DIGITAL HEALTH

Pilot study to evaluate usability and acceptability of the 'Animated Alcohol Assessment Tool' in Russian primary healthcare

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Abstract

Background and aims: Accurate and user-friendly assessment tools quantifying alcohol consumption are a prerequisite to effective prevention and treatment programmes, including Screening and Brief Intervention. Digital tools offer new potential in this field. We developed the 'Animated Alcohol Assessment Tool' (AAA-Tool), a mobile app providing an interactive version of the World Health Organization's Alcohol Use Disorders Identification Test (AUDIT) that facilitates the description of individual alcohol consumption via culturally informed animation features. This pilot study evaluated the Russia-specific version of the Animated Alcohol Assessment Tool with regard to (1) its usability and acceptability in a primary healthcare setting, (2) the plausibility of its alcohol consumption assessment results and (3) the adequacy of its Russia-specific vessel and beverage selection.

Methods: Convenience samples of 55 patients (47% female) and 15 healthcare practitioners (80% female) in 2 Russian primary healthcare facilities self-administered the Animated Alcohol Assessment Tool and rated their experience on the Mobile Application Rating Scale – User Version. Usage data was automatically collected during app usage, and additional feedback on regional content was elicited in semi-structured interviews.

Results: On average, patients completed the Animated Alcohol Assessment Tool in 6:38 min (SD = 2.49, range = 3.00–17.16). User satisfaction was good, with all subscale Mobile Application Rating Scale – User Version scores averaging >3 out of 5 points. A majority of patients (53%) and practitioners (93%) would recommend the tool to 'many people' or 'everyone'. Assessed alcohol consumption was plausible, with a low number (14%) of logically impossible entries. Most patients reported the Animated Alcohol Assessment Tool to reflect all vessels (78%) and all beverages (71%) they typically used.

Conclusion: High acceptability ratings by patients and healthcare practitioners, acceptable completion time, plausible alcohol usage assessment results and perceived adequacy of region-specific content underline the Animated Alcohol Assessment Tool's potential to provide a novel approach to alcohol assessment in primary healthcare. After its validation, the Animated Alcohol Assessment Tool might contribute to reducing alcohol-related harm by facilitating Screening and Brief Intervention implementation in Russia and beyond.

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Introduction

Background

Alcohol-related injuries and diseases contribute substantially to the avoidable burden of disease in Europe and worldwide.[1,2] Alcohol assessment tools allowing to accurately describe and quantify the user's consumption are crucial to improving the current situation: To date, the majority of drinkers with risky or hazardous drinking habits and possible alcohol use disorders remain undiagnosed worldwide[3,4] and only about one in five individuals with an alcohol use disorder receives professional support.[5,6] At the population level, alcohol consumption, as assessed in self-report surveys, covers on average only around 50% of the total alcohol consumed, as recorded in sales, import, export and taxation statistics.[7–9] This undercoverage is not uniform across different population groups.[10] It thus complicates the estimation of the alcohol-related health burden in projects such as the global burden of disease initiative and likely slows down the introduction of effective evidence-based alcohol policies.[11,12]

As part of its SAFER initiative, an action package of the five most effective and cost-effective alcohol control interventions, the World Health Organization (WHO) recommends the integration of Screening and Brief Intervention (SBI) programmes in primary healthcare (PHC).[13,14] Alcohol SBI aims to detect risky and harmful alcohol use at an early stage and provide timely support to prevent serious harm requiring specialized treatment. It is often based on the administration of the WHO's Alcohol Use Disorders Identification Test (AUDIT),[15] a text-based 10-item screening tool that is one of the most widely validated and used questionnaires for alcohol use screening worldwide.[16–18] A positive screening result is followed by a short intervention that aims to motivate the individual to change their drinking behaviour. SBI has repeatedly been shown to be effective,[19–21] yet its global implementation is overall low.[5]

Electronic SBI (eSBI), defined as SBI using electronic devices to facilitate the delivery of key elements of screening or intervention, is a promising supplement to traditional approaches. In the PHC context, both partially digitalized eSBI devices to support healthcare professionals and fully digitalized online eSBI programmes have been shown to reduce risky and harmful alcohol use.[22] By providing interactive elements of visualization to help users describe their consumption, digital assessment tools can address an important weakness of traditional assessment tools: Established tools such as the AUDIT generally rely on the counting of 'standard drinks'. This measure, defined as a beverage volume containing a fixed amount of pure alcohol, serves to compare consumed alcohol quantities across different beverage types with varying alcohol content. However, the defined size of a standard drink differs widely across countries, cultures and settings, with numerous countries completely lacking an official definition.[23] In addition, the concept is often poorly understood by consumers.[16] Digital assessment tools may take on the task of calculating the quantity of alcohol consumed based on the input of individualized consumed drinks and allow to flexibly account for regional differences in beverages of choice and typical serving sizes.[24]

