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Brief Physician Advice for Problem Drinking among Older Adults: An Economic Analysis of Costs and Benefits*

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ABSTRACT. Objective: Problem alcohol use among elderly persons can have a variety of health-related consequences, complicating management of chronic illnesses and increasing health care utilization and costs. This study evaluates the economic cost and benefits of brief intervention for at-risk drinking older adults. Method: A controlled clinical trial with 24-month follow-up tested effectiveness of brief physician advice in reducing alcohol use, health care utilization and other consequences among older (age 65 or older) adult problem drinkers. Of 6,073 patients screened for problem drinking in 24 community-based primary care practices in Wisconsin, 158 patients met inclusion criteria and were randomized into control (n = 71) or intervention (n = 87) groups. Intervention group patients received two 10- to 15-minute physician-delivered counseling sessions including professional advice, education and contracting using scripted workbooks. Results: The intervention group demonstrated significant reductions in alcohol use (p = 0.001) and frequency of excessive drinking (p = 0.03) compared with the control group over 24 months, but no significant differences emerged in economic outcomes, including hospital days, emergency department visits, office visits, medications, lab and x-ray procedures, injuries, legal events or mortality. Conclusions: Although the clinical benefits of brief alcohol interventions with older adults are clear, the economic results in this age group are less certain. Older adult problem drinkers may require more intensive and costly interventions to achieve economic benefits similar to those seen in younger adult problem drinkers. Methodological issues, such as statistical power, outcome measures, outlier cases and follow-up periods, are identified for future evaluations. (J. Stud. Alcohol 66: 389-394, 2005)

WITH THE PROPORTION of elderly individuals in the United States continually rising, an important aspect of health care for this rapidly growing population is the prevention of alcohol-related health problems. Natural changes in body composition and liver function in the elderly can reduce tolerance to alcohol (National Institute on Alcohol Abuse and Alcoholism, 1998). In addition, the elderly are more susceptible to accidents and injuries as a result of excessive alcohol consumption (Adams et al., 1993; Waller, 1998).

Brief physician advice, which incorporates assessment, feedback, contracting and goal setting, is one treatment alternative for addressing problem alcohol use (Moyer et al., 2002). Brief physician advice has been proven both effective and cost-effective in younger patients (Fleming et al., 1997, 2000), but information is limited on its cost-effec-


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All patients aged 65 and older were asked to complete a Health Screening Survey (HSS) (Fleming and Barry, 1991; Wallace and Haines, 1985) as they arrived for regularly scheduled appointments. The screening instrument masked the alcohol focus of the study by including questions regarding diet, exercise and tobacco use. Men who consumed more than 11 drinks (132 g alcohol) per week and women who consumed more than 8 drinks (96 g alcohol) per week were eligible for the study. Patients were excluded if they had attended an alcohol treatment program or reported symptoms of alcohol withdrawal in the past year.

Patients who screened positive on the initial HSS were contacted for an assessment interview and their consent to be included in the study, and those meeting all inclusion criteria were randomized to the control or intervention group. Control subjects received a general health booklet and were re-interviewed at 3, 6, 12 and 24 months. Patients randomized to the intervention group were given the same booklet and scheduled to see their personal physician for the brief intervention protocol, which included feedback on the patient’s health behaviors, a review of problem drinking prevalence, reasons for drinking, adverse effects of alcohol, drinking cues, a drinking agreement in the form of a prescription, and drinking diary cards. Two 10- to 15-minute visits with the physician were scheduled 1 month apart (brief intervention and reinforcement session). Each patient also received a reinforcement follow-up phone call from the clinic nurse 2 weeks after the intervention visit.

Primary outcome measures included alcohol use, health care utilization (hospitalization, emergency department visits, clinic visits and outpatient procedures) and medications. Alcohol use was measured as total drinks during the past 7 days, heavy episodic drinking (>4 drinks/occasion for men and >3 drinks/occasion for women) during the past 28 days and excessive drinking (>20 drinks for men and >13 drinks for women) during the past 7 days. The Wisconsin Department of Justice (1999) and Wisconsin Department of Transportation (1999) provided information on legal and motor vehicle events occurring during the 24-month follow-up period. Mortality information was obtained through patient follow-up procedures, family member contacts, the Social Security Death Index (1999), and the Wisconsin Department of Administration (1999). Death certificates were obtained for all deceased patients.

