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Predictors of Treatment Referral after AUDIT-C Screening for Heavy Drinking

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Abstract

OBJECTIVES—The Veterans Health Administration has implemented annual screening for heavy drinking during primary care encounters using the 3-item Alcohol Use Disorders Identification Test - Consumption (AUDIT-C) questionnaire and made specialized services available to patients with alcohol use disorders (AUDs). We sought to identify the factors that influence whether a patient who has an elevated AUDIT-C score receives appropriate care in the context of an integrated mental health services program. We focused on higher AUDIT-C scores, as these are seen in individuals who are most likely to have a moderate-to-severe AUD and more severe alcohol-related consequences.

METHODS—Utilizing electronic health record data, we conducted a four-year retrospective study of veterans at high-risk for an AUD, based upon an AUDIT-C score ≥ 8 recorded during a primary care encounter at a Veterans Affairs Medical Center and its community-based outpatient clinics.

RESULTS—In multivariate analysis, the predictors of treatment referral were younger age, being non-white, higher AUDIT-C score, and main campus location. Among patients referred for treatment, younger age and being white were associated with an increased likelihood of completing a pre-treatment assessment.

CONCLUSIONS—Efforts to increase the consistency of treatment referrals, according to established clinical guidelines, could enhance the effectiveness of AUDIT-C screening during primary care visits. Subgroups of patients who may benefit from such efforts include individuals with high-risk but sub-maximal AUDIT-C scores, older patients, and patients who are seen at community-based outpatient clinics.

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Conflicts of Interest

For the remaining authors, no conflicts of interest were declared.

1. Introduction

Alcohol use disorders (AUDs) are prevalent in the general population and cause considerable morbidity, mortality and economic harm.^{1–3} Despite the availability of effective treatments,^{4–8} approximately 80% of individuals with an AUD never receive treatment, according to national epidemiologic information.¹ To address the low rates of treatment engagement, the U. S. Preventive Services Task Force (USPSTF) recommended that primary care providers (PCPs) regularly screen for AUDs.⁹ Given their role as front-line clinicians, delivering comprehensive services within established long-term, patient-provider relationships, PCPs are in an advantageous position to influence their patients' health-related behaviors, including heavy drinking. Moreover, effective screening instruments, such as the Alcohol Use Disorders Identification Test - Consumption (AUDIT-C) questionnaire, are available to identify patients with alcohol misuse.^{10–11}

One framework recommended to address heavy drinking among primary care patients is the screening, brief intervention, and referral to treatment (SBIRT) model designed to provide intervention and/or referral to treatment for individuals at moderate-to-severe levels of alcohol-related risk.¹² Despite public health efforts to disseminate the SBIRT model, annual screening for heavy drinking occurs inconsistently in primary care settings. A national cross-sectional survey of over 2,500 primary care patients showed that only 25% believed that they had been screened for alcohol problems during the prior year, either by a healthcare professional asking them questions about alcohol consumption or being asked to complete an intake form with alcohol-related questions.¹³ Although the analysis of data from the National Survey on Drug Use and Health (NSDUH) showed that nearly three-quarters of ambulatory care patients had an alcohol use assessment, fewer than 4% of heavy drinkers received advice to reduce their drinking, and fewer than 10% of adults with alcohol dependence received information about available treatments.¹⁴ Within Veterans Health Administration (VHA) outpatient clinics, systematic annual screening using the AUDIT-C has been required since 2004, and performance improvement data consistently show that greater than 90% of veterans are screened.¹⁵ However, research has shown that veterans with positive AUDIT-C screens frequently report that they did not receive alcohol-related advice,¹⁶ and they are referred for treatment at much lower rates than individuals with other psychiatric conditions.¹⁷ In addition, previous research has shown that provider-related barriers to recommending treatment include lower provider adherence to standard guidelines for alcohol dependence treatment as compared with other chronic medical conditions¹⁸ and provider discomfort and avoidance during discussions with patients about their drinking.¹⁹

Over the last 10 years, the VA has required that mental health services be integrated within primary care clinics to provide collaborative care, decision support, and assistance with referrals to specialty programs. These mental health services can provide brief interventions for veterans who screen positive on the AUDIT-C but are on the lower end of severity (AUDIT-C < 8), as well as integrated addiction services within primary care⁸ or referral assistance for specialty care²⁰ for those on the higher end of severity, in accordance with the SBIRT conceptual framework. These evidence-based programs also accord with the USPSTF recommendations, in that screening services should be accompanied by a robust and systematic response when a screen is positive.

In this study, we sought to identify the factors that influence whether a patient with an elevated AUDIT-C score receives appropriate care in the context of an integrated mental health services program which has been shown to reduce barriers to care.^{21–22} We focused on higher AUDIT-C scores, as these are seen in individuals who are most likely to have a moderate-to-severe AUD and more severe alcohol-related consequences. Individuals with moderate-to-severe AUD are also unlikely to respond to brief advice or a brief intervention, requiring referral for a higher level of care.⁶ We hypothesized that higher AUDIT-C scores would predict veterans' greater acceptance of a referral for further assessment and their subsequent attendance at the assessment. In addition, we explored whether patient demographic factors and clinic location were related to these specific outcomes. We were interested in understanding the effectiveness of the screening and referral processes in promoting patient engagement in addiction-focused care. The VA has invested considerable resources to identify individuals with AUDs, and these investments are only justified to the extent that screening and referral processes ensure that individuals who need treatment receive appropriate mental health services.

2. Materials and Methods

2.1. Study setting and sample

Utilizing electronic health record (EHR) data, we conducted a four-year, retrospective study of veterans who were screened for alcohol misuse during a primary care encounter. We identified all enrolled patients at the Corporal Michael J. Crescenz Veterans Affairs Medical Center (CMCVAMC) in Philadelphia, PA who were screened by a PCP over the period from July 1, 2010 to June 30, 2014, either at the main campus or one of four community-based outpatient clinics (CBOCs). Patients with an AUDIT-C score ≥ 8 were included if they were screened in a primary care setting and not engaged in mental health or addiction treatment at the time of the screen, according to the provider's documentation within an encounter note template. Because AUDIT-C screening is performed annually, only the first instance of a qualifying AUDIT-C score was used for the analyses.

According to VA clinical guidelines, patients who screen positive on the AUDIT-C (≥ 4 for men and ≥ 3 for women) should receive brief advice and/or a brief intervention, and those with scores ≥ 8 should receive a more thorough evaluation in which a treatment plan is formulated.²³ Also, the *Uniform Mental Health Services in VA Medical Centers and Clinics* handbook states that patients who screen positive for "alcohol dependence" should be referred for treatment, rather than specifying an exact AUDIT-C threshold for referral decisions.²⁴ Such patients should be referred for evidence-based psychosocial treatments and offered pharmacotherapy when there is no contraindication. Consequently, we focused on veterans who had AUDIT-C scores ≥ 8 , a cut-point with $>95\%$ specificity for both DSM-IV alcohol dependence and DSM-5 severe AUD.²⁵

2.2. Measures

The AUDIT-C is a 3-item questionnaire that queries respondents as to the frequency of their drinking, typical amount consumed, and frequency with which they drank 6 or more drinks on an occasion during the preceding year. Each of the three questions is rated on a scale of

0-4 points, yielding a total score of 0-12. The AUDIT-C score, patient demographic variables (age, sex, and race), and location of the primary care practice (the VA Medical Center main campus or one of the four CBOC facilities) were abstracted from the EHR for each patient in the sample. The VA utilizes an automated clinical reminder system within the EHR to ensure that provider decisions are documented after a positive AUDIT-C is obtained. Under those circumstances, the CMCVAMC system prompts the provider to indicate which of the following outcomes occurred: a referral was made to the mental health/primary care integrated care program, the Behavioral Health Lab (BHL), for further evaluation; a direct referral was made to a mental health provider in either the emergency room (ER) or a specialty outpatient clinic; the patient refused the recommendation for further assessment; or the provider, upon discussion with the patient, decided that the patient's drinking was within safe limits despite the elevated AUDIT-C score. We considered patients referred to either the BHL or directly to a mental health provider (whether in the ER or a specialty outpatient clinic) as having been referred for treatment. The non-referred patients either refused a referral or were judged to be drinking within safe limits. Among referred patients, an assessment was considered as having been completed when there was documentation of either a completed BHL assessment (for BHL referrals) or mental health provider visit (for direct specialty referrals) within 90 days of referral. Also, same-day ER visits (for direct ER referrals) were treated as completed assessments. An "intent to refer" measure was calculated as the percentage of patients who either received or refused a referral. The "referral acceptance" rate was calculated as the percentage of cases with intent to refer for which the patient received a referral (i.e., the referral was not refused).

2.3. Analyses

Descriptive statistics for demographic and clinical characteristics were calculated for the overall sample. Differences between the two referral groups (i.e., referred versus non-referred) were examined using Fisher's exact tests for categorical variables and independent samples t-tests for continuous factors. These methods were repeated for the subsample of individuals who received a referral with comparisons made across the assessment status (i.e., completed versus not completed).

Separate multivariate binary logistic regressions were used to model (a) whether the patient was referred and (b) whether the patient received an assessment. All demographic and clinical characteristics were considered for each model. The final models were constructed using both forward and backward stepwise selection (probability for entry=0.05, removal=0.1). The forward stepwise and backward stepwise procedures for both logistic regressions converged, producing the final models.

All statistical analyses were performed using SPSS version 20 (IBM Corp., Armonk, New York) with a significance level of 0.05.

3. Results

3.1. Sample characteristics

During the study period, there were 1885 unique patients for whom an AUDIT-C score ≥ 8 was documented for a primary care encounter, excluding patients engaged in mental health or addiction treatment at the time of the encounter, and limiting the data extraction to the first such encounter during the study period for each patient (see Figure 1). Of these patients, 913 (48.4%) were white, 840 (44.6%) were black, 8 (0.4%) were Asian, 10 (0.5%) were American Indian or Alaska Native, 8 (0.4%) were Native Hawaiian or Pacific Islander, 32 (1.7%) were multiracial, and 74 (3.9%) were of unknown race. Given the relatively low non-white, non-black percentages, the race variable was dichotomized to white and non-white categories. A sensitivity analysis confirmed that reverse dichotomization to black and non-black categories did not substantially alter the inferences from the data analyses. The study sample was predominantly male ($n=1839$ or 98%). The majority of patients were seen on the main campus ($n=1127$ or 60%) versus a CBOC location. The mean age of the patients was 57.8 (range: 23-94, $SD=15.0$). The mean AUDIT-C score was 9.3 ($SD=1.3$).

The percentage of patients who were white differed considerably by clinic location, with 37% of main campus patients being white compared with 65% of CBOC patients ($\chi^2=142.19$, $\phi=-0.275$, $p<0.001$). The male patients were more likely to be white ($\chi^2=4.73$, $\phi=-0.050$, $p=0.036$) and older (mean age=58.1 for males; 47.2 for females, $p<0.001$) than female patients. The AUDIT-C scores were minimally correlated with patient age ($r(0.046)$, $p=0.045$). There was no significant difference in the AUDIT-C scores according to patient sex (male: $M=9.3$, $SD=1.3$; female: $M=9.1$, $SD=1.2$; $p=0.347$), race (white: $M=9.3$, $SD=1.3$; black: $M=9.3$, $SD=1.3$; $p=0.906$), or location (main campus: $M=9.2$, $SD=1.3$; CBOC: $M=9.3$, $SD=1.3$; $p=0.154$).

3.2. Bivariate analyses

After an AUDIT-C screen with ≥ 8 score, 47% ($n=879$) of patients were referred for further evaluation, 33% of patients refused further assessment ($n=620$), and 21% of patients were considered to be drinking within safe limits ($n=386$). Of the referred patients, 89% ($n=780$) were referred to the BHL and 11% ($n=99$) were referred directly to a mental health provider. Table 1 compares the referred and non-referred subgroups on age, sex, race, clinic location, and AUDIT-C score. Every one-year increase in age was associated with a reduction in the odds of referral ($OR=0.95$, $p<0.001$), both because older age decreased the odds of providers' intent to refer ($OR=0.98$, $p<0.001$), as well as referral acceptance ($OR=0.95$, $p<0.001$). The decline in referral likelihood with increased age is evident in Figure 2, which also shows the number of patients in each 10-year age group. In the youngest age group (<30 years, $n=100$), 67% of patients were referred and 16% of patients refused; in the oldest age group (≥ 70 years, $n=317$), 21% of patients were referred and 46% of patients refused. Although females were more frequently referred than males (61% vs. 46%), the sex difference was not statistically significant ($p=0.053$). White patients, who were more likely to be seen at a CBOC clinic rather than on the main campus, were more likely to receive a referral ($OR=0.66$, $p<0.001$). In general, though, patients seen on the main campus were more likely to receive a referral ($OR=1.58$, $p<0.001$). With every increment in AUDIT-C

score, patients with higher AUDIT-C scores were more likely to receive a referral (OR=1.27, $p<0.001$; see Figure 3). Higher AUDIT-C scores increased the odds of provider intent to refer (OR=1.44, $p<0.001$), as well as referral acceptance (OR=1.16, $p<0.001$). Among patients with the maximum AUDIT-C score of 12 ($n=161$), 66% were referred compared with 40% of patients with an AUDIT-C score of 8 ($n=740$).

Of the 879 referred patients, 65% ($n=574$) completed a mental health assessment. Among patients referred to the BHL, the mean number of days between referral provision and BHL assessment was 14.9 days. Table 2 compares the referred patients on whether they completed an assessment. Older patients were less likely to complete an assessment after receiving a referral, although patient age was a stronger predictor of treatment referral than subsequent assessment (referral OR=0.96; assessment OR=0.98). Every one-year increase in age was associated with a small reduction in the odds of assessment completion (OR=0.98, $p<0.001$). Also, patient race was a predictor for assessment completion, with white patients more likely to complete an assessment after referral (OR=1.57, $p=0.001$). Nonetheless, because white patients were less likely to receive a referral, the likelihood of assessment after the positive screen did not differ significantly by patient race. Overall, 30% of white patients and 31% of non-white patients completed a mental health assessment after screening ($p=0.368$).

3.3. Multivariate analyses

The final binary logistic regression models for both referral initiation and subsequent assessment are presented in Table 3. After adjustment for all of the other variables, receiving a referral was associated with younger age, being non-white, higher AUDIT-C score, and main campus location. Only patient age and race were predictors for patient assessment after referral. When all of the main effects in the models were included in analyses involving two-way interactions, no significant interaction effects were seen.

4. Discussion

We examined the extent to which AUDIT-C screening of primary care patients at a single VA Medical Center and its affiliated outpatient clinics led to the successful referral and assessment of patients at high-risk for a severe AUD. Overall, intent to refer was documented for 80% of patients, referrals were provided for 47% of patients, and 31% of patients completed an assessment. Given that all patients in this sample were at high risk for severe AUD, the fact that less than one-third of patients were successfully referred underscores the need to further refine the strategies for engaging patients into treatment. The clinical program at the primary care clinics in this study represents a well-resourced, evidence-based scenario with high rates of screening and availability of embedded mental health providers who are directly accessible by patients and providers.

Within the integrated behavioral health and primary care VA setting, providers would be expected to proceed with a referral for high-risk patients, unless the provider determined that a particular AUDIT-C score was unreliable, the patient had a recent reduction in alcohol intake, the patient intended to pursue non-VA treatment, or referral was impractical due to the patient's medical condition or other barriers to further assessment. The high rate of providers indicating that patients were drinking within safe limits is counter to the evidence

base showing the AUDIT-C to be sensitive and specific to current drinking levels. This suggests the possibility of providers and patients discounting the results or avoiding alcohol-related discussions.

The fact that patient age, AUDIT-C score, clinic location, and patient race predicted provider referral decisions suggests that these contribute to non-adherence to clinical guidelines. The routine AUDIT-C screening program with clinical guidelines for the management of positive results is intended to ensure that patients are consistently provided with a standard level of care. Unfortunately, the influence of providers' perceptions regarding whether certain patients would benefit from a treatment referral may reduce the effectiveness of a screening program. The study results indicate that, despite the reality that many patients may not accept a referral, a substantial proportion of patients participate in the assessment process after a provider's recommendation.

While younger patient age was a strong predictor of patient referral, its effect on the likelihood of referral was predominantly due to a lower rate of referral acceptance by older patients, rather than providers' reluctance to refer older patients. Therefore, efforts are needed to increase patients' willingness to accept a referral, potentially by addressing age-related barriers (e.g., inadequate transportation and poor general health) and the presentation of desirable treatment options for older patients. Previous research has shown that older adults recognize the benefits of mental health services,²⁶ although racial and ethnic differences have been reported.²⁷ The Primary Care Research in Substance Abuse for the Elderly (PRISM-E) study indicated that older adults prefer integrated primary care and mental health treatment.²² Thus, further research on strategies that leverage co-location and collaborative treatment could help to determine how best to deliver addiction treatment services to this population. While there are challenges in the engagement of older adults, a retrospective study of residential treatment outcomes comparing older and middle-aged patients²⁸ and the prospective PRISM-E trial involving two different outpatient care models²⁹ showed substantial reductions in alcohol consumption after treatment.

Although higher AUDIT-C scores were related to greater referral acceptance, only a minority of patients in each score category refused referral, suggesting that encouragement of providers to refer high-risk patients with sub-maximal scores could lead to additional treatment referrals. Also, such efforts would be aligned with the chronic disease model of AUD, which emphasizes early-stage intervention and continuing care to reduce the risk of relapse.^{18,30} Furthermore, certain subgroups of patients (e.g., women and patients at higher medical risk due to advanced age, concurrent medications, or comorbidities) may benefit from referral to treatment at lower AUDIT-C score thresholds.

As predictive factors, patient race and clinic location were confounded in this sample, as the main campus patients, who were more likely to be black, were also more likely to receive a referral, as compared with the CBOC patients. With regard to patient race, black patients were more likely to receive a referral, although white patients were more likely to complete an assessment after referral. A recent study showed that black veterans were 40% more likely to receive specialty addictions treatment, either in VA inpatient or outpatient settings, than white veterans.³¹ Other researchers have reported similar VA utilization differences and

surmised that unconscious bias among providers in making an AUD diagnosis, a higher prevalence of concurrent drug addiction(s), higher rates of income- and disability-based VA copayment exemption, lower rates of private insurance coverage for other treatment options, greater motivation to obtain treatment due to more severe consequences, and higher social support for abstinence may be factors that account for the higher utilization of services among black patients.^{31,32} In the case of this particular medical center, the urban main campus serves a predominantly black population of veterans, and the addiction treatment and other behavioral health specialty services on the main campus provide an important public health resource for individuals who may not otherwise receive treatment services. In contrast, a study based on the National Alcohol Survey found that despite higher levels of problem severity, blacks in the general population were less likely to have utilized treatment services than white individuals.³³

A major strength of this study was the differentiation of referral issuance and subsequent assessment as distinct steps in the referral process for the predictive analyses. However, the study sample was limited to patients who received primary care through a single VA Medical Center and its affiliated outpatient clinics. In further research, this approach to referral outcome analysis could be applied to national VA data and non-veteran population data. As a result of the comparatively small sample size and non-representativeness of the general population, the study may not have detected important interactions between explanatory variables that would be apparent in a larger sample. For instance, researchers in a study of national quality improvement data were able to discern that both black and Hispanic patients were more likely to receive alcohol-related care at VA networks with a high prevalence of black patients.³² Additional research is needed to assess predictive factors for certain subgroups that were not well represented in this study, particularly other racial and ethnic groups, women, and non-urban locations, perhaps utilizing datasets that oversample these populations. The relative lack of outcomes research for non-treatment-seeking patients who are referred for treatment after a high-risk positive screen has been recognized as a public health concern.¹² Ultimately, healthcare systems could achieve improved outcomes for patients with moderate-to-severe AUDs through process improvements informed by the identification of predictors of referrals to addiction treatment services.

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Figure 1.
Retrospective flow chart of study sample.

Figure 2.

Intent to refer, the percent of patients who received or refused a referral, by age group.

Note: The numbers above the bars represent the total number of patients in each age group with a high-risk positive screen (i.e., AUDIT-C score ≥ 8).

Figure 3.

Intent to refer, the percent of patients who received or refused a referral, by AUDIT-C Score.

Note: The numbers above the bars represent the total number of patients in each score category.

Table 1

Characteristics of the sample and their bivariate associations with patient referral.

	Referred (n=879)	Not referred (n=1006)	p-value	OR (95% CI)
Age (mean, SD)	53.1 (14.4)	62.0 (13.8)	<0.001	0.96 (0.95-0.96)
Male	851 (97%)	988 (98%)	0.053	0.55 (0.30-1.01)
White	377 (43%)	536 (53%)	<0.001	0.66 (0.55-0.79)
Seen on the main campus vs community-based clinic	577 (66%)	550 (55%)	<0.001	1.58 (1.32-1.91)
AUDIT-C score (mean, SD)	9.5 (1.4)	9.1 (1.2)	<0.001	1.27 (1.19-1.37)

SD: standard deviation; OR: odds ratio; 95% CI: 95% confidence interval.

Boldface corresponds to significance at $\alpha=0.05$.

Table 2

Characteristics of the subset of referred patients and their bivariate associations with assessment completion.

	Assessed (n=574)	Not Assessed (n=305)	p-value	OR (95% CI)
Age (mean, SD)	51.8 (14.8)	55.6 (13.2)	<0.001	0.98 (0.97-0.99)
Male	556 (97%)	295 (97%)	1.000	1.05 (0.48-2.30)
White	269 (47%)	108 (35%)	0.001	1.61 (1.21-2.14)
Seen on the main campus vs community-based clinic	373 (65%)	204 (67%)	0.602	0.92 (0.69-1.23)
AUDIT-C score (mean, SD)	9.5 (1.4)	9.5 (1.4)	0.647	0.98 (0.88-1.08)

SD: standard deviation; OR: odds ratio; 95% CI: 95% confidence interval.

Boldface corresponds to significance at $\alpha=0.05$.

Table 3

Multivariate associations of patient referral and subsequent assessment completion.

	Was patient referred?		Was patient assessed?	
	aOR (95% CI)	<i>pseudo-R</i> ²	aOR (95% CI)	<i>pseudo-R</i> ²
Age	0.95 (0.95-0.96)	0.119	0.98 (0.97-0.99)	0.021
White	0.66 (0.54-0.81)	0.010	1.52 (1.13-2.02)	0.013
Seen on the main campus vs community-based clinic	1.48 (1.20-1.82)	0.016	–	–
AUDIT-C score	1.36 (1.26-1.46)	0.037	–	–

aOR: adjusted odds ratio; 95% CI: 95% confidence interval

*pseudo-R*²: Nagelkerke R-squared