Opportunistic screening for alcohol use disorders in primary care: comparative study

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Several screening strategies for alcohol use disorders in primary care were examined. These were the alcohol use disorders identification test (AUDIT) and traditional biochemical markers such as gamma-glutamyltransferase (GGT), aspartate aminotransferase (ASAT), erythrocyte mean cell volume (MCV), and per cent carbohydrate deficient transferrin (%CDT). The AUDIT is a 10-item questionnaire specifically developed for use as a short screening instrument for the identification of hazardous, harmful, or dependent alcohol users.

Type of intervention
Screening.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised adult individuals attending visits in a primary care setting.

Setting
The setting was primary care. The economic study was carried out in south Wales.

Dates to which data relate
The period during which the effectiveness and resource use data were gathered was not reported. The costs were expressed using 2000/01 prices.

Source of effectiveness data
The effectiveness evidence was derived from a single study.

Link between effectiveness and cost data
The costing was carried out in a sample of 1,000 hypothetical patients, who were different from those included in the effectiveness analysis.

Study sample
Power calculations were not performed. Eligible participants were recruited among male attendees in primary care. Of the 1,794 men who were consecutively approached and who completed the AUDIT questionnaire, 447 (24.9%) were positive for alcohol use disorders and 112 (25% of patients with a positive test result) agreed to participate. Of the 1,347 patients with a negative test result, 450 were randomly sampled and 82 (18% of patients with a negative result) agreed to take part in the study. Thus, the final sample included 194 individuals. The mean age of those with a positive
AUDIT result was 42.8 years (range: 18.3 to 75.3) and 54% were married or cohabiting. The mean age of those with a negative AUDIT result was 50.9 years (range: 18.7 to 80.9) and 73% were married or cohabiting. Patients with a negative test result who did or did not take part in the study showed no significant difference in age or test score. Similarly, patients with a positive test result who did or did not take part in the study showed no significant difference in age or test score.

**Study design**

This was a diagnostic study that was carried out at six general practices in south west Wales. Each patient underwent all screening strategies. The patients were not followed after the tests were completed. No patient was lost to the follow-up assessment. Research nurses asked male attendees in primary care to complete an AUDIT questionnaire embedded within a general lifestyle questionnaire. Participating individuals were then interviewed by researchers in the practice who assessed frequency and quantity of alcohol use in the previous 180 days using the time line follow back method. The researchers were blind to the patient's score. This approach was used to establish the number of weeks in the previous 180 days the patient had exceeded the “safe level” of alcohol consumption (greater than 21 units of alcohol in any one week) and the frequency with which the patient engaged in binge alcohol consumption (greater than 8 units of alcohol in any one day) in the past 180 days. This was used as a criterion for hazardous and binge alcohol consumption and is inclusive of harmful alcohol consumption and dependence. The researcher established a diagnosis of alcohol dependence according to the Diagnostic and Statistical Manual of Mental Disorders by administering the alcohol dependence element of the short form composite international diagnostic interview. Blood samples were then taken from each patient by venepuncture. Blood tests were carried out blind to the patient's score on the AUDIT.

**Analysis of effectiveness**

The analysis of the clinical study considered all patients included in the study sample. The primary outcome measure was the accuracy of the tests in identifying hazardous alcohol consumption, weekly or monthly binge consumption, and alcohol dependence, which was estimated by constructing receiver operating characteristic curves on the basis of all possible continuous values of the test results. The sensitivity, specificity, and positive and negative predictive values were also assessed. Correlations were used to compute linear associations between the quantity of alcohol consumed, the standard drinks consumed per drinking day and test score, GGT, ASAT, MCV and %CDT. The prevalence of drinking behaviour was also estimated.

**Effectiveness results**

When using the sample to estimate the prevalence of drinking behaviours in the general practice population, the prevalence of hazardous alcohol consumption was 34% (95% confidence interval, CI: 28 to 40), monthly binge consumption was 35% (95% CI: 29 to 42), weekly binge consumption was 24% (95% CI: 19 to 29), and alcohol dependence was 12% (95% CI: 9 to 16).

