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Perspective

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Alcohol use disorders among healthcare professionals: a call for action

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Abstract

Alcohol consumption and harmful and hazardous drinking are significant contributors to the global burden of disease, accounting for about 3 million deaths each year globally. Owing to their stressful work environment, healthcare professionals are at a high risk of experiencing physical and mental health problems, particularly alcohol use disorders. Alcohol use disorder among healthcare professionals is of concern as it is associated with decreased work productivity and performance and associated ill health and cognitive impairment. This review, therefore, aimed to gather evidence on the prevalence and associated factors for alcohol use disorders among healthcare professionals. The findings revealed a high prevalence of alcohol use disorders among healthcare professionals, which were worsened during the COVID-19 pandemic. Additionally, there was a glaring dearth of studies conducted in low- and middle-income countries. Urgent interventions and support systems are therefore needed to address these issues. A comprehensive approach, considering individual and organizational factors, alongside evidence-based interventions, training and support programs, can promote workforce well-being and improve the quality of patient care. It is imperative to integrate alcohol use screening, preventive and treatment interventions with primary healthcare and psychiatry services. This will help ensure early diagnosis and timely initiation of preventive and therapeutic measures, reducing the risk of missed opportunities. Furthermore, offering effective human resource management support services to healthcare professionals would significantly enhance their well-being and help prevent alcohol use disorders.

Keywords: alcohol use disorder, risky drinking, heavy episodic use, healthcare professionals

Contribution to Health Promotion

- Description of the prevalence and correlates of alcohol use disorders among healthcare professionals worldwide.
- Emphasis on the notable deficiency of research in prevalence and evidence-based treatment of alcohol use disorders among healthcare professionals conducted in low- and middle-income countries.
- Overview of preventive and evidence-based treatment measures to be considered for addressing alcohol use disorders among healthcare professionals.

INTRODUCTION

Alcohol consumption, particularly heavy drinking, is a major contributor to the global burden of disease. Alcohol is a well-known risk factor for premature morbidity and mortality and a number of diseases, including infectious diseases, cancer, diabetes, neuropsychiatric diseases, cardiovascular disease, liver and pancreas disease and injuries (Rehm, 2011; Park and Kim, 2020; Mpinganjira *et al.*, 2023). About 3 million deaths each year globally are attributed by alcohol consumption, which is close to 5.3% of all deaths globally (WHO, 2018). In 2016, 132 million disability-adjusted life years (DALYs) were attributable to alcohol consumption, responsible for 5.0% of all DALYs (Park and

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Kim, 2020). The burden of alcohol consumption is highest in the regions of Eastern Europe and sub-Saharan Africa with disadvantaged and especially vulnerable populations having higher rates of alcohol-related death and hospitalization (WHO, 2018; Park and Kim, 2020)

Evidence shows that healthcare professionals (HCPs) are at a higher risk of burnout and mental health conditions, including depression and anxiety, than the general population (Wilson *et al*., 2022). Alcohol use and abuse have been reported as one of the common maladaptive coping strategies among HCPs (Beiter *et al*., 2022). Owing to their stressful work environment, HCPs are at an increased risk of experiencing physical and mental health problems particularly alcohol use disorders (AUDs) (Gossop *et al*., 2001; Obadeji *et al*., 2018). In Swiss, for example, doctors were more likely to drink alcohol (96% vs. 78%), and twice more likely to be at-risk drinkers (30% vs. 15%) in comparison to the general population (Sebo *et al*., 2007). A study conducted by Gossop *et al*. (2001) in London, found that over half of the interviewed HCPs (59%) who had been referred to an inpatient specialist service with drug and alcohol misuse problems had confirmed alcohol dependence based on International Classification of Diseases (ICD)-10 diagnosis. Moreover, a systematic review and meta-analysis on alcohol use among HCPs across the world report that almost one-fifth of HCPs drink to hazardous levels and engage in frequent binge drinking (Halsall *et al*., 2023). AUD by HCPs is of concern as it can impact their performance, professional conduct, health of the medical profession and subsequently the outcome of the attended patients (Gossop *et al*., 2001). AUD particularly among HCPs is associated with decreased work productivity and performance as a result of associated ill health and cognitive impairment (Jaguga *et al*., 2022).

