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EVALUATION OF ALCOHOL RISK SCREENING AND INTERVENTION USING ALCOHOL USE DISORDERS IDENTIFICATION TEST-10 (AUDIT-10) IN KOTA KINABALU, SABAH

Norsyahida Md Taib[1], Mohd Shamril Mohd Nawi[2], Fredie Robinson[3], Syed Sharizman Syed Abdul Rahim[4*]

[1]Faculty of Medicine & Health Sciences, Department of Public Health Medicine, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia
[2]Sabah State Health Department, Kota Kinabalu, Sabah, Malaysia
[3]Faculty of Medicine & Health Sciences, Department of Public Health Medicine, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia
[4]Faculty of Medicine & Health Sciences, Department of Public Health Medicine, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia
Correspondence Author: Syed Sharizman Syed Abdul Rahim
Email: syedsharizman@ums.edu.my

ABSTRACT

Introduction: Alcohol consumption poses a significant public health concern due to its association with non-communicable diseases, social harm, and mental health issues. In Malaysia, the highest prevalence of alcohol consumption was in Sabah (28.6%) and Sarawak (31.2%), especially among indigenous and rural populations. **Aims:** This study aimed to examine demographic patterns linked to alcohol risk categories and evaluate the implementation of harm reduction interventions based on the Ministry of Health Malaysia's 2013 community guideline. **Methods:** A retrospective cross-sectional study was conducted using secondary data from AUDIT-10 screenings collected between 1 January 2020 and 31 December 2024 in Kota Kinabalu, Sabah. Demographic variables included age, gender, ethnicity, and citizenship. categorised. Risk levels categorized AUDIT-10 scores, and associations with demographic factors were examined using chi-square tests. Intervention implementation was assessed based on documentation aligned with national guidelines. **Results**: Of the 1,066 records analyzed, males were significantly overrepresented in higher-risk categories χ^2 (3, N = 1066) = 51.14, $p < 0.001$). Indigenous groups formed the majority across all risk levels. While most participants were Malaysian citizens, non-citizens were more common in the low- and very-high-risk groups. Age distribution showed minimal variation across categories. However, incomplete records on intervention delivery limited the assessment of compliance with national protocols. **Conclusion:** The study underscores elevated alcohol risk among males and indigenous populations. Gaps in intervention delivery highlight the need for enhanced training and culturally tailored strategies. Strengthening data quality and implementation fidelity is crucial to improving alcohol harm reduction at the community level.

Keywords: Alcohol Drinking, AUDIT-10, Health Promotion, Indigenous Peoples, Risk Factor

INTRODUCTION

Alcohol consumption, though socially and culturally variable, poses a significant threat to public health due to its strong association with a broad spectrum of physical, mental, and social harms. Globally, the World Health Organisation (WHO) estimates that harmful use of alcohol is responsible for approximately 3 million deaths each year, representing 5.3% of all deaths worldwide and accounting for 13.5% of total deaths among individuals aged 20–39 years (WHO et al., 2018). In Malaysia, while the national prevalence of alcohol consumption may appear modest due to religious and cultural factors, there exists a concentrated burden among specific communities, particularly among ethnic minorities and populations in East Malaysia, such as Sabah and Sarawak (IPH et al., 2019).

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There were approximately 11.8% of Malaysian adults aged 18 years and above who reported ever consuming alcohol, with a higher prevalence reported among men (19.6%) compared to women (4.4%) (IPH, NIH and Malaysia, 2019). Among these, the highest prevalence was seen in Sabah (28.6%) and Sarawak (31.2%), especially among indigenous groups such as Kadazan-Dusun, Murut, and Iban, where traditional fermented beverages are culturally embedded (Joseph et al., 2020). Importantly, while social drinking may be normalised in some communities, the transition to hazardous and harmful drinking patterns often occurs unrecognised, leading to serious consequences for individual health, family dynamics, and community welfare.

The implementation of this alcohol harm reduction guideline supports several key national and international strategic objectives. It aligns with the Malaysian National Strategic Plan for Non-Communicable Diseases (NSP-NCD 2016–2025), particularly under Priority Area 2, which is Risk Factor Reduction, by addressing alcohol consumption as a modifiable health risk.