A recently developed tablet app, designed to facilitate the detailed assessment of drinking habits amongst Aboriginal and Torres Strait Islander Australians[25] showed promising results with regard to both user-friendliness and validity.[26,27] However, while numerous alcohol applications exist on the market, a recent systematic review demonstrated that few use animation features to facilitate alcohol assessment and of those, only a small minority have been evaluated in published studies.[24,28] The issue of low SBI implementation is shared by many countries worldwide. A validated digital screening tool that allows direct mapping to the well-established AUDIT and can easily be adapted to different regional contexts would thus be of great value. These considerations led us to develop the 'Animated Alcohol Assessment Tool' (AAA-Tool), a self-administered mobile app version of the AUDIT, which enables the description of individual drinking behaviour through interactive, culturally informed animation features.

The AAA-Tool's pilot version is based on the recently validated Russian AUDIT (RUS-AUDIT).[29] In Russia, new alcohol policies including efforts to improve the implementation of SBI have led to a decline in alcohol use,[30] yet

the country still has one of the highest proportions of alcohol-attributable mortality worldwide. The current implementation of SBI is closely linked to specialized care services, such as narcology services and the 'dispanserization' programme of the Russian Federation, that addresses only part of the population.[31] With its novel assessment approach, the AAA-Tool could contribute to the sustained efforts and innovative approaches required to bridge the gap between PHC and specialized care and overcome some of the known barriers to the more widespread implementation of SBI in the Russian PHC.[32,33] Volume and patterns of drinking vary greatly even within Russia, with regional differences in both preferred beverages and prevalence of unrecorded alcohol consumption.[34] Scientific data on typically used drinking vessels in Russia or their regional variation is still scarce. Striving for a balance between a widely applicable tool and satisfactory regional adaptation, we aimed to include a mixture of both popular and unusual but characteristic beverages and drinking vessels. The beverages and drinking vessels offered in the AAA-Tool's pilot version have been selected in a multistep process involving 10 Russian alcohol researchers to reflect the drinking habits in the whole country. Originally developed in English by an international development team, the tool was translated into Russian with the help of a multidisciplinary expert panel, following the formal WHO procedures of instruments translation.[35]

Study objectives

This pilot study aims to evaluate the Russian version of the AAA-Tool with regard to (1) its usability and acceptability to assess individual alcohol consumption amongst adult patients and healthcare practitioners in a PHC setting in Russia, (2) the plausibility of its alcohol consumption assessment results and (3) the adequacy of its country-specific vessel and beverage selection.

Methods

The AAA-Tool

The AAA-Tool (Screenshots available in online Appendix 1) is structured into five chapters. The first three chapters map onto the three AUDIT items focusing on patterns and quantity of alcohol consumption that have been independently validated as a shorter screening instrument (Alcohol Use Disorders Identification Test – Consumption (AUDIT-C)).[36] They include an additional question about the largest drinking occasion in the past 30 days. The fourth chapter comprises the remaining non-visualized AUDIT items focusing on dependence symptoms and consequences of harmful alcohol use. Brief feedback and advice are given in chapter five.

The tool's first three chapters enable the interactive visual description of individual drinking habits. In addition to general alcohol consumption patterns, the beverage-specific quantity and frequency of drinking are assessed for each beverage category (e.g. beer, wine, etc.) the user reports to consume (Figure 1). For each category, the user first selects a drinking vessel from a Russia-specific selection of glasses, bottles and other containers (Vessel images available in online Appendix 2). For very commonly used vessels (such as wine glasses or beer bottles), the AAA-Tool offers different sizes and the volumes are displayed in the gallery that users choose from. A specific beverage is then selected from a list of beverages within the current category (e.g. 'blonde beer' or 'dark strong beer'). Finally, the consumed amount can be indicated by moving a slider upwards, thus 'pouring' an individual drink. To offer a maximally realistic experience, visualizations account for beverage characteristics such as colour and sparkles and are animated to imitate movement properties of poured liquids. The individualized 'typical drinks' are saved and can be selected and modified by the user to report on the individual largest drinking occasion in the past 30 days. To assess heavy episodic drinking (HED) frequency, the tool randomly generates a drink combination of saved drinks that contains 60 grams of pure alcohol, the WHO threshold HED commonly used in Russia.[29,37]

The brief feedback following the assessment includes a visual representation of the reported largest drinking occasion, the individual average consumption per week, and the obtained AUDIT score with a score-dependent WHO standard advice.