Literature shows a bidirectional relationship between harmful alcohol use and psychological distress, as people who abuse alcohol are likely to suffer from psychological distress and vice versa (Obadeji *et al*., 2018; Croock *et al*., 2023; Ndumwa *et al*., 2023). Gossop *et al*. (2001) and Chen *et al*. (2023) mention some of the factors associated with AUDs among HCPs, including years of training with intense competition, excessive workload, stress due to unreliability of jobs after completing training, stress from daily practice of medicine and exposure to alcohol marketing in the media. This is further evidenced during the COVID-19 pandemic, where the prevalence of psychological distress and alcohol abuse was reported to be high among HCPs. The increased prevalence of psychological distress and alcohol abuse resulted from increased workload and constant exposure of HCPs to potentially traumatic events in the course of the pandemic (Jaguga *et al*., 2022). The pandemic led to increased workload, fatigue, trauma, sleep deprivation and deprivation of social relationships among HCPs, all of which impacted their mental health leading to increasing levels of anxiety, depression and substance abuse (Moya-Salazar *et al*., 2022). Moreover, knowledge of and easy access to many types of drugs is reported to potentially dispose HCPs into using drugs (Gossop *et al*., 2001; Kenna and Lewis, 2008; Obadeji *et al*., 2018).

The role of HCPs extends beyond clinical duties; they are essential agents in screening for alcohol consumption, imparting knowledge about low-risk alcohol use and managing cases of harmful or hazardous alcohol use (Bakhshi and While, 2013). Understanding the prevalence and factors associated with alcohol use among HCPs is crucial for designing targeted interventions tailored to their specific needs. Potential interventions include brief intervention approaches focusing on educational and skills building, self-efficacy and personal feedback have been reported effective in the medical setting (Ames and Bennett, 2011). Our study aimed to shed light on the prevalence of AUD among HCPs to inform the development of potential targeted interventions to address harmful alcohol use among HCP.

METHODS

Study design

This was a systematic review and meta-analysis developed in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols (PRISMA-P) (Moher *et al*., 2009). The review was registered in the International Prospective Register of Systematic Reviews (PROSPERO) database (registration number: CRD42022380625, registration date: 12/12/2022) (Chien *et al*., 2012).

Eligibility criteria

This study included observational studies (cross-sectional, case-control studies and cohort studies) conducted among HCPs. There were no geographical, timeline or language restrictions. All systematic reviews, meta-analyses, case reports, letters to the editor and opinion papers were excluded.

Search strategy

A rigorous and systematic search strategy was developed with the help and guidance of two experienced health sciences librarians (R.C. and W.J.). Five databases (PUBMED, CINAHL, SCOPUS, Africa Wide Information and Web of Science) were systematically searched for publications from 1 January 2005 up to 21 November 2023. We used the following key terms: ('Alcohol Drinking' OR 'Alcoholism' OR 'Alcohol Use' OR 'alcohol utilization' OR 'alcohol intake') AND ('Alcoholism' OR 'Alcohol Abuse' OR 'Alcohol Addiction' OR 'Alcohol Use Disorder*' OR 'Chronic Alcoholic Intoxication' OR 'Alcohol Dependence') AND ('Health Personnel' OR 'Healthcare worker*' OR 'health care worker*' OR 'Health Care Professional*' OR 'Healthcare Provider*' OR 'health care provider*' OR 'medical practitioner*' OR clinician*). Supplementary Table S1.

Study selection

Studies were eligible if they assessed the prevalence of AUD (risky drinking, harmful alcohol use, alcohol abuse) or the factors associated with AUD or reported both prevalence and factors of alcohol use and AUDs.

AUDs was defined according to Diagnostic and Statistical Manual of Mental Disorders, fifth edition and ICD-11 and categorized as risky drinking as defined by alcohol use disorders identification test—consumption (AUDIT-C) scores above 3 or more for men and 4 or more for female, alcohol use disorders identification test (AUDIT) scores above 7 and CAGE score of 1 or more.