Additionally, it is consistent with the WHO Global Strategy to Reduce the Harmful Use of Alcohol (2010), which highlights the importance of health system responsiveness, community engagement, and the use of screening and brief interventions (SBI) (Lee and Rajandran, 2024).

Harmful alcohol use can increase the risk of non-communicable diseases (NCDs). For example, liver cirrhosis, hypertension, cardiovascular diseases, pancreatitis, and several types of cancer (WHO, 2014). Additionally, injuries from road traffic accidents, falls, and violence, including domestic abuse, were consequences of alcohol misuse.

Alcohol misuse is a significant public health issue in Malaysia due to its broad impact and contributes to the higher years of life lost (YLL) and disability-adjusted life years (DALYs), and it remains among the top ten risk factors for morbidity and mortality in Malaysia (Sornpaisarn and Rehm, 2021). Addressing this alcohol misuse is essential to reducing NCDs and to improve population health outcomes. This effort is a critical component of Malaysia's strategy to reduce long-term health consequences and societal burden.

Primary prevention needs to be applied by early identification of individuals at risk of alcohol-related harm before they develop serious alcohol-related diseases or complications. There were two tools for alcohol screening, which were the Alcohol Use Disorders Identification Test – Consumption (AUDIT-C) and the full Alcohol Use Disorders Identification Test (AUDIT-10). These screening tools were developed by the WHO and widely used (Lawford et al., 2012). Therefore, healthcare providers can offer interventions such as counselling, brief interventions, or referrals after the comprehensive screening. Moreover, these tools help healthcare providers and community workers to determine risk levels and implement timely interventions (WHO, 2010).

The WHO Global Strategy to Reduce the Harmful Use of Alcohol (2010) was adopted by the Ministry of Health Malaysia (MOH) to create the *Garis Panduan Saringan dan Intervensi Pencegahan dan Pengurangan Kemudaratan Alkohol* in 2013. This guideline was specifically designed to equip community volunteers with the tools and knowledge necessary to identify and manage alcohol-related risks within their local communities through standardised screening and intervention protocols (MOH, 2013a).

The guidelines provide an important role for strategic management of alcohol intervention. It serves a stepwise intervention approach. For example, for low-risk individuals, the health care staff will offer health education. Health advice to reduce alcohol intake will be given for those at moderate risk. Then, for those at high

risk, they will be referred and get involved in community support groups. All of the interventions will be done after facilitating the early detection of hazardous drinking through the use of the AUDIT-C screening tool. Then, for individuals identified as higher risk, the screening will further use the AUDIT-10 for escalating care. This guideline also embeds the culturally relevant information on traditional alcoholic beverages such as *tuak*, *lihik*, and *montoku*. This is important for enabling volunteers to conduct discussions that contextually appropriate with indigenous populations in Sabah and Sarawak (MOH, 2013a).

The Ministry of Health also created a guideline to encourage the behavioural changes in 2013. Community Support Groups (*Kumpulan Sokongan Komuniti*) provide training to community volunteers to do alcohol risk screening and help deliver health education to the community members. This guideline supports Malaysia's broader public health strategy under the *Mekanisme Sokongan Intervensi Pencegahan Penyakit* (MeSVIPP). This approach brings the prevention strategies into everyday community settings, enhancing accessibility, cultural relevance, and long-term sustainability, particularly in rural and indigenous areas where access to formal healthcare may be limited. This will empower community participation and create long-term intervention (MOH, 2013b).

Community-based participation plays an important role in Malaysia's health promotion strategies (Woldie et al., 2018). The healthcare system can bring prevention and service to homes, schools, and community centres by facilitating them with simple and reliable tools such as AUDIT-C and AUDIT-10. The volunteers understand the indigenous communities in the context of culture and will increase their trust. It can maintain close proximity to at-risk populations, qualities that position them as effective agents of behavioural change (Chung et al., 2017).

The stigma, lack of information, or poor access to healthcare can be prevented by implementing community-based participation strategies. This approach is important to the marginalized or indigenous communities where usually poses poor service utilisation. This fosters the collective responsibility for the health programme and also enhances screening coverage. Thus, it can increase the likelihood that interventions will be accepted, implemented, and sustained over time (Woldie et al., 2018; Fahmy et al., 2022).

