

# APPLICATION OF SBIRT TOOLS IN MANAGING ALCOHOL AND DRUG USE DISORDERS

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## SUMMARY

**Background:** To evaluate the eligibility and feasibility of the "Voice Modules in Narcology" (VMIN) program.

**Material and methods.** We developed a computer program to screen for risky alcohol or drug use, utilizing an interactive voice assistant as a motivational component. Given the low detection of such risks during population health examinations and medical check-ups, this program could allow the primary healthcare sector to expand screening coverage for risky alcohol and drug use without additional medical personnel. VMIN includes an anonymous short questionnaire (CAGE) and a question about drug use, offering a short (3-4 minutes) voice file with motivational information encouraging specialist consultation if risks are detected. The program also assesses the usefulness of the information received and the readiness to consult a narcologist for diagnosing substance use disorders. 51 outpatients under treatment at Samara State Medical University Hospital were included in the pilot project for evaluation the eligibility and feasibility program.

**Results:** 11 patients (21.6%) who were identified as at risk of alcohol or drug consumption listened to the voice modules after screening. Among these, 8 (72.7%) respondents provided feedback: 8 (72.7%) respondents found the information useful, 5 (45.5%) expressed willingness to change their behavior to reduce substance or alcohol use, 2 (18.2%) expressed readiness to seek specialized help, and 1 (9.1%) provided contact information for follow-up assessment of substance or alcohol use risk.

**Conclusions:** A significant proportion of patients in multi-profile hospitals' cardiology and gastroenterology units (21.6%) reported risky alcohol consumption; drug use was reported by one man (1.9%). The majority of respondents who listened to the voice modules considered the provided information useful, but only one (1.9%) shared contact information for the follow-up assessment, and 3 (27.3%) did not give feedback. The high proportion of individuals giving positive feedback provides preliminary support for the feasibility of the method.

**Key words:** screening – motivation - interactive voice module - risky alcohol and drug use - computer program

**Abbreviations:** AUDIT – Alcohol Use Disorders Identification Test; CAGE - short questionnaire; IVR - Interactive Voice Response; SBIRT - Screening, Brief Intervention, and Referral to Treatment; VMIN - Voice Modules in Narcology

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## INTRODUCTION

Screening, Brief Intervention, and Referral to Treatment (SBIRT) is a public health framework used to identify and provide services to individuals at risk for substance use disorders, depression, and other mental health conditions (Hargraves et al. 2017). There is extensive experience using this technology abroad in primary healthcare across various population groups (Gette et al. 2022, Hahn et al. 2024, Ellington 2019, Ozechowski et al. 2015). To improve the quality of motivational techniques and optimize the use of primary healthcare physicians' time, an interactive voice response technology serves as a motivational element. There is experience using Interactive Voice Response (IVR) technology within the SBIRT framework (Barata et al. 2017). With the help of a voice assistant, patients undergo a short screening for alcohol use problems (often using the Alcohol Use Disorders Identification Test - AUDIT). If problems are detected, patients are offered recommendations for reducing or stopping their alcohol consumption.

Recommendations include goal setting, planning for high-risk situations, self-monitoring, and other strategies. Information about further support options, local resources, and advice to consult a specialist in addiction is also provided (Andersson et al. 2017, Helzer et al. 2008).

This technology allows, with limited human resources screening of patients in outpatient care for alcohol problems but also to provide information on remediation measures. Several studies evaluating such interventions indicate their effectiveness, usually based on assessments of participants' readiness to change risky behavior, frequency of specialist consultations, and decreasing alcohol consumption over time. Results show that 40-60% of patients receiving IVR as part of a brief intervention often express readiness to reduce alcohol consumption (Rose et al. 2010, 2017). Patients receiving IVR statistically significantly more often consulted specialists and discussed their risky behavior in interviews (Rose et al. 2016). Fewer results are available on IVR intervention effectiveness in reducing alcohol consumption over long-term assessments.