The area under the receiver operator curve for the four measures of alcohol behaviour (hazardous alcohol consumption, weekly or monthly binge consumption, and alcohol dependence) ranged from 0.94 to 0.96 with AUDIT, from 0.59 to 0.64 with GGT, from 0.49 to 0.59 with ASAT, from 0.68 to 0.73 with %CDT, and from 0.57 to 0.64 with MCV.

The sensitivity for the four measure of alcohol behaviour ranged from 66 to 84% with AUDIT, from 32 to 44% with GGT, from 19 to 29% with ASAT, from 47 to 61% with %CDT, and from 28 to 36% with MCV.

The specificity for the four measure of alcohol behaviour ranged from 69 to 76% with AUDIT, from 67 to 71% with GGT, from 80 to 82% with ASAT, from 68 to 76% with %CDT, and from 67 to 87% with MCV.

The positive predictive value for the four measure of alcohol behaviour ranged from 41 to 95% with AUDIT, from 13 to 49% with GGT, from 12 to 45% with ASAT, from 20 to 57% with %CDT, and from 11 to 40% with MCV.

The negative predictive value for the four measure of alcohol behaviour ranged from 84 to 97% with AUDIT, from 69 to 88% with GGT, from 66 to 88% with ASAT, from 72 to 92% with %CDT, and from 67 to 87% with MCV.

The AUDIT questionnaire was significantly more accurate than any of the biochemical predictors and had a highly
significant relationship with alcohol consumption for all classifications.

Significant correlations were found between alcohol consumption, measured as the number of standard drinks consumed per drinking day over the previous 180 days, and AUDIT score, (p<0.001), GGT, (p=0.04) and %CDT, (p<0.001), but not ASAT, (p=0.7) or MCV, (p=0.9).

Clinical conclusions
The effectiveness analysis showed that the accuracy of screening was significantly higher with the AUDIT.

Measure of benefits used in the economic analysis
The summary benefit measure used was the expected number of true positives for the four measures of alcohol behaviour (hazardous alcohol consumption, weekly or monthly binge consumption, and alcohol dependence) in a hypothetical cohort of 1,000 male attendees. These measures were derived directly from the effectiveness analysis.

Direct costs
The perspective of the analysis was unclear but it might have been that of the NHS. Only direct medical costs were included. The categories of costs considered were printing (for AUDIT), venepuncture (for biochemical markers), analysis and interpretation of results (including practice nurse time and premises). The unit costs were presented separately from the quantities of resources used for many items. Resource consumption was based on a hypothetical sample of 1,000 patients (one screening test for each individual). Some costs were estimated on the basis of the Personal Social Services Research Unit. The sources of the other costs were not reported. Discounting was not relevant since the costs were incurred during a short time. The costs were expressed using 2000/01 prices.

Statistical analysis of costs
The costs were treated deterministically.

Indirect Costs
The indirect costs were not included in the economic evaluation.

Currency
UK pounds sterling (€).

Sensitivity analysis
Sensitivity analyses were not carried out.

Estimated benefits used in the economic analysis
The expected number of true positives for hazardous alcohol consumption in a cohort of 1,000 patients was 236 with AUDIT, 126 with GGT, 69 with ASAT, 162 with %CDT, and 109 with MCV.

The expected number of true positives for monthly binge consumption in a cohort of 1,000 patients was 233 with AUDIT, 149 with GGT, 93 with ASAT, 209 with %CDT, and 125 with MCV.

The expected number of true positives for weekly binge consumption in a cohort of 1,000 patients was 182 with AUDIT, 107 with GGT, 70 with ASAT, 148 with %CDT, and 75 with MCV.