Covidence Software (Australia) was used to manage the study selection process. Two independent reviewers (H.W.W. and H.N.P.) evaluated each of the identified articles for potential eligibility by screening the titles and abstracts. The articles that were potentially eligible proceeded to full-text screening to determine eligibility for final inclusion in the review. The inclusion of the studies was agreed by consensus between the two reviewers (H.W.W. and H.N.P.). Disagreements were resolved by engaging a third reviewer (J.M.F.). All duplicate studies were removed using the Covidence software.

Data extraction

We used a Microsoft Excel data extraction form to collect the following information from each eligible article: (i) author,

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(ii) study title, (iii) publication year, (iv) study implementation year, (v) study implementation period (pre-COVID/COVID), (vi) country, (vii) study design, (viii) study population (healthcare workers—not specified, nurses, doctors, dentists, clinical officers, mental health specialists, etc.), (ix) sample size, (x) response rate, (xi) age group (below 40 years, 40 years and above), (xii) sex (male, female), (xiii) alcohol use/AUD screening tools applied, (xiv) prevalence of alcohol use/AUD, (xv) factors associated with alcohol use/AUD.

Quality assessment

A descriptive quality assessment of the final papers included in this study was conducted by two independent reviewers (H.W.W. and H.P.N.). The reviewers used the Joanna Briggs Institute (JBI) quality assessment tool for cross-sectional analytical studies (Munn et al., 2020), JBI tool case-control studies and JBI tool for cohort studies (Moola *et al.*, 2019) to assess the articles as low, medium and high quality. Disagreement was resolved using arbitration by a third reviewer (J.M.F.). The tool encompassed eight questions with four responses: Yes, No, Unclear or Not applicable. We categorized the study quality score into low (0–3), medium (4–6) or high (7–8) quality.

Risk of bias

We evaluated the possibility of publication bias using visual inspection (funnel plot) and an objective measure (Egger's test).

Statistical analysis

Random-effects meta-analysis was appropriate (i.e. the frequencies of participants with AUDs were measured and defined similarly, and sample size was reported). Similar statistical tests were used to derive study estimates. Analyses were conducted using the *metan* command in Stata version 17. Between-study variability was assessed using the heterogeneity statistic I^2.

Proportions were used in the synthesis and presentation of the results. Studies missing the frequency of the study population with the outcome of interest were not included in the meta-analysis.

For sensitivity analysis, we conducted sub-group analysis for pre-COVID vs COVID pandemic periods and between doctors and other healthcare workers, stratified by the screening tools used to explore possible causes of heterogeneity in the study results. Screening tools that had less than five studies were not included in the meta-analysis. We further conducted a narrative synthesis of factors associated with AUDs.

FINDINGS

Our study identified 7101 articles and reviewed 51 articles which met the inclusion criteria (Figure 1). The studies included in the review covered a total study population of 121 375 healthcare workers (Table 1). Of the total included studies, 84.4% ($n = 54$) were conducted in the high-income countries, while 75% ($n = 48$) were conducted in the pre-COVID-19 pandemic period. Psychiatric and chronic