Economic costs and benefits

The benefit-cost analysis was performed from both a medical payer perspective and a societal perspective and is reported in 1996 dollars. Estimates of intervention costs (e.g., personnel, supplies, telephone) were obtained by surveying the manager at each clinic for average hourly wages of each category of medical personnel associated with the intervention. These average hourly wages were then multiplied by the estimated per-patient time necessary for the screening, assessment and intervention phases of the trial. Overhead costs were assessed at 25% of staff salaries to account for personnel benefits, use of facilities and shared equipment. The average hourly wage rate for all occupations in Wisconsin was used to account for patient time costs. Additional information on the cost estimation can be obtained from a previous report (Fleming et al., 2000).

Multiple data sources were used to determine health care utilization over the 24-month follow-up period. The Wisconsin MetaStar agency provided aggregate dollar amounts of Medicare reimbursement for all Wisconsin patients hospitalized during the follow-up period (MetaStar, 1999). For 11 study patients who were residents of Illinois, hospitalization costs were calculated by multiplying self-reported hospital days by the average daily expense at a Wisconsin community hospital (American Hospital Association, 2002). For all patients, self-reported emergency department visits were multiplied by the average cost of an emergency department visit in Wisconsin in 1996 (General Accounting Office, 2001).

Medical records were audited for clinic visits and outpatient laboratory and x-ray procedures performed during the study period. Prescription and over-the-counter drug use was ascertained through a combination of medical chart review and patient self-report. Chart audits documented use of commonly prescribed medications and patients self-reported use of common classes of medications. When conflicting data arose, the chart was taken as the primary source of medication information. Dollar values were assigned using First DataBank Blue Book supplier prices (First DataBank, 1995). When only drug category data were available, an average daily cost was assigned based on the averages from the Blue Book supplier prices for the category.

Economic costs of motor vehicle crashes were estimated from a report by Miller et al. (1998), which details direct expenses such as medical care, mental health services, property damage, victim’s work loss, public service costs and intangible costs such as victim’s pain, suffering and reduction in quality of life. For calculations of life-years lost, the observed mortality rates of the intervention and control patients over the 2-year study period were standardized by age and gender using data on expected mortality from the National Center for Health Statistics (MacDorman and Atkinson, 1999). Life-years lost during the study were discounted at a 5% annual rate and valued at $50,000 per life-year (Miller et al., 1996).

Statistical analysis

The overall treatment effect and time-related trends in alcohol use were determined using repeated measures analysis of variance (Cochran and Cox, 1957). Data from subjects randomized to the intervention group who failed to
complete the intervention visits were analyzed on an intent-to-treat basis. Data for patients who were missing some but not all of the follow-up interviews were imputed using postbaseline averages. Data for patients with no postbaseline data were imputed using baseline measures. This imputation provides a conservative estimate of effect size, as most subjects reduced alcohol consumption from baseline levels. Only 12% of subjects had data that required any type of imputation, with 4% imputed solely from baseline data. Confidence intervals and statistical significance of the cost estimates were generated using nonparametric bootstrap analysis (Efron and Tibshirani, 1993). All analyses were performed in SAS, version 6.07 (SAS Institute, Inc., Cary, NC).

Results

Patient screening and recruitment

Six thousand six hundred and ninety-three older adults were approached during physician visits and asked to complete the HSS. Of those asked, 620 individuals did not complete the survey, owing to incapacitation (n = 92), inability to read/speak English (n = 14) or refusal (n = 514), for a survey response rate of 91%. Initially, 656 patients (10.8%) screened positive for problem drinking. Of those screening positive, 396 patients (60.4%) completed the face-to-face assessment interview and 158 were determined eligible and randomized into the control (n = 71) or intervention (n = 87) group. One hundred sixty patients who screened positive on the HSS indicated on the survey that they desired to read/speak English (n = 14) or refusal (n = 514), for a survey response rate of 91%. Initially, 656 patients (10.8%) screened positive for problem drinking. Of those screening positive, 396 patients (60.4%) completed the face-to-face assessment interview and 158 were determined eligible and randomized into the control (n = 71) or intervention (n = 87) group. One hundred sixty patients who screened positive on the HSS indicated on the survey that they desired no further study contact, and 97 subjects screening positive and invited to complete the assessment interview phase refused participation in the research study at that point. Most subjects excluded at the assessment phase reported alcohol use below the designated threshold for inclusion. The 7-day Timeline Followback procedure (Sobel and Sobel, 1990) used in the face-to-face assessment interview provides more precise information on alcohol use than the initial HSS. Other reasons for exclusion included recent suicide ideation, symptoms of alcohol dependence, alcohol treatment in the previous year and severe medical problems. Of the 87 persons randomized to the intervention group, 72 (83%) completed both intervention visits, 12 (14%) completed only one physician visit and 3 did not keep any appointment with the physician and therefore did not receive the intervention. A total of 139 subjects (88%) participated in all of the 24-month follow-up procedures. One hundred fifty-two of the 158 subjects (96%) participated in all of the 24-month follow-up procedures. One hundred sixty patients who screened positive on the HSS indicated on the survey that they desired no further study contact, and 97 subjects screening positive and invited to complete the assessment interview phase refused participation in the research study at that point.