The expected number of true positives for alcohol dependence in a cohort of 1,000 patients was 103 with AUDIT, 39 with GGT, 24 with ASAT, 70 with %CDT, and 34 with MCV.
**Cost results**
The total cost to screen 1,000 patients was 1,700 with AUDIT, 5,250 with GGT, 5,250 with ASAT, 27,250 with %CDT, and 8,250 with MCV.

**Synthesis of costs and benefits**
Average cost-effectiveness ratios were calculated to combine the costs and benefits of the alternative screening strategies.

The average cost per true positive for hazardous alcohol consumption was 7.19 with AUDIT, 41.82 with GGT, 76.47 with ASAT, 168.16 with %CDT, and 75.42 with MCV.

The average cost per true positive for monthly binge consumption was 7.30 with AUDIT, 35.13 with GGT, 56.49 with ASAT, 130.26 with %CDT, and 65.98 with MCV.

The average cost per true positive for weekly binge consumption was 9.35 with AUDIT, 48.89 with GGT, 75.32 with ASAT, 183.68 with %CDT, and 109.58 with MCV.

The average cost per true positive for alcohol dependence was 16.49 with AUDIT, 135.79 with GGT, 222.20 with ASAT, 390.57 with %CDT, and 240.05 with MCV.

An incremental analysis was not performed but the AUDIT was both more effective and less expensive than the other screening strategies.

**Authors’ conclusions**
The alcohol use disorders identification test (AUDIT) questionnaire was an easy, quick and efficient diagnostic tool for routine screening for alcohol use disorders in primary care.

**CRD COMMENTARY** - **Selection of comparators**
The rationale for the choice of the comparators was clear. They all represented possible screening strategies for the identification of individuals with alcohol use disorders. You should decide whether they are valid comparators in your own setting.

**Validity of estimate of measure of effectiveness**
The effectiveness data came from a diagnostic study (within-group comparison), which has the advantage of applying all the strategies to the same sample of patients. A control group was therefore not required, thus reducing the potential impact of confounding factors. This design is usually considered to be weak because of the possible effect of selection bias, but the use of blinding and correlation analyses enhanced the internal validity of the study. The diagnosis of alcohol dependence according to the Diagnostic and Statistical Manual of Mental Disorder was used as the ‘gold’ standard. This is considered a reliable and valid method for the detection of alcohol dependency. No justification for the size of the sample was provided and, owing to the small number of patients included in the analysis, it is unclear whether the results obtained were due to the intervention or to chance. The evidence came from several centres, which enhances the representativeness of the study sample. Extensive information on the patient selection process was provided. The authors showed that patients enrolled in the study were similar to those who did not participate. These issues should be considered when examining the validity of the effectiveness measures.

**Validity of estimate of measure of benefit**
The summary benefit measures were specific to the disease considered in the study. They will not be comparable with the benefits of other health care interventions. However, they represent the direct results of the screening tests.
Validity of estimate of costs
The authors did not explicitly report the perspective that was taken for the analysis, although it might have been that of the health service payer. The unit costs and resource use were reported for some items. The sources of the data were not provided for all of the costs. The cost estimates were specific to the study setting and the impact of using alternative cost estimates was not investigated. Thus, it may be difficult to extrapolate the economic results to other settings. Statistical tests were not carried out. The price year was reported, which will facilitate reflation exercises in other time periods.

Other issues
The authors did not compare their findings with those from other studies, although they stated that recent work has concluded that brief counselling interventions are effective in reducing alcohol consumption. The issue of the generalisability of the study results to other settings was not explicitly addressed and sensitivity analyses were not carried out. Therefore, the external validity of the analysis is limited. The authors noted that the study focused on male attendees, thus caution will be required when extrapolating the results of the analysis to other patient groups.

Implications of the study
The study results support the use of the AUDIT questionnaire to screen for alcohol use disorders in primary care. The authors stated that the widespread and routine implementation of intervention strategies could have large benefits for public health and the health of the individual. The authors recommended the study be replicated in female attendees.

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