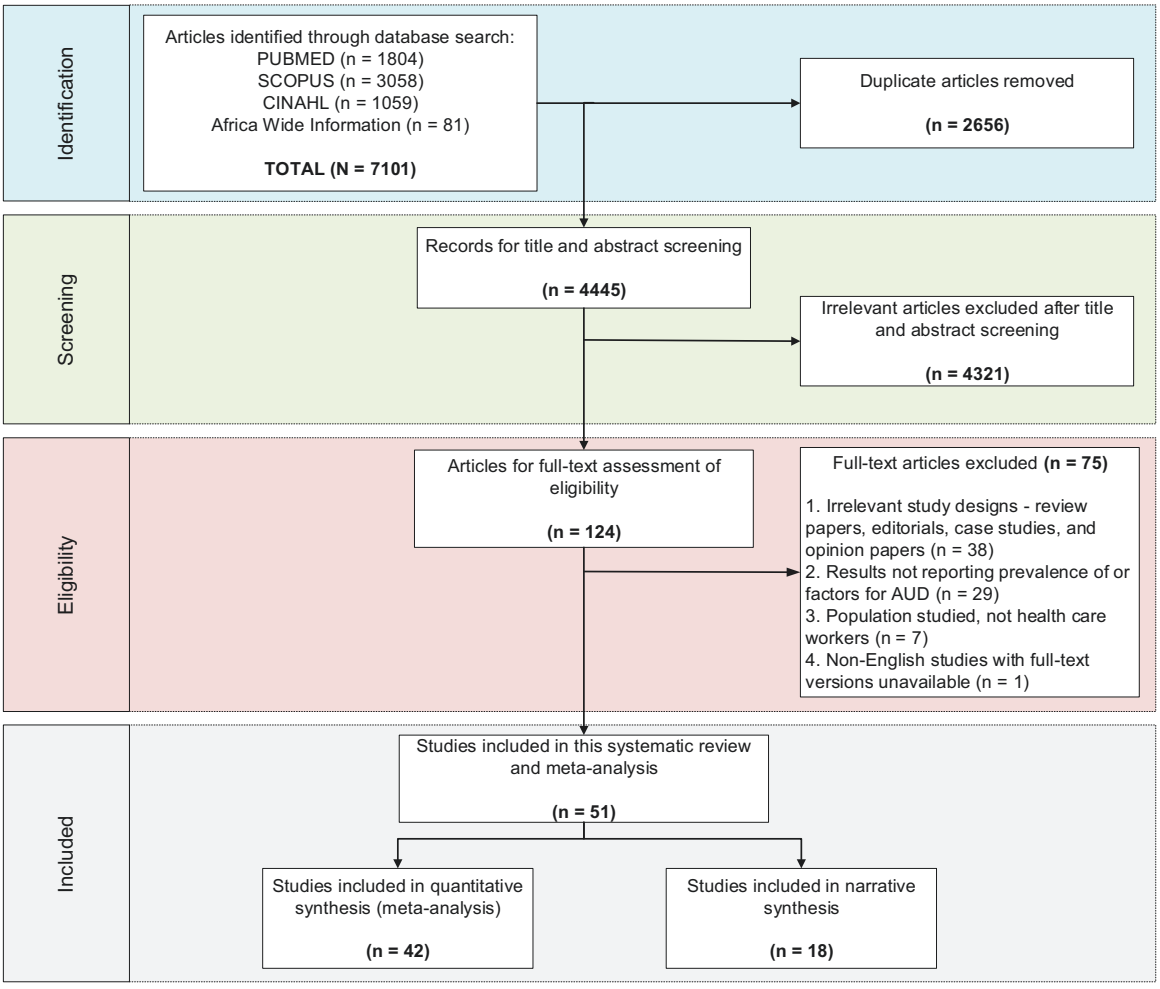


Fig. 1: Flow diagram showing the article search and included studies.

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Table 1: Description of studies included in the systematic review and meta-analysis