Study setting, sample and data collection

Patients for this non-randomized pilot study were recruited in the *National Medical Research Center for Therapy and Preventive Medicine of the Ministry of Healthcare of the Russian Federation* in Moscow using convenience sampling and age and sex quotas ensuring equal proportions of participants older and younger than 45 years of age, and male and female participants. To be eligible, patients had to report alcohol consumption in the past 12 months. Additionally, a smaller convenience sample of healthcare practitioners employed by or collaborating with the centre was assessed in person or via video calls in Moscow and in the cities of Vologda, situated about 500 km northeast of Moscow, and Astrachan, situated about 1400 km southeast of Moscow. Data collection was carried out by staff of the centre who formed part of the study team. Ethical clearance was sought from the centre's institutional ethics boards and the *Medical Faculty of Heidelberg University*.

Three modes of data collection were used (Figure 2): (i) Data recorded during patients' completion of the AAA-Tool, (ii) patients' and practitioners' perspective on region-specific content as evaluated in brief semi-structured
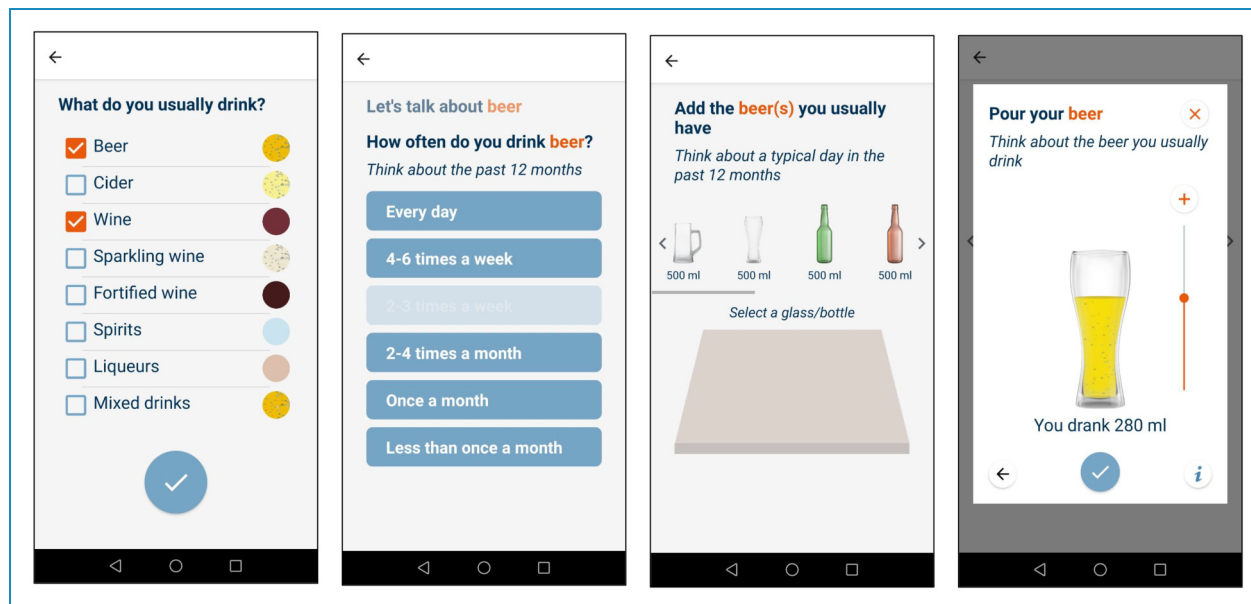
Figure 1. Example screens of the AAA-Tool chapters 1–3 (mapping onto the AUDIT-C items) which assess beverage-specific quantity and frequency of drinking in user-relevant beverage categories.
AAA-Tool: Animated Alcohol Assessment Tool; AUDIT-C: Alcohol Use Disorders Identification Test – Consumption.
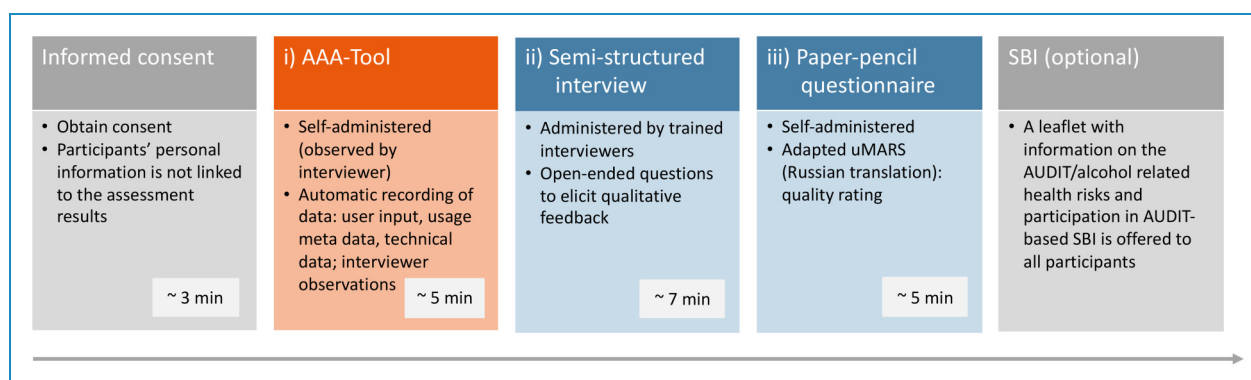

