFEST findings none of them displayed any significant association with poor insight or PANSS subscales, GAF or neurocognition (Gabel et al.,

2010). The two DAI versions appear to assess a unique clinical dimension relevant to non-adherence, which cannot be assessed by other commonly used scales.

In DAI-10, there are six positively phrased and four negatively phrased items, in contrast to the balanced mother scale (Nielsen et al 2012). Three of the negatively phrased items refer to side-effects whereas most of the positively phrased items refer to symptom reduction, generating a confounding problem and an acquiescence problem. Furthermore, the resolution of DAI-10 is poor (0-10). These design flaws of the original DAI-10 scale leave room for improvement.

The data of the present paper was obtained within a larger project. The overall aim was to screen for physical and mental health problems among persons living in sheltered housing in the South of Sweden. The aim of the current report was to evaluate if a modified 10-item DAI self-report questionnaire generated clinically meaningful information in a group of seriously and chronically ill patients, most of whom are diagnosed with schizophrenia.

## **2. Experimental Procedures**

### **2.1. Participants**

Persons living in 13 different subsidized housings in three different municipalities of southern Sweden during the years 2010-2011 were asked to participate. Potential participants were informed about the research project by the research team at group meetings at the sites. Each person was then approached individually and asked to fill in a set of self-report forms, including DAI-10, by a research team member. Participants were awarded nine Euros for completing the forms. Out of 135 users, 68 accepted to participate.

## 2.2. Measures

### 2.2.1. The DAI-10 scale (*modified response format*)

The standard DAI-10 phrasing in Swedish translation (Nielsen et al., 2012) was used with a modified response format (Likert scale) to the statements: Score 1: Does not agree; Score 2: Agrees to some extent; Score 3: Agrees to a large extent; and Score 4: Agrees fully to the statement. The items are listed in Table 1.

Table 1. Items of the DAI-10. Bold items refer to symptom reduction; items in italic refer to side-effects. Item three refers to the perceived control over one's drug treatment. Item 6 is conceptually ambiguous.

**1. For me, the good things about medication outweigh the bad**

*2. I feel strange, "doped up", on medication*

3. I take medications of my own free choice

**4. Medications make me feel more relaxed**

*5. Medication makes me feel tired and sluggish*

6. I take medication only when I feel ill

**7. I feel more normal on medication**

*8. It is unnatural for my mind and body to be controlled by medications*

**9. My thoughts are clearer on medication**

**10. Taking medication will prevent me from having a breakdown**

### 2.2.2. Statistical Methods

Standard statistical methods, as implemented in the SPSS 18, were used as indicated in the text.

### 2.2.3. Ethics

The mother project, including this study, was approved by the Regional Ethics Committee in Lund.

### **3. Results**

Sixty-eight participants were included (39 men, 29 women). They had lived in sheltered housing between 0-12 years. Sixty-six were Caucasian and two were of African origin. The age range was 21 to 71 years, with a median age of 50 years. Diagnosis according to ICD10 and current drug treatment were obtained from their physicians: 88% had a psychotic disorder (79% schizophrenia including 3% with schizoaffective disorder, 6% other non-organic psychoses) and 12% was diagnosed with various organic conditions including mild learning disability. Co-morbid substance misuse was registered for 23%, most often alcohol or benzodiazepines (18%). Six percent of the participants were currently not treated with antipsychotic drugs but all had experience of such treatment. In the group treated with antipsychotics 21% had clozapine, 32% had non-clozapine second generation antipsychotics, and 47% had first generation antipsychotic drugs as their main drug. Eight percent were treated with lithium or other mood stabilizers. Approximately half of the participants were given long acting injectable antipsychotics. Haloperidol equivalent doses ranged from 0 to 24 mg with a mean dose of 7.42 mg.