Participants

Small differences were found between the intervention and control groups at baseline, none of which was statistically significant (Table 1). The sample consisted of 105 men and 53 women, most of whom were between the ages of 65 and 75. Approximately 75% were currently married or living with a partner, with the remainder mostly widows or widowers. The sample was well educated, with 26% having completed 4 or more years of college. Ten percent of the sample (n = 16) reported smoking at baseline, and about 15% used mood-altering drugs (sedatives or narcotic medications) during the 6 months prior to baseline. Almost the entire sample (99%) was non-Hispanic white.

Alcohol consumption

Alcohol consumption at baseline (top panel, Table 2) was similar across treatment groups, with both groups consuming approximately 16 drinks/week. By 3-month follow-up, average weekly alcohol use decreased by 40% in the intervention group but only by 6% in the control group (p < .001). Participants in the intervention group maintained significantly lower levels of alcohol consumption and heavy episodic drinking (middle panel, Table 2) throughout the 24-month observation period. Additionally, about 50% fewer heavy drinkers in the intervention group at baseline were still drinking heavily at 24-month follow-up (bottom panel, Table 2).

In contrast, alcohol use measures for the control group did not follow a consistent pattern. Weekly alcohol use among subjects in the control group dropped, on average,
Table 2. Alcohol consumption at baseline and follow-up, by study group

<table>
<thead>
<tr>
<th></th>
<th>Treatment group (n = 87)</th>
<th>Control group (n = 71)</th>
<th>z statistic</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of drinks in previous 7 days,</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>15.5 (7.5)</td>
<td>16.7 (11.3)</td>
<td>0.75</td>
<td>ns</td>
</tr>
<tr>
<td>3 months</td>
<td>9.6 (6.6)</td>
<td>15.7 (11.9)</td>
<td>3.91</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>6 months</td>
<td>10.2 (7.5)</td>
<td>16.5 (13.7)</td>
<td>3.45</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>12 months</td>
<td>10.1 (7.1)</td>
<td>16.6 (12.9)</td>
<td>3.80</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>24 months</td>
<td>10.5 (8.0)</td>
<td>14.7 (11.7)</td>
<td>2.58</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Percent drinking excessively in previous 7 days,</td>
<td>% (n)</td>
<td>% (n)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>3.34 (6.8)</td>
<td>4.61 (9.0)</td>
<td>0.98</td>
<td>ns</td>
</tr>
<tr>
<td>3 months</td>
<td>1.03 (2.4)</td>
<td>4.25 (8.5)</td>
<td>3.09</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>6 months</td>
<td>1.82 (4.4)</td>
<td>4.42 (8.8)</td>
<td>2.27</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>12 months</td>
<td>1.11 (2.4)</td>
<td>5.46 (9.4)</td>
<td>3.78</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>24 months</td>
<td>2.05 (5.1)</td>
<td>3.94 (8.9)</td>
<td>1.59</td>
<td>ns</td>
</tr>
</tbody>
</table>

Notes: Excessive drinking is defined as ≤21 drinks/week for men and ≤14 drinks/week for women; heavy episodic drinking is consuming more than 4 drinks/day for men and 3 drinks/day for women.

Intervention costs

The total cost of the intervention, which included clinical activities associated with screening and intervention delivery as well as patient-related costs associated with travel and participation, was $20,518, or $236 ($197 clinic costs plus $39 patient costs) per treatment subject (Table 3). Screening activities easily accounted for the largest component of economic costs ($132 per subject). A small cost ($3 per subject) was attributed to the control group, which reflects the cost of the health promotion booklet they received.