Figure 2. Study assessment flow.
AAA-Tool: Animated-Alcohol Assessment Tool; AUDIT: Alcohol Use Disorders Identification Test; SBI: Screening and Brief Intervention; uMARS: Mobile Application Rating Scale – User Version.

interviews; and (iii) patients' and practitioners' acceptability ratings of the tool assessed via the Mobile Application Rating Scale – User Version (uMARS).

Testing the AAA-Tool. Patients completed the AAA-Tool on provided Android tablets, while practitioners downloaded the tool to their personal devices. In the patient sample, user inputs and timestamps were automatically recorded. The data were used to assess usability, via the indicator of chapter-specific and overall completion time; plausibility of alcohol consumption assessment results and frequency of logically incoherent input; and adequacy of region-specific content via the indicator of use frequencies of specific vessels and beverages.

Semi-structured interviews. Qualitative feedback on the AAA-Tool was elicited in brief semi-structured interviews. Interviews were audio-recorded, transcribed for coding and thematically analysed to guide further improvement and implementation of the AAA-Tool (publication of results forthcoming). In this paper, to assess adequacy of the region-specific content, we restricted our analysis to the participants' specific feedback on the available vessel and beverage selection, assessed with two questions: 'Do you think the app reflects all beverages that you typically drink?'; 'Do you think the app reflects all the glasses and bottles that you typically use?'

The uMARS. The Mobile Application Rating Scale (MARS)[38] and its adapted User Version[39] are designed to

evaluate the quality of mobile health apps. Both have shown good internal consistency and test–retest reliability.[38–40] App quality is evaluated through 26 items covering 6 subscales: engagement, functionality, aesthetics, information quality, subjective quality and perceived impact. Each item is rated on a scale from 1 (lowest quality) to 5 (highest quality). The mean rating of the first four subscales forms the 'app quality' score. Ratings of the subjective quality subscale items are reported separately. In preparation for this study, a Russian translation of the uMARS was realized with the help of an interdisciplinary expert panel, following WHO guidelines.[35] To test acceptability of the AAA-Tool, all participants completed a paper-pencil version of the uMARS. The used version included two items of the subjective quality subscale: willingness to recommend the app and subjective overall (star) rating. The items referring to willingness to pay for the app and expected frequency of use were judged non-applicable for a free one-time screening application.

Statistical analysis

Descriptive analyses were performed to investigate the distributions (e.g. mean, SD, interquartile range (IQR) and graphic display) of completion time, alcohol consumption patterns and uMARS ratings, as well as beverage categories, beverages and vessel types used in the AAA-Tool to report on individual alcohol consumption. The use of a small convenience sample limits the meaningfulness of statistical

significance tests. We used correlation coefficients and *t*-tests as descriptive indicators to gauge the AAA-Tool's potential to cater to different relevant subgroups of users, such as older patients or patients with higher alcohol consumption. Spearman correlation coefficients were thus calculated to explore associations between uMARS ratings and patient characteristics (e.g. age, AUDIT score reached in the AAA-Tool and tool completion time). Similarly, two-sample *t*-tests were performed to descriptively explore gender differences in uMARS subjective quality and app quality ratings. Statistical analyses of quantitative measures were carried out in R version 3.6.3.[41]