First author (year)	Study implementation year	COVID or Pre-COVID study period	Country	Study population	Sex[a]	Age group[b]	Study design	Sample size	Assessed alcohol use (yes/no)	Assessed AUD (yes/no)	Alcohol screening tool	Quality score
Albano *et al.* (2020) (1)	2018	Pre-COVID	Italy	HCPs—not specified	Both	40+	Cross-sectional	639	No	Yes	AUDIT-C	8
Bakhshi *et al.* (2015) (2)	2011	Pre-COVID	UK	Nurses	Both	<40	Cross-sectional	623	No	Yes	AUDIT-C	7
Brooks *et al.* (2023) (3)	2020	COVID	USA, UK, Canada, Ireland, South Africa	Dental hygienists	Both	40+	Cross-sectional	786	No	Yes	AUDIT	8
Buchvold *et al.* (2015) (4)	2008/2009	Pre-COVID	Norway	Nurses	Both	<40	Cross-sectional	2 059	No	Yes	AUDIT-C	8
Cedrone *et al.* (2022) (5)	2020	COVID	Italy	Doctors	Both	40+	Cross-sectional	1 170	No	Yes	AUDIT-C	6
Nash *et al.* (2010) (7)	2007	Pre-COVID	Australia	Doctors	Both	40+	Cross-sectional	2 999	No	Yes	AUDIT	8
Obadeji *et al.* (2018) (8)	Not reported	Pre-COVID	Nigeria	Doctors, nurses, pharmacists, lab scientists	Both	<40	Cross-sectional	256	No	Yes	AUDIT-10	7
Obadeji *et al.*, (2015) (9)	Not reported	Pre-COVID	Nigeria	Doctors	Both	<40	Cross-sectional	122	No	Yes	AUDIT-10	7
Olusanya and Barry, (2020) (10)	2018	Pre-COVID	USA	Midwives	Both	40+	Cross-sectional	77	No	Yes	AUDIT-C	6
Pedersen *et al.*, (2016) (11)	2014	Pre-COVID	Denmark	Doctors	Both	40+	Cross-sectional	1 841	No	Yes	AUDIT	6
Rath *et al.*, (2015) (13)	2013	Pre-COVID	USA	Doctors	Both	40+	Cross-sectional	369	No	Yes	CAGE	5
Rosta and Aasland, (2010) (15)	2000 and 2006	Pre-COVID	Norway and German	Doctors	Both	40 + and < 40	Cross-sectional	2 608	No	Yes	AUDIT-C	6
Rosta and Aasland, (2005) (16)	2000	Pre-COVID	Norway	Doctors	Both	40+	Cross-sectional	1 385	No	Yes	AUDIT	6
Rosta and Aasland, (2012) (17)	2010	Pre-COVID	Norway	Doctors	Both	40+	Cohort	682	No	Yes	AUDIT	7
Silczuk, (2020) (21)	2020	COVID	Poland	Doctors	Both	<40	Cross-sectional	117	No	Yes	AUDIT-3	8
Sørensen *et al.*, (2015) (22)	2014	Pre-COVID	Denmark	Doctors	Both	40+	Cross-sectional	1 943	No	Yes	DUDIT	4
Sørensen *et al.*, (2016) (23)	2014	Pre-COVID	Denmark	Doctors	Both	40+	Cross-sectional	1 943	No	Yes	AUDIT and DUDIT	6
Stelnicki *et al.*, (2020) (24)	2019	Pre-COVID	Canada	Nurses	Both	40+	Cross-sectional	4 067	No	Yes	AUDIT	8

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Table 1. Continued

First author (year)	Study implementation year	COVID or Pre-COVID study period	Country	Study population	Sex[a]	Age group[b]	Study design	Sample size	Assessed alcohol use (yes/no)	Assessed AUD (yes/no)	Alcohol screening tool	Quality score
Talih *et al.* (2018) (25)	2013	Pre-COVID	Lebanon	Nurses and doctors	Both	40+	Cross-sectional	91	No	Yes	AUDIT	8
Tao *et al.* (2021) (26)	Not reported	Pre-COVID	China	Nurses, doctors, psychiatrists	Both	<40	Cross-sectional	13 980	No	Yes	AUDIT-C	6
Thiebaud *et al.*, (2020) (27)	2018	Pre-COVID	France	Doctors	Not reported	40+	Cross-sectional	515	No	Yes	AUDIT	7
Cousin et al. (2022) (28)	2020	COVID	France	Nurses, assistant nurses, X-ray technicians, managers, lab technicians, midwives and childcare assistants	Both	<40	Cross-sectional	1 238	No	Yes	AUDIT	7
Thrasher *et al.*, (2016) (29)	2002–2004	Pre-COVID	USA	Hospital professionals (not specified)	Both	Not reported	Case-control	664	No	Yes	CAGE	6
Tobias *et al.* (2019) (30)	Not reported	Pre-COVID	Brazil	Doctors and nurses	Both	<40	Cross-sectional	510	No	Yes	AUDIT	8
Unrath *et al.* (2012) (31)	2009	Pre-COVID	Germany	Doctors	Both	40+	Cross-sectional	808	No	Yes	None for alcohol use; CAGE-G for AUD	8
Dyrbye *et al.*, (2012) (34)	2010	Pre-COVID	USA	Surgeons	Both	40+	Cross-sectional	25 073	No	Yes	AUDIT-C	6
Fernandes *et al.*, (2017) (35)	2013–2014	Pre-COVID	Brazil	Nurses	Both	<40	Cross-sectional	184	No	Yes	AUDIT	8
Galán-Rodas E *et al.* (2011) (36)	2011–2012	Pre-COVID	Peru	Physicians	Both	<40	Cross-sectional	520	No	Yes	AUDIT-C	8
Geuijen *et al.*, (2023) (37)	2011–2019	Pre-COVID	Netherlands	Physicians	Both	<40	Cross-sectional	38 455	No	Yes	DSM-IV	8
Romero-rodríguez *et al.*, (2019) (38)	2014–2016	Pre-COVID	Spain	Primary care physician, nurses and medical residents	Both	40+	Cross-sectional	24 474	No	Yes	AUDIT-C	8
Hennein *et al.*, (2020) (40)	2020	COVID	USA	Physician, nurses, physician, nursing or medical assistant, health technologist/technician, medical trainee; other clinical role	Both	40+	Cross-sectional	1 132	No	Yes	AUDIT-C	8