This study aims to describe the demographic patterns associated with alcohol risk categories based on AUDIT-10 scores in Kota Kinabalu from 2020 to 2024. Secondly, is to evaluate the implementation of the intervention based on AUDIT-10 scores.

METHODS

Study Setting

This study was conducted in Kota Kinabalu, the capital of Sabah in East Malaysia, characterised by a mix of urban and peri-urban populations, including Malaysian citizens, indigenous communities, and non-citizens such as migrants. The setting includes multiple public health clinics and outreach facilities involved in alcohol risk screening. Secondary data were obtained from documented AUDIT-10 screenings conducted between 1 January 2020 and 31 December 2024. These records, maintained by public health units under the Ministry of Health Malaysia, follow national alcohol screening and intervention guidelines. This study was conducted over two months from June to July 2025. This is a retrospective cross sectional study utilising secondary data from AUDIT-10 screening records collected over the specified five-year period. Records were obtained from three public health clinics (Klinik Kesihatan Inanam, Manggatal, and Telipok) with complete demographic and AUDIT-10 data.

All AUDIT-10 screening records conducted in Kota Kinabalu between 1st January 2020 and 31st December 2024. Records that included complete demographic data (age, gender, race) and AUDIT-10 scores. Purposive sampling was used to collect all available and recorded AUDIT-10 screening data that met the inclusion criteria and were recorded in Kota Kinabalu between 1st January 2020 and 31st December 2024.

Research Tools

Data were extracted using a structured Microsoft Excel form designed to systematically capture relevant information. Tools included the AUDIT-10 screening form. A validated 10-item WHO questionnaire to assess alcohol use, dependence, and harm, with scores categorising individuals into risk levels. Then, a data extraction template which was an Excel-based form capturing demographics (age, gender, ethnicity), AUDIT-10 score and risk category, intervention type (health education, brief advice, referral), and follow-up actions. Next, the Ministry of Health Community Guideline in 2013. This national guideline titled *"Garis Panduan Saringan dan Intervensi Pencegahan dan Pengurangan Kemudaratan Alkohol"* is used as reference to classify risk levels and ensure interventions are aligned with recommended protocols, including the use of Kumpulan Sokongan Komuniti (KSK) for high-risk individuals.

Data Analysis

Data were analysed using both descriptive and inferential statistical methods using R software. Descriptive statistics were used to summarise demographic characteristics and the distribution of AUDIT-10 scores, providing an overview of age, gender, ethnicity, and alcohol risk levels within the study population. Associations between demographic variables and alcohol risk categories were examined using chi-square tests. Additionally, the study aims to identify alignment with national protocols and detect any implementation gaps across different risk levels.

Quality Control

All data were thoroughly reviewed for completeness and accuracy. Thus, it can enhance the validity and reliability of the findings. Several quality control measures were implemented throughout the data management process. For example, any records found to be incomplete, inconsistent, or missing critical variables were excluded from the dataset. To prevent bias and overestimation of results, the duplicate entries were identified and removed. Two independent reviewers did the data verification to confirm the completeness and accuracy. This triangulation can reduce human error, increase data accuracy, and ensure consistency in data extraction and entry. These quality control procedures were essential to maintaining the integrity of the dataset and ensuring that the analysis reflected an accurate representation of the original screening records.

Data Storage and Data Confidentiality

This study followed the strict ethical and data protection standards to ensure data safety and privacy. The authorised research team members can only assess the data. All data were stored securely on password-protected computers and encrypted storage devices. Any physical documents used during data extraction were kept in locked cabinets and destroyed upon study completion. To maintain confidentiality, all datasets were anonymised, with personal identifiers removed prior to analysis. All information obtained in this study was kept strictly confidential and used solely for research purposes. Personal identifiers such as names, identification numbers, and addresses were removed during the data extraction process. Each record was

assigned a unique study ID to ensure anonymity. The data were stored in a password-protected electronic file accessible only to the principal investigator and designated research personnel. Hard copies, if used, were kept in a locked cabinet and destroyed securely after the study concluded. The study complied with data protection guidelines outlined by the Ministry of Health Malaysia and international ethical standards.

Ethical Consideration

Ethical approval was granted by the Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia (Approval No: NMRR-25-01830-EJC). As the study utilised anonymised secondary data, informed consent was not applicable. As a retrospective study using secondary data, there will be no direct contact with participants.