However, some studies indicate a 25% reduction in alcohol consumption in the IVR group two weeks after specialist consultation. We are not aware of results on using voice assistants in doctor-patient interactions for aiding substance users in Russia. Such applications are highly relevant for several reasons:

- High latency of substance use disorders. Many substance users never contact addiction services, where they could receive information on the consequences of substance use obtain their diagnosis, and initiate treatment (Mendelevich 2013).
- Practical impossibility (due to workload) for primary healthcare physicians to screen for substance use problems and motivate general patients to consult an addiction specialist. Few people presenting with alcohol and drug use risks during health examinations contact addiction services, and those who are diagnosed with alcohol-associated diseases in primary care rarely seek addiction treatment (Colistra et al. 2023). The situation is exacerbated by the shortage of psychiatrists and narcologists, especially in rural areas of Russia (Antipina et al. 2023). Often, doctors who first contact a newly identified substance user (typically during medical intoxication examinations or in toxicology departments for substance poisoning) cannot provide complete information about the consequences of substance use and the necessary further steps.

Given this background, we performed this pilot study to evaluate the feasibility of the "Screening, Motivation, Referral to a Specialist. Voice Modules in Addiction Treatment" program, in anticipation of a future investigation in a large cohort.

## MATERIALS AND METHODS

### The questionnaire development

The voice modules developed in Samara are currently used as non-interactive one-way information sources for patients who have undergone medical intoxication examinations. The developed program, including interactive voice modules, has been registered with "Federal Service for Intellectual Property" as a computer program (Tsarev et al. 2024). We developed the software to implement: a) the CAGE screening questionnaire with four questions about alcohol consumption. This questionnaire has the advantage that it does not require calculating alcohol doses (unlike the AUDIT), which simplifies the test; b) an additional question about lifetime drug use; c) an interactive voice assistant as part of SBIRT with variable voice response options: for risky alcohol or other drug use, and a special module for adolescents under 18 years.

The computer program consists of three blocks: screening, short informational and motivational voice intervention, and provision of information on avenues for further assistance. Access to the program is also available via a patient's device. The program begins

with a voice greeting and explanation of the purpose behind participation. Next, the patient is asked to indicate gender and full age in the program fields, and then proceeds to the "Screening" block, consisting of 4 CAGE test questions, which is a tool for detecting problematic alcohol use. The CAGE test aims to reveal dissimulation symptoms of addiction diseases and their initial signs (Mitchell et al. 2014), followed by one question about drug use facts. Thus, the screening block consists of 5 questions with simple "yes/no" answers, where two or more "yes" answers indicate risky substance use. Depending on the combination of positive response to the screening test, the program offers the patient an option to listen to the appropriate module(s). Then the patient is asked to evaluate the usefulness of the received information, and their readiness to change risky behavior and consult a specialist. Finally, the patient is asked if they can be contacted at 3- and 6-months follow-up to provide information on whether their risky behavior has changed and if they sought specialist help. The program records the anonymized information obtained for further analysis.

The voice modules are audio files lasting 3-5 minutes, consisting of several parts. The first part provides general information about the risks of substance use. Depending on the scores (positive CAGE test answers), the program invites the patient to choose among the appropriate module(s): short-term and long-term risks associated with alcohol and drug use, information on substance use disorders, and information on the consequences of abstaining from alcohol and drugs. The final part of the voice module suggests that the patient adopt a readiness to change their risky behavior and consult a specialist, if necessary.

### Software development

Development of the program utilized PHP, MySQL, React JavaScript library.

### Study design

The pilot project (feasibility study) of implementing the program "Screening, Motivation, Referral to Specialist. Voice modules in narcology" (VMIN – Voice Modules in Narcology) was performed at the clinics of Samara State Medical University using QR codes placed on information boards in the cardiology (propaedeutic and faculty therapy) and gastroenterology units June 10-11, 2024. During morning rounds, doctors recommended all patients who had used alcohol and other psychoactive substances in the past year to participate in the program. Our choice of units was driven by the assumption of that this would capture patients with signs of alcohol-related diseases (alcoholic cardiomyopathy, alcohol-related liver damage, pancreatic damage). Participation in the study was carried out as part of the voluntary informed consent of patients to their medical intervention.

## Statistical analysis

We narrowed our statistical evaluation to the preliminary descriptive data analysis characterizing the study sample of respondents. Whereas quantitative variables on the assessments are presented as mean  $\pm$  standard deviation measures, the distribution of qualitative variables related to the responses of respondents is calculated using frequencies and percentages. Primary analysis of the pilot study sample allows us to check the hypothesis at the first stage of the trial, thus to elaborate necessary changes related to the study design at the second stage of the trial. Further analysis will be provided when the larger size of the sample will be available for the advanced statistical approach application.