Results

Sample characteristics

A total of 79 patients and 16 practitioners were approached between December 2020 and February 2021. None of the practitioners and a minority of the approached patients (n = 6; 8%) did not consent to participate, 23% of patients (n = 18) were excluded because they reported no alcohol consumption in the past 12 months. One practitioner could not complete the app due to technical difficulties. In total, 55 patients (47% female) and 15 practitioners completed the assessment (Table 1). The practitioners were overwhelmingly female (80%) and the majority (87%) reported involvement in screening for risky and harmful alcohol use as part of their profession. A broad age range was covered in both samples. All participants reported regular use of mobile phone or tablet applications.

Usability – completion time

The average tool completion time amongst patients was 6:38 min (SD = 2.49; range = 3.00–17.16), with 50% needing 4.53–7.14 min (Figure 3, Online Appendix 3). Completion of chapter two (description of beverage-specific 'usual drinking') was most time-intensive and accounted for 2:41 min (SD = 1.40; range = 0.47–8.10), or 39% of the total completion time on average. Chapter four (non-visualized AUDIT questions) took up, on average, 28% of the total completion time.

Acceptability – uMARS quality ratings

uMARS ratings of the AAA-Tool are shown in Table 2. In the patient sample, app quality was rated with a mean of 3.79 out of 5 points. The subjective quality of the AAA-Tool was rated with a mean of 3.55 points. In total, 53% of patients (n = 29) indicated that they would recommend the tool to 'many people' or 'everyone'. The perceived impact of using the AAA-Tool to evoke changes related to the participant's personal alcohol consumption received a mean rating of 3.07 points.
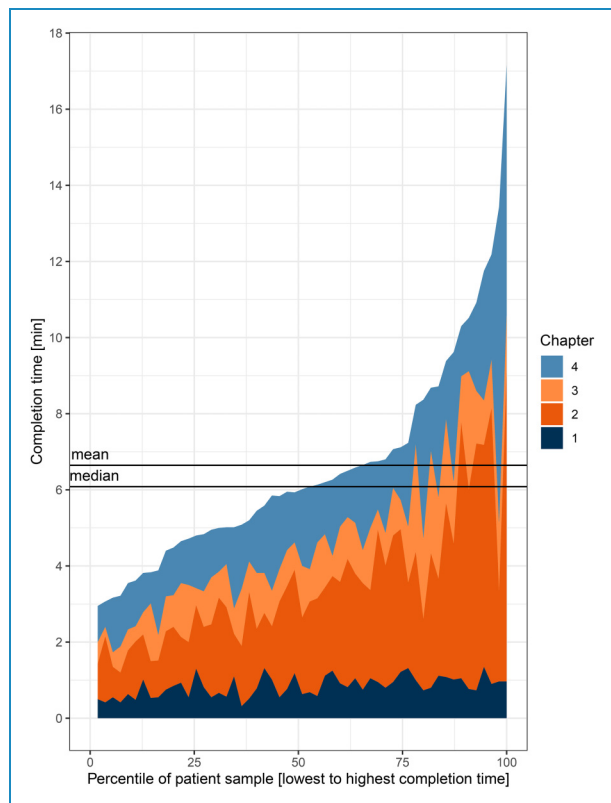
Table 1. Sample characteristics.

	PHC patients (n = 55)	Healthcare practitioners (n = 15)
Age, years		
Mean (SD)	41.5 (15.1)	46.9 (12.8)
Range	22–80	30–66
> 40 years (%)	24 (44)	9 (60)
Gender		
Female (%)	26 (47)	12 (80)
App experience		
Phone applications (%)	53 (96)	15 (100)
Tablet applications (%)	4 (7)	0 (0)
None (%)	0 (0)	0 (0)

PHC: primary healthcare; SD standard deviation.

Figure 3. Distribution of time needed by patients to complete the AAA-Tool assessment[a].
AAA-Tool: Animated Alcohol Assessment Tool
[a]Time spent in the AAA-Tool's result/feedback section (chapter 5) was not recorded.

Mean uMARS ratings were slightly higher in female compared to male patients (subjective quality score: women = 3.73, men = 3.40, p in two-sided t-test = 0.11; score on subscales A–D: woman = 3.85; men = 3.74; p = 0.36), and younger compared to older patients (subjective quality score: r in Pearson's correlation test = −0.25; p = 0.07; app quality subscales A–D: r = −0.13, p = 0.33).