RESULT

Demographic patterns associated with alcohol risk categories based on AUDIT-10 scores in Kota Kinabalu from 2020 to 2024.

Table 1 shows the sociodemograph factors associated with alcohol risk categories in Kota Kinabalu from 2020 to 2024. Males consistently outnumber females across all alcohol risk categories, particularly in the moderate to very high-risk groups. Females are mainly represented in the low-risk category, with very minimal presence in higher-risk levels.

Most individuals across all risk categories are from the indigenous population. Other ethnic groups such as Chinese, Suluk, Malay, and Indian appear in much smaller numbers, with minimal representation in the high and very high-risk categories. Then, most individuals in all risk groups are Malaysian citizens. Non-citizens constitute a small fraction of the population and are mostly found in the low and very high-risk categories, with no presence in the high-risk group. Age distribution is relatively similar across the risk categories, with average ages in the early forties and standard deviations ranging from 13 to 15 years. This indicates a consistent age profile across risk groups, with no significant age-based differences in alcohol risk levels.

Associations between demographic variables and alcohol risk categories

A chi-square test was conducted to determine the association between gender and alcohol risk categories based on AUDIT-10 scores. The result was statistically significant, χ^2 (3, N = 1066) = 51.14, $p < 0.001$, which suggests a significant relationship between gender and alcohol risk level, with males being more likely to fall into higher-risk categories.

Implementation of the intervention in accordance with the *Garis Panduan Program Intervensi Pengesanan Masalah Penggunaan Alkohol di Komuniti* (2013)

This study is to evaluate the implementation of community-based alcohol intervention activities in accordance with the *Garis Panduan Program Intervensi Pengesanan Masalah Penggunaan Alkohol di Komuniti* (2013), which is the national clinical practice guideline issued by the Ministry of Health (MOH) Malaysia. The evaluation focuses on risk categorisation, consistency of follow-up, and the documentation of intervention practices.

Based on the AUDIT-10 scoring system, the outcome of implementation of AUDIT-10 screening was categorised individuals into four risk zones, which is Zone I (scores 0–7), Zone II (8–15), Zone III (16–19), and Zone IV (20 and above). However, the official MOH guideline groups risk levels into three main categories, which are low risk (score 0–7), hazardous or harmful use (score 8–19), and high risk or possible dependence (score 20 and above). Despite the appropriate use of risk stratification, a significant shortcoming

of the implementation is the absence of fields indicating whether the recommended interventions were implemented. According to the MOH guideline, individuals in Zone I require no intervention or simple brief advice, while those in Zone II should receive simple advice and be monitored. Individuals in Zone III should undergo structured brief counselling, and those in Zone IV must be referred to a medical officer or specialist for further evaluation and treatment.

The guideline also emphasises the use of a standardised intervention form (*Borang Intervensi Alkohol*) to record the type of intervention delivered. However, there is an incomplete intervention was document whether brief advice was provided to individuals in Zones I and II, or whether counselling or referrals were made for those in Zones III and IV.

Furthermore, the dataset does not include any unique identifiers, such as names or identification codes, that would allow individuals to be tracked over time. As a result, it is not possible to determine whether any individuals underwent repeat screening, whether follow-up interventions were consistent, or whether their risk category changed over time.

Table 1. Sociodemographic patterns associated with alcohol risk categories based on AUDIT-10 scores in Kota Kinabalu from 2020 to 2024

Variable	Low Risk (≤7)	Moderate Risk (8–15)	High Risk (16–19)	Very High Risk (≥20)	Total (n)
Gender					
Female	336 (95.7%)	12 (3.4%)	0 (0.0%)	3 (0.9%)	351
Male	565 (78.0%)	117 (16.1%)	16 (2.2%)	17 (2.3%)	715
Race					
Chinese	68 (85.0%)	8 (10.0%)	1 (1.3%)	3 (3.8%)	80
Indian	4 (100%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	4
Malay	5 (100%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	5
Indigenous people	805 (82.6%)	120 (12.3%)	15 (1.5%)	15 (1.5%)	955
Suluk	19 (86.4%)	1 (4.5%)	0 (0.0%)	2 (9.1%)	22
Citizenship					
Citizen	882 (85.5%)	128 (12.4%)	16 (1.6%)	18 (1.7%)	1,044
Non-citizen	19 (86.4%)	1 (4.5%)	0 (0.0%)	2 (9.1%)	22
Age (years)	43 (±15)	41 (±14)	41 (±13)	43 (±13)	—

DISCUSSION

The pattern of alcohol consumption showed high in males, with the trend becoming especially prominent in the moderate, high, and very high-risk categories, where female involvement remains minimal. A study in Selangor reported that men were significantly more likely to engage in hazardous and harmful drinking behaviours compared to women (Ghazi et al., 2021).