Intervention benefits

The economic benefits of Project GOAL were divided into two broad categories: health services utilization and other social consequences. Table 3 reports the dollar equivalent value for seven different outcomes over the 24-month follow-up period. Estimates are reported separately for the intervention and control groups, and statistical significance of the differences was assessed using a bootstrap analysis. In addition, estimates were derived for the aggregate values of all outcomes within a particular category and overall.

Several important findings can be observed from the information in Table 3. First, group differences in the dollar value of all health care outcomes were generally small and always statistically nonsignificant. The total cost of all health services utilization over the 24-month follow-up was $3,260 for the intervention group and $3,924 for the control group (p = .52). Second, the costs of other social consequences had wider group differences than those of health care outcomes, but these differences were still not statistically significant. The total cost of other social consequences over the follow-up period was $1,981 per patient for the intervention group and $2,364 per patient for the control group (p = .81). The majority of the cost difference in societal consequences is the result of a group difference in mortality. One intervention patient died during the 24-month follow-up compared with 4 control patients. Third, even with bootstrapping, the standard deviations for some estimates were relatively high owing to the low incidence of certain events (e.g., motor vehicle accidents, deaths), heavy utilizers for some outcomes (e.g., hospitalizations) or both.

Discussion

This study presents some of the first data available on the cost, effectiveness and economic benefits of brief physician advice for problem drinking among older adults. The results of this study suggest that brief talk therapy, delivered by primary care physicians, can reduce alcohol use in problem-drinking older adults for at least 24 months. Furthermore, the cost per patient for the brief intervention was
low ($197 clinic costs + $39 patient costs) and considerably less than the average cost of most outpatient treatment approaches (French, 2000; Salomé and French, 2001). Although the findings for the drinking outcomes favored the intervention group, the economic benefits were more ambiguous. Specifically, considering a set of seven health care and social outcomes, the intervention group had lower mean costs than the control group over the 24-month follow-up, but none of the individual or aggregate differences were statistically significant.

The inconsistency between the drinking and economic outcomes has at least two possible explanations. The first pertains to the age of the sample. Namely, brief interventions (or even more intensive treatments for that matter) may be ideal for affecting short-term behaviors such as alcohol consumption but may not lead to changes in health services utilization or other outcomes, at least not initially. Stated differently, through decades of living, most elderly individuals have accumulated a fairly fixed amount of health capital, which is difficult to meaningfully alter by moderate behavioral changes such as reduced alcohol consumption.

Another explanation is more methodological than epidemiological. The sample size of 158 subjects, coupled with economic outcomes that are sometimes rare events with outlier cases, may have left the study underpowered to detect statistically significant differences between the intervention and control groups. Assuming that additional subjects would reduce the variance of these measures while leaving the point estimates relatively unchanged, the potential economic benefits of Project GOAL would still be relatively modest (with the possible exception of mortality differences), especially compared with the economic benefits of Project TrEAT (Trial for Early Alcohol Treatment). Designing studies with sufficient power to detect economic effects is rare unless the economic outcomes show a strong bias for the intervention.

Despite the study limitations associated with sample size, power and reliance on self-reported information for certain outcomes, this brief intervention trial for older adults has several strengths. Both the calculation of intervention costs for the program and patient as well as the inclusion of multiple economic benefits are important improvements relative to most other evaluations of alcohol interventions (French, 2000; Holder et al., 1995). Similarly, this project is one of the few alcohol studies to estimate the cost of medications over a multiyear follow-up. Follow-up rates were high and in the economic analysis, most of the outcomes such as hospital or emergency department use (reported by Medicare spending), motor vehicle crashes or violations (abstracted from state records), clinic visits (abstracted from medical records) or mortality were not subject to lost-to-follow-up. Finally, the economic evaluation design for Project GOAL is a complement to the economic evaluation design for Project TrEAT, and these models can serve as a resource for future evaluations of brief interventions.

The clinical and economic results of Project GOAL suggest that brief physician-delivered interventions are a low-cost approach for reducing alcohol consumption among problem drinking older adults. Unlike brief interventions for younger adults, lower drinking levels among the elderly do not immediately translate into reductions in health services utilization, accidents, injuries and premature mortality. Nevertheless, the most important outcome of brief interventions may be quality of life improvements, which represent another type of economic benefit. Improvements in social and cognitive function could be a direct result of a reduction in excessive alcohol consumption. Thus, future evaluations of brief health interventions for elderly individuals could improve on the present study by collecting appropriate information on quality of life changes, data not collected in Project GOAL. In addition, these findings should be contrasted with new studies that are able to include a larger sample and a longer follow-up period.

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