No relevant associations between uMARS ratings and the user's AUDIT score were identified (ρ in spearman's correlation test ≤ 0.01 for both subjective quality and app quality subscales A–D). Users' uMARS ratings did not fall considerably with rising assessment completion time (subjective quality score: ρ = −0.17, confidence interval (CI) = −0.42; 0.10; app quality subscales A–D: ρ = −0.17, CI = −0.41; 0.10).

Healthcare practitioners rated the app more favourably than patients across all uMARS scales, with a mean of 4.14 points for app quality, 4.32 points for subjective quality and 3.98 points for perceived impact. A great majority (n = 12; 93%) stated they would recommend the tool to 'many people' or 'everyone'.

Assessed alcohol consumption data

Characteristics of the patient samples' AUDIT score distributions as assessed in the AAA-Tool are presented in Table 3. The mean AUDIT score of 7.38 out of 40 points (SD = 5.34) differed by gender (women: 6.04, 95% CI = 3.68; 8.40; men: 8.59, 95% CI = 7.04; 10.10). An average of 4.89 of the total points were obtained on the first three visualized AUDIT items (AUDIT-C, maximum possible score: 12 points). On average, patients reported to consume 7.20 standard drinks, or 72 g of pure alcohol, per week (SD = 12.77) and engage in HED, i.e. consuming more than 60 g of pure alcohol on one occasion, 0.70 times in 30 days (SD = 0.85). Many patients reported a typical drinking day consumption exceeding the HED threshold (n = 24, 44%), or a typical drinking day consumption that exceeded their described largest drinking occasion in the past 30 days (n = 26; 47%). The reported average typical drinking day consumption was 74.0 g of pure alcohol, the average largest drinking occasion 80.2 g of pure alcohol.

A minority of patients provided logically impossible entries when describing their consumption. This included a HED frequency lower than their overall drinking frequency while their reported drinking on a 'typical drinking day' exceeded the HED threshold (n = 3; 5%), or a beverage-specific drinking frequency that exceeded the overall drinking frequency (n = 5; 9%).

Perceived adequacy and use of region-specific content

When interviewed, 78% (n = 43) of patients indicated that the AAA-Tool included all drinking vessels they typically used. A minority missed vessels that were already included in the tool but did not appear in all beverage categories (5%, n = 3). Others suggested new vessels to be added (16%, n = 9), such as larger wine glasses, 1 l plastic bottles, or small glasses with volumes of 40–50 ml. Five patients (9%) spontaneously expressed confusion about the option to choose between identical vessels in different glass colours. Similarly, 71% (n = 39) of the patients reported to have found all beverages they typically consumed. Some suggested the addition of further beverages, often beverages with high alcohol content (16%, n = 9), such as rum (7%, n = 4) and tequila (5%, n = 3). Four patients (7%) commented that the cocktail selection might be improved by adding more beverages or enabling users to 'mix' individual cocktails. Analysis of usage data revealed that two-thirds of patients chose one or two out of the eight available beverage categories to describe their usual drinking (mean = 2.31, SD = 1.25). Beer, wine and spirits were each chosen by about half of the patients (54%, 52%, 49%), sparkling wine, cider and mixed drinks by about one in four patients (25%, 23%, 23%). None of the patients chose fortified

Table 2. Participants' uMARS quality ratings of the AAA-Tool.

uMARS scales	PHC patients (n = 55)	Healthcare practitioners (n = 14)[b]
Total app quality (subscales A–D)	uMARS ratings[a]	uMARS ratings[a]
Mean (SD)	3.79 (0.43)	4.14 (0.48)
Median (IQR)	3.81 (3.56–4.06)	4.26 (3.89–4.42)
A – Engagement		
Mean (SD)	3.39 (0.53)	3.63 (0.80)
Median (IQR)	3.40 (3.00–3.80)	3.60 (3.30–4.20)
B – Functionality		
Mean (SD)	4.23 (0.63)	4.57 (0.48)
Median (IQR)	4.25 (4.00–4.75)	4.75 (4.31–5.00)
C – Aesthetics		
Mean (SD)	3.80 (0.62)	4.17 (0.60)
Median (IQR)	3.67 (3.33–4.33)	4.33 (4.00–4.58)
D – Information		
Mean (SD)	3.85 (0.54)	4.32 (0.38)
Median (IQR)	3.75 (3.50–4.25)	4.29 (4.06–4.50)
Subjective quality overall		
Mean (SD)	3.55 (0.79)	4.32 (0.54)
Median (IQR)	3.50 (3.00–4.00)	4.50 (4.00–4.50)
Subjective quality 1[c]		
Mean (SD)	3.51 (0.86)	4.07 (0.62)
Median (IQR)	4.00 (3.00–4.00)	4.00 (4.00–4.00)
Subjective quality 2[d]		
Mean (SD)	3.60 (0.97)	4.57 (0.65)
Median (IQR)	4.00 (3.00–4.00)	5.00 (4.00–5.00)
Perceived impact		
Mean (SD)	3.07 (1.09)	3.98 (1.04)
Median (IQR)	3.17 (2.33–3.83)	4.08 (3.38–4.96)