Similarly, a national survey (IPH, NIH and Malaysia, 2019) showed that the prevalence of alcohol consumption among Malaysian males (10.3%) far exceeded that of females (1.4%). Cultural and religious norms in Malaysia, where alcohol consumption is more socially restricted for women, especially among the Muslim

population, likely contribute to this gender discrepancy (Dotinga et al., 2006). Southeast Asian trends reflect similar gender disparities. In Thailand, reported that 43% of men consumed alcohol in the past year compared to just 10% of women (Wakabayashi et al., 2015). In Indonesia, alcohol use is also significantly in male influence of behaviour, influenced by social acceptance and occupational exposure (WHO, 2018). In addition, men are more likely to consume alcohol in high quantities, experience alcohol dependence, and suffer from alcohol-related harm (White, 2020).

The unique demographic and cultural composition of Sabah, where by indigenous groups such as the Kadazan-Dusun and Murut make up a significant proportion of the population. Several studies have identified alcohol consumption as a culturally embedded practice among certain indigenous communities in East Malaysia, often associated with traditional events, rituals, and social gatherings (Jaimon, Deligannu and Robinson, 2024). A qualitative study in Sarawak showed that the indigenous communities' drinking locally made alcohol is part of their culture and helps them immerse themselves with their communities (Abd Rashid et al., 2021). Alcohol consumption prevalence in East Malaysia was higher compared to Peninsular Malaysia, particularly among non-Muslim Bumiputera groups stated by the National Health and Morbidity Survey (NHMS) 2019. This finding important because while promoting alchohol harm reduction there is a need for culturally sensitive interventions that acknowledge traditional practices. Moreover, this practice was the same of indigenous highland communities in northern Thailand and Laos. They were consumed of homemade rice wine as a significant part of their traditional rituals (Krajangchom, 2023). Without proper intervention, such behaviours can increase the risk of alcohol-related issues, including dependency, interpersonal violence, and injury.

The high-risk category of alcohol consumption was higher in non-citizens, especially among the undocumented migrants, foreign labourers, and stateless individuals. They may have limited access to routine healthcare services and seek treatment after symptoms become severe and associated with complications (Ghazi et al., 2021). In East Malaysia, the limited access to healthcare services was faced often by foreign workers in Sabah that can influence their behaviour to take substance (Lasimbang, Tong and Low, 2016). Globally, high risk of harmful alcohol use is usually higher in migrant and refugee populations. This is because of social constraints such as stress, social isolation, and barriers to care (WHO, 2018). Targeted outreach and culturally appropriate interventions are needed to address the needs of these vulnerable groups.

The ages of people in each risk group are quite similar, with an average age of 41 to 43 years. This shows that alcohol risk in this group is spread across all adult ages, not just in specific age group categories. This finding was different from some earlier studies in Malaysia, which found that drinking was highest among people aged 25 to 34 years (IPH, NIH and Malaysia, 2019). However, this discrepancy due to the study setting and methodology which the data was drawn on data from public health clinics that were more likely to serve older adults with existing health concerns. Furthermore, middle-aged adults may be more likely to present for screening due to comorbidities or occupational health requirements. A study in Vietnam has showed similar findings, with alcohol use distributed evenly among adults aged 30 to 60 years (Kumar et al., 2021). The findings of the study in high income coutries (Australia, England, Scotland, New Zealand, St Kitts and Nevis) showed that older people tend to consume alcohol more frequently in smaller amounts per occasion (Chaiyasong et al., 2018).

The screening implementation utilised the AUDIT-10 scoring system and classified individuals into four zones that deviate slightly from the three-level risk classification recommended by the MOH guideline (MOH, 2013). The detailed risk categories from WHO provide healthcare staff to implement the interventions more accurate. However, it also poses challenges to synchronise the management with national guidelines, where used only three levels of risk category. It can make it difficult to compare the findings and implementation programmes between states or facilities (Babor et al., 2001). Even though trained healthcare staff are available, follow-up records for people at moderate or high risk are often not completed. This problem continues despite efforts to improve routine documentation and provide ongoing training for health workers (Demsash et al., 2023). In Thailand, even though the AUDIT tool is widely used, healthcare workers often do not record brief advice or referrals, especially in main clinics (Goldschmidt et al., 2023)

Patient identification, such as unique identifiers like patient IDs or coded names, is crucial for healthcare continuity and program evaluation. A study in Pahang highlighted that the clinic faced difficulties in monitoring the progress of high-risk individuals without individual identifiers (Riplinger, Piera-Jiménez and Dooling, 2020). This not only hampers continuity of care but also undermines the ability to longitudinally evaluate program effectiveness. Moreover, many countries with structured national guidelines fall short in implementation fidelity (Masrie et al., 2024).

The national guideline provides a clear and structured framework for managing alcohol use at the community level; its success depends heavily on the capacity of local health facilities to implement and monitor interventions. The lack of structured follow-up mechanisms, the absence of referral outcome data, and incomplete documentation significantly weaken the program's impact, particularly for individuals in the moderate and high-risk categories who require ongoing care. Without these elements, the screening programme functions more as a point-in-time diagnostic rather than a continuum of care model.

Limitations and Strengths

This study uses all available AUDIT-10 screening records in Kota Kinabalu over 5 years, ensuring a large sample size and enhancing representativeness for the local context. Then, it is directly guided by the 2013 KKM community guideline, making findings relevant for policy and program implementation at national and local levels.

Moreover, the Alcohol Use Disorders Identification Test (AUDIT-10) is a globally validated tool endorsed by WHO and the Ministry of Health Malaysia, ensuring the credibility of risk classification. However, this study relies on retrospective data from health records, which may suffer from incomplete, inaccurate, or inconsistent data entry. Some records had missing demographic or intervention variables. For example, data spans across five years, allowing for the observation of trends and changes over time, including impacts of external events (COVID-19 pandemic). Then, this study does not account for deeper behavioural, social, or cultural drivers of alcohol use, such as mental health status, peer influence, or indigenous practices.

Recommendation

To effectively tackle the sociodemographic factors linked to hazardous or harmful alcohol use, especially among men from indigenous communities, it is crucial to prioritise interventions that address the unique cultural, social, and economic drivers of alcohol misuse in these groups. Given that alcohol-related risks are evenly distributed across age groups, screening and brief intervention (SBI) programs should extend beyond younger individuals to include middle-aged adults, who are often neglected despite being at significant risk. The gender and ethnic disparities observed reflect broader national and global patterns, highlighting the importance of public health messaging that is culturally sensitive and resonates with diverse audiences. Expanding behavioural intervention services in community settings, particularly in areas with high prevalence rates, is essential, as is ensuring these services are tailored to the cultural contexts.

Additionally, the lack of non-citizen data in public health screening need for inclusivity of migrant and stateless populations. For example, outreach activities, addressing barriers such as language, legal status, and healthcare access to ensure these vulnerable groups are not excluded. To improve alcohol intervention programs, several system changes are needed. First, the classification system used during screening should match the national guideline to ensure clear and consistent results. Second, recording interventions should be done digitally in the health information system to make follow-ups easier and more reliable. Third, using anonymous patient IDs will allow progress to be tracked over time while keeping personal information private. Finally, healthcare staff should receive proper training to follow the right procedures and to use tools like the *Borang Intervensi Alkohol* (Alcohol Intervention Form), ensuring interventions are delivered correctly and consistently. By implementing these recommendations, public health systems can better address the complex sociodemographic factors associated with alcohol misuse, leading to more equitable and effective outcomes.

CONCLUSIONS

In conclusion, while the deployment of the AUDIT-10 tool in Sabah reflects progress in screening for alcohol misuse at the community level, the overall implementation of interventions remains suboptimal when evaluated against the MOH's 2013 guideline. Comparisons with other Malaysian states, Southeast Asian countries, and global trends reveal similar barriers, particularly around documentation, follow-up, and digital integration. Addressing these issues is essential to improving outcomes for individuals at risk of alcohol-related harm and strengthening Malaysia's broader public health response.

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