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Table 1. Continued

First author (year)	Study implementation year	COVID or Pre-COVID study period	Country	Study population	Sex[a]	Age group[b]	Study design	Sample size	Assessed alcohol use (yes/no)	Assessed AUD (yes/no)	Alcohol screening tool	Quality score
Hennein *et al.* (2021) (41)	2020	COVID	USA	Physician, nurses, physician, nursing or medical assistant, health technologist/technician, medical trainee; other clinical role	Both	40+	Cross-sectional	1 092	No	Yes	AUDIT-C	8
Hidalgo *et al.* (2012) (42)	Not reported	Pre-COVID	South America	Physicians and nurses	Not reported	<40	Cross-sectional	58	No	Yes	CAGE-3	5
Issa *et al.* (2012) (43)	Not reported	Pre-COVID	Nigeria	Surgeons, Physicians, Medical Officers	Both	40+	Cross-sectional	241	No	Yes	AUDIT	7
Jaguga *et al.* (2022) (44)	2020	COVID	Kenya	Nurses, doctors, clinical officers and public health officers	Both	40+	Cross-sectional	887	No	Yes	AUDIT	8
Jones *et al.* (2018) (46)	Not reported	Pre-COVID	USA	First responders—fire-fighters and EMT/paramedics	Both	Not reported	Cross-sectional	190	No	Yes	AUDIT	8
Joos *et al.* (2013) (47)	2011	Pre-COVID	Belgium	Medical specialists	Both	40+	Cross-sectional	1 501	No	Yes	AUDIT	8
Kenna and Wood (2005) (49)	2002	Pre-COVID	USA	Dentists and physicians	Both	40+	Cross-sectional	217	No	Yes	None	5
Kordel *et al.*, (2020) (50)	1994–2014	Pre-COVID	Poland	Dentists and physicians	Both	40+	Cross-sectional	74	No	Yes	Not specified	4
Lamb *et al.* (2021) (51)	2020	COVID	UK	Medical, nursing, midwifery, allied health professionals, support, administrative, management and students	Both	40+	Cross-sectional	4 378	No	Yes	AUDIT	8
Cohen *et al.* (2023) (52)	2020/2021	COVID	Brazil	Physicians, nurses and nursing technicians	Both	<40	Cross-sectional	1 581	No	Yes	AUDIT-C	7
Lichstein *et al.* (2020) (53)	Not reported	Pre-COVID	USA	Physicians and residents	Both	Not reported	Cross-sectional	661	No	Yes	AUDIT-C	8
Medisauskaite and Kamau, (2019) (54)	2016	Pre-COVID	UK	Doctors	Both	40+	Cross-sectional	417	Yes	Yes	History for alcohol use and AUDIT for AUD	8
Beiter *et al.*, (2022) (57)	2020	COVID	USA	Physician, nurse, physician assistant, medical assistant, respiratory therapist	Both	40+	Cross-sectional	102	No	Yes	AUDIT-C	8