AAA-Tool: Animated Alcohol Assessment Tool; IQR: interquartile range; PHC: primary healthcare; SD: standard deviation; uMARS: Mobile App Rating Scale – User Version.
[a]Scores range from 1 (lowest quality) to 5 (highest quality).
[b]One healthcare practitioner included in the original sample did not complete the uMARS assessment.
[c]Item text: *What is your overall (star) rating of the app?*.
[d]Item text: *Would you recommend this app to people who might benefit from it?*.

Table 3. Patient AUDIT scores and AUDIT-C scores as assessed in the AAA-Tool.

Gender	AUDIT[a]		AUDIT-C[b]	
	Mean	SD	Mean	SD
All	**7.38**	**5.34**	**4.89**	**2.45**
Women	6.04	6.15	4.08	2.50
Men	8.59	4.25	5.62	2.21

AUDIT: Alcohol Use Disorders Identification Test; AUDIT-C: Alcohol Use Disorders Identification Test – Consumption; SD: standard deviation.
[a]10 items. Maximum possible score: 40 points.
[b]3 items. Maximum possible score: 12 points.

wine; liqueurs were chosen once. During the study, patients described a total of 145 drinks, revealing very popular and less popular vessels and beverages (Figures available in online Appendices 4a and 4b).

Discussion

Summary of main findings

To our knowledge, the AAA-Tool is the first mobile app that provides a visualized and interactive version of the WHO's well-established AUDIT. Its usability and acceptability in a Russian PHC setting, the plausibility of its alcohol consumption assessment results and the perceived adequacy of its country-specific vessel and beverage selection were all evaluated as satisfactory in this first pilot study. The AAA-Tool showed good acceptability, as expressed in uMARS mean ratings of 3.79 out of 5 points in the patient and 4.14 out of 5 points in the practitioner sample. With these results, the AAA-Tool compares favourably to similar apps: a recent study evaluating 74 substance use recovery apps using the MARS scale found low overall quality of available apps in the field of alcohol use (overall MARS median score: 2.82, SD = 0.55).[28] The lowest average uMARS scores were obtained in the subscale used to evaluate the perceived impact to evoke changes related to the participant's personal alcohol consumption and the engagement scale. All other scales scored above 3.5 in the patient and above 4.0 in the professional sample. These findings are likely related to the AAA-Tools current structure. The tested pilot version is a one-time screening application that includes only a very basic feedback section at the end. The intended combination with a results-based brief intervention delivered by the attending healthcare professional to any patient with a positive screening result will likely increase the perceived impact. The fact that patients evaluated the

AAA-Tool directly after the screening process without discussing the results with their attending healthcare professional might also explain the moderate engagement score. The absence of technical issues and the average completion time of less than 7 min indicate that AAA-Tool is reasonably easy to use. The traditional AUDIT is usually completed in less than 2 min.[42] However, the AAA-Tool's observed completion time of less than 7 min is still promising for its integration into routine care, as the app may be used in the waiting room without a healthcare professional's assistance. The alcohol consumption data assessed through the AAA-Tool was found to be plausible, e.g. it could reasonably reflect the actual alcohol consumption in the sample. This finding paves the way for a larger validation study testing the convergent validity of the AAA-Tool with an established assessment method. Implausible or logically inconsistent input patterns that were observed in some pilot study use cases could point to a reduced understandability of certain assessment parts. They might be prevented in future versions of the AAA-Tool by automatic detection of inconsistent inputs and subsequent querying of users for clarification. The region-specific content of the AAA-Tool, i.e. the available vessel and beverage selection, was regarded as helpful and adequate by a large majority of patients and practitioners. Concrete suggestions for additional content and the analysis of popular and less relevant beverage categories, beverages and vessel types will inform future versions of the AAA-Tool.

Limitations of the study design

The use of relatively small convenience samples demands all results to be interpreted as descriptive markers and reduces the generalizability of findings. Moreover, our samples were recruited amongst healthcare practitioners and patients in the regions of Moscow, Vologda and Astrachan only, and are thus not representative of users in the Russian PHC in general. Usability and acceptability of the Russian AAA-Tool in other contexts, such as rural or less affluent regions need to be evaluated separately. The COVID-19 pandemic might have introduced additional sampling bias by limiting the selection of patients attending PHC services. To account for the assumably important variation in alcohol consumption patterns and typically used drinking vessels across Russia, the perceived adequacy of the country-specific vessel and beverage selection was evaluated in a broader online survey amongst Russian alcohol consumers paralleling this pilot study. The resulting additional insights will be used along with the pilot study participants' feedback to revise the AAA-Tool's country-specific contents prior to its implementation in routine patient care.

Lastly, the conditions in which study participants completed the AAA-Tool were not entirely representative of its intended implementation. The presence of the interviewer who answered upcoming questions during the

assessment might have biased the tool's acceptability ratings and the assessment completion time.

Future perspectives

Designed to be completed without professional assistance, the AAA-Tool could be self-administered to screen for risky or harmful alcohol use in waiting areas of healthcare facilities or even at home, possibly prior to a medical appointment. Its interactive and culturally informed animation features might reduce data loss by automatically registering user input and results and facilitate detailed analyses in epidemiological studies or seamless storage of main outcomes in electronic patient records. The animations in the AAA-Tool might act as craving-inducing cues in patients with diagnosed alcohol use disorder.[43] While none of the study participants mentioned enhanced craving in the semi-structured interviews, to ensure patient safety we will further investigate the risk of animation-induced craving before the AAA-Tool's implementation. The high MARS rating scores obtained amongst healthcare practitioners are encouraging, as the inclusion of these stakeholders is critical for the successful implementation of the tool into standardized SBI programmes after its validation.[32] The AAA-Tool is planned to be published as a downloadable mobile app to be used free of charge by individuals, healthcare providers and scientists in epidemiological research. It is currently adapted and translated to provide culture-specific country-versions to be used in different regional contexts in the WHO European region.

Conclusion

Considering the vast treatment gap in the field of alcohol-related disorders[5,6] and the substantial underestimation of alcohol consumption in self-report surveys,[7–9] there is a clear need for new approaches to assess alcohol consumption in an accurate and user-friendly manner. In the context of this pilot study, patients and healthcare practitioners in a Russian PHC setting successfully used the interactive animation features of the AUDIT-based AAA-Tool to describe their drinking behaviour. High acceptability ratings, acceptable completion time, plausible alcohol usage assessment results and perceived adequacy of region-specific content underline the AAA-Tool's potential to provide a novel approach to alcohol assessment in the PHC context. The results of this study pave the way for a formal validation study. Once validated, the AAA-Tool could help reduce alcohol-related harm by accelerating the much-needed widespread implementation of SBI in Russian PHC and beyond.

Data availability: All used data are available upon reasonable request from the authors.

Declaration of Conflicting Interests: CF and EY are staff members of the WHO, and MN is a WHO consultant. The authors alone are responsible for the views expressed in this article and they do not necessarily represent the views, decisions or policies of the institutions with which they are affiliated. The authors declare no further conflict of interest.

Contributorship: The first authorship is shared by AB and VW. CP is the corresponding author and the named guarantor of the study. AB, CF, CP, EY, MN, SK and VW were involved in conceptualisation and development of the tested screening tool and conceived the study. AB, CP, MN and VW developed the study protocol. CP and VW obtained ethical approval in Germany. AB and MN were responsible for obtaining ethical approval, patient recruitment and data collection in Russia. AKa, AKo and BG were involved in gaining ethical approval in Russia, advised on the study design, and facilitated patient recruitment. AB, CP and VW performed the data processing and statistical analysis. VW wrote the first draft of the manuscript. CP supervised the study. All authors reviewed and edited the manuscript and approved the final version of the manuscript.

Ethical approval: The ethics committee of the Medical Faculty of Heidelberg University, Germany (REC number: S-885/2020) and the ethics committee of the National Medical Research Center for Therapy and Preventive Medicine of the Ministry of Healthcare of the Russian Federation (details can be obtained from the authors) approved this study.

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