In four patients we saw a uniform pattern in answers, with a tendency to answer all questions in one of the extremes (between 1 and 4). As some of the DAI-9 questions are similar to a certain degree, but phrased positively or negatively, it let us to believe that the questions were not understood or read, and the answers therefore were not valid. These four subjects' results

were thus censored due to lack of sense in results, e.g. entering distinctly inconsistent ratings. Thus, more than 90% of the group were able to rate the items in a meaningful way.

None of the 40 response alternatives were empty. An exploratory factor analysis of the ten items suggested a two-factor solution which explained 50% of the total variance, using the Eigenvalue $>1$  as well as the scree criterion (Costello and Osborne, 2005). Orthogonal (Varimax) as well as oblique (Promax) rotations were applied. The two factors were uncorrelated and the orthogonal rotation was preferred. Two items were orphans with respect to the factors, i.e. did not load in any factor: Item- 3 (I take my medication voluntarily) and Item 6 (I take my medication only when ill). Item 6 is conceptually ambiguous whereas Item 3 refers to an important adherence-relevant aspect. The results of the exploratory factor analyses were then confirmed by analyses of subscale homogeneity and clinical/conceptual considerations.

Items 1, 4, 7, 9 and 10 (see Table 1), forming the larger factor, are all positively phrased and refer to wanted effects of the drug treatment (Positive factor). The homogeneity of this subscale was high, 0.51 (single item intra-class correlation, icc). The Negative factor, including Items 2, 5 and 8 refer to unwanted effects of the drug treatment (single item icc 0.27).

The distribution of checked response alternatives of the Positive factor's five items was similar. Then, a sumscore is a good overall estimate because all items will contribute with approximately equal variance. The distribution of the Positive sumscores is displayed in Figure 1. It might be noted that it is bimodal with a break-point at a sumscore of 11.



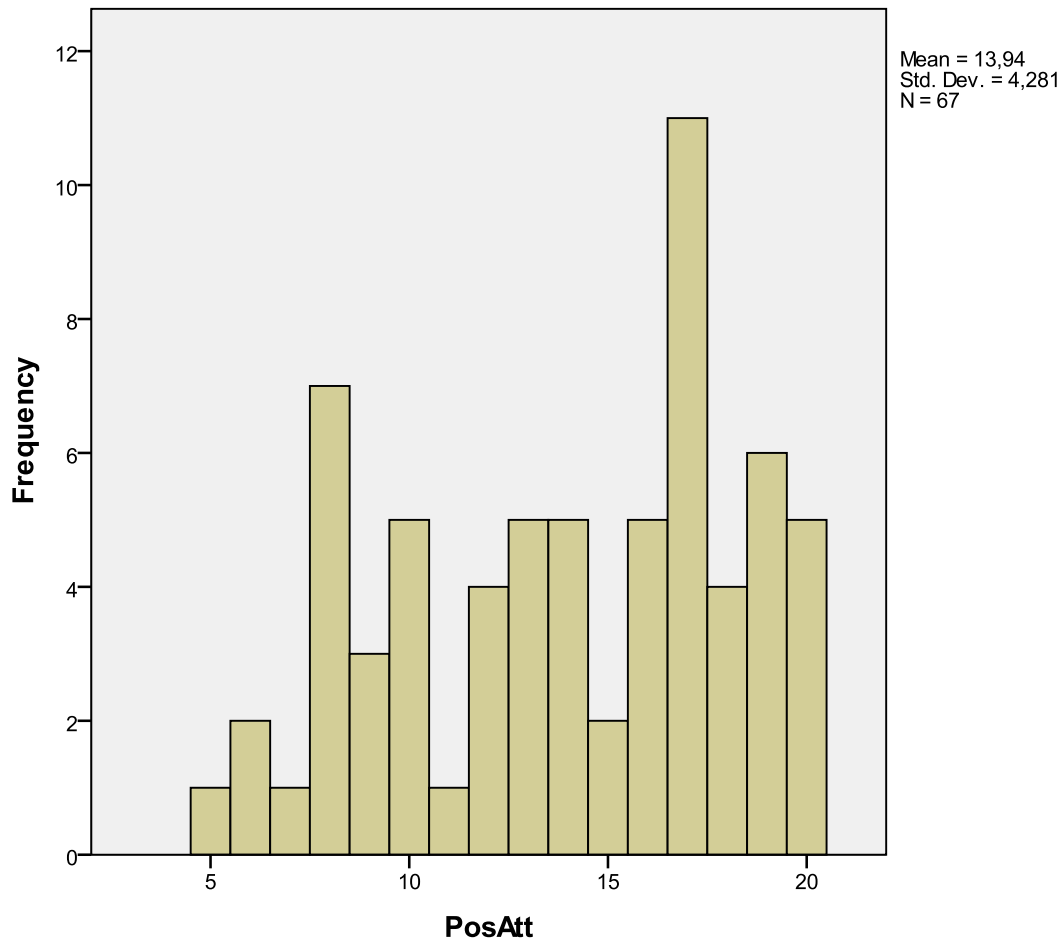


Figure 1: Distribution of Positive Sumscores

A sumscore was also computed for the three Negative factor items. This sumscore ranged between 3 and 10. Thirteen percent of the participants scored 8 or more.

Twelve percent of the participants scored 1 on Item 3, i.e. perceived that their drug treatment was forced upon them.

The correlation between the Positive and Negative sumscores was non-significant (0.19).

None of the two sumscores correlated significantly with Item 3 (perceived control over the medication).

## 4. Discussion

Nine of the DAI-10 items were conceptually and psychometrically consistent, forming two subscales and one orphan item. The Positive subscale (five items) displayed an unusually high homogeneity. Although less homogenous, the Negative subscale displayed a good homogeneity. Thus, most of these seriously ill long-term patients were able to respond to the items in a statistically as well as clinically meaningful way.

The item content of the **Positive subscale** suggests that low scores indicate **poor symptom-alleviating effects** of the drug treatment. The **Negative subscale** includes items which refer to **unwanted side effects** of the drug treatment.

We suggest that this new DAI-9 scale can be used to identify drug adherence problems according to the following rules. If the Positive subscale sumscore is lower than 11 and especially if lower than 9, adherence-improving interventions should be implemented focusing on lack of effectiveness of the drug treatment. The reason why we chose 11 is the distribution of the scores: bimodal distributions are not common when scores are based on a sum of items – if so it suggests that a one-dimensional latent factor is either present or absent.

This problem factor can be illuminated by symptom-ratings, both clinician-based (PANSS or PECC) (Lindström et al., 2012) and matching self-ratings (4S) (Lindström et al., 2009).

If the Negative sumscore is higher than 7, which was the case for 13% of the participants, interventions focusing on side-effects should be initiated. By using the UKU scales in clinician (Lingjaerde et al., 1987) as well as self-rating (Lindström et al, 2001) versions, the pattern of significant side effects can be assessed and appropriate interventions can be

initiated. Finally, if Item 3 is scored 1, the issue of perceived lack of control over one's medication should be addressed, by improving insight and underlining shared responsibility and decision-making. The overall effect of interventions can be verified by DAI-9 retesting.

## **5. Conclusion**

DAI-9 is an easy-to-use self-report instrument for monitoring drug attitudes and to identify needs for different types of adherence-improving interventions among seriously ill patients. We have demonstrated its usefulness in the setting of sheltered housing and seriously ill patients, but our results can probably also be extended to settings with less ill patients. The DAI-9 can be administered by staff at all levels of care to enhance the dialogue with patients and patient participation in care (Gray et al., 2010).

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### **Contributors**

SS: collected patient data, main responsibility for writing up the paper.

KP: collected patient data, shared responsibility for the text.

RN: participated in the data analysis, added expert knowledge in writing the text.

ET: collected patient data, main clinical responsibility for the project, shared responsibility for the text.

SL: senior author, project leader, participated in the data analysis, shared responsibility for the text.

### **Conflict of interest**

No conflict of interest.

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