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Table 1. Continued

First author (year)	Study implementation year	COVID or Pre-COVID study period	Country	Study population	Sex[a]	Age group[b]	Study design	Sample size	Assessed alcohol use (yes/no)	Assessed AUD (yes/no)	Alcohol screening tool	Quality score
Wright *et al.*, (2020) (58)	2020	COVID	USA	Hospital staff (mental health professional, physicians, nurses, nurse practitioners, non-clinical support staff, administrators)	Both	40+	Cross-sectional	579	No	Yes	AUDIT-C	8
Wu *et al.* (2008) (60)	2006	Pre-COVID (during SARS 2003 outbreak)	China	Doctors, nurses and administrative/other hospital staff	Both	<40	Cross-sectional	662	No	Yes	History	8
Young *et al.* (2022) (61)	2020	COVID	USA	Nurses, mental health providers, physicians and administrators	Both	40+	Cross-sectional	8 494	No	Yes	AUDIT-C	6
Pachi *et al.* (2023) (62)	2020	COVID	Greece	Doctors and nurses	Both	40+	Cross-sectional	639	No	Yes	CAGE	7
Mc Magh *et al.* (2023) (63)	2021/2022	COVID	South Africa	Doctors, nurses, clinical associates and dentists	Both	<40	Cross-sectional	330	No	Yes	AUDIT-C	8
Cona *et al.* (2013) (64)	Not reported	Pre-COVID	Italy	Not specified	Both	Not reported	Cross-sectional	1 691	No	Yes	AUDIT-C	4
Bransi *et al.*, (2020) (65)	Not reported		Germany	Doctors	Both		Cross-sectional	829	No	Yes	AUDIT-C	2

AUD—Alcohol use disorder, UK—United Kingdom, HCP—Healthcare professionals, COVID—Corona virus disease, USA—United States of America, AUDIT—Alcohol Use Disorders Identification Test, AUDIT-C—Alcohol Use Disorders Identification Test—Consumption, DUDIT—Drug Use Disorders Identification Test, DSM-IV—Diagnostic and Statistical Manual of Mental Disorders, fourth edition, CAGE: C—Cutting Down, A—Annoyance by Criticism, G—Guilty Feeling, E—Eye-openers

[a]Sex was categorized as either male, female or both.

[b]Age group of majority of study participants (< 40 or 40 + years).

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Table 2: Description of the parameters assessed from the reviewed studies

Parameter assessed	N (%) (Total = 51)
Geographical distribution	
High-income countries	41 (80.4)
Low- and middle-income countries	10 (19.6)
Study design	
Cross-sectional	49 (96.0)
Cohort	1 (2.0)
Case-control	1 (2.0)
Population studied	
Doctors	24 (47.0)
Other HCPs (not doctors)	14 (27.5)
Both doctors and other HCPs	13 (25.5)
Time periods	
Pre-COVID	37 (72.5)
During COVID	14 (27.5)

COVID—Coronavirus disease 2019, HCPs—healthcare workers

comorbidities assessment was as follows: depression 25% ($n = 16$), anxiety 23% ($n = 15$), post-traumatic stress disorder (PTSD) 25% ($n = 16$), suicide ideation 8% ($n = 5$), hypertension and diabetes 2% ($n = 1$) each (Table 2). Notably, the prevalence of AUD varied depending on the screening tool utilized. The prevalence rates were 15.1% (AUDIT), 29.1% (AUDIT-C), 29.5% (CAGE) (Figure 2).

Prevalence of alcohol use disorders among healthcare professionals

The prevalence of AUD among HCPs varied depending on the screening tool used, with rates ranging from 4.1% in Nigeria (Issa *et al.*, 2012) to 43.9% in Kenya (Jaguga *et al.*, 2022) using the AUDIT tool, 3.7% in Italy (Cona *et al.*, 2013) to 78.8% in Norway (Buchvold *et al.*, 2015) using the AUDIT-C tool, and 9.9% in Greece (Pachi *et al.*, 2023) to 79.3% in South America (Hidalgo *et al.*, 2012) using the CAGE screening tool. The prevalence