## RESULTS

51 patients participated in the pilot project over 2 days (men  $n=12$ , women  $n=39$ ). The average age of respondents was  $44.6 \pm 1.8$  years old. Analysis of responses related to the screening part of the study (4 questions from the CAGE test and a question about drug or alcohol use in the past year) revealed the following results: all answers were "no" for 30 (58.8%) respondents (men:  $n=4$ , 13.3%; women:  $n=26$ , 86.7%). One "yes" answer was given by 10 (19.6%) respondents (men:  $n=4$ , 40%; women:  $n=6$ , 60%). Two or more "yes" answers indicating risky alcohol use were provided by 11 (21.6%) respondents (men: 4, 36.4%; women: 7, 63.6%). Alcohol and drug use was reported by one man (1.9%).

Thus, 11 respondents listened to the voice modules following the screening stage of the study, among whom 10 listened to the module on risky alcohol use, and 1 respondent listened to modules on risky alcohol and drug use. After listening to the module(s), 8 (72.7%) of the 11 respondents provided feedback: 8 (72.7%) respondents found the information useful, 5 (45.5%) patients expressed willingness to change their behavior to reduce substance or alcohol use, 2 (18.2%) patients expressed readiness to seek for specialized assistance, and 1 (9.1%) patient provided contact information for follow-up assessment of substance or alcohol use risk after three and six months perspective. Three (27.3%) patients did not provide any feedback.

## DISCUSSION

Intermediate results of this pilot study demonstrated that the SBIRT (Screening, Brief Intervention, and Referral to Treatment) technology is an easy manageable tool that can address screening and motivational interventions for patients with risky substance or alcohol use, in particular, under the time constraints faced by primary care physicians and specialists in

hospital settings. The use of interactive voice response technology within SBIRT fully automates the process, reducing the burden on medical personnel's time. Although 5 (45.5%) patients who were alcohol or drug users expressed a readiness to change their behavior to reduce their risks, and 2 (18.2%) were prepared to consult a specialist, the feature to receive feedback from patients after listening to the voice modules was unproductive, with only one (1.9%) patient agreeing to follow-up assessment. The high proportion of individuals giving positive subjective feedback supports the feasibility of its broader application. We also did not follow subsequent changes in drug or alcohol use, nor check if the participants asked for specialized medical care. These results resemble those with other IVR-using studies, which showed that 40-62% of respondents expressed a readiness to reduce alcohol consumption (Rose et al. 2010, Rose et al. 2017).

The developed software is accessible through any device connected to internet, thus facilitating widespread use in outpatient settings during medical examinations, screening programs, and in hospital settings such as therapeutic, neurological, and gastroenterological departments of general hospitals and outpatient units. Present results inform on the decision to study its broader implementation in more organizations of the Samara state healthcare structure.

## CONCLUSIONS

Results of the pilot project support several conclusions:

- a significant proportion of patients in multi-profile hospitals' cardiology and gastroenterology units (21.6%) reported risky alcohol consumption; drug use was reported by one man (1.9%);
- five patients among the respondents (45.5%) expressed a readiness to change their behavior to reduce their risks, which is comparable to results of IVR-using studies performed in other countries (40-62%) [9, 10];
- 8 (72.7%) of the 11 respondents listened to the voice modules, and considered the provided information useful, but only one (1.9%) shared his contacts for the follow-up assessments, and 3 (27.3%) did not give any feedback. We assume that the program needs adjustment to encourage more feedback and follow-up assessment.
- The high proportion of individuals giving positive feedback supports the feasibility of the method.
- The broader implementation of this program is economically efficient due to the minimal costs. Subject to its refinement, coverage of a broader patient population, and participation in channels for monitoring and mitigating the consumption of drugs and alcohol may help improving the general health of local population.



## Limitations of the study

The study has the typical limitations of research based on self-report questionnaires. We did not examine the participants subsequent changes in drug or alcohol use, and did not check if the participants had asked for specialized medical care. Thus, we cannot make claims about the efficacy of the program in its present limited application. Due to the requirement for participants to scan a QR-code using their devices, it can be inferred that individuals without such tools would have difficulty in participating. To further lower the barrier to entry into the program, it would be necessary to provide access through other means, such as using the physician's PC or other devices.

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## Contribution of individual authors:

Sergey Tsarev, Andrey Sherban & Nikolay Izmailkov: search and analysis of literature, collection of clinical data, data interpretation, writing the first draft.

Armen Benian & Arseny Gayduk: search and analysis of literature, data interpretation, and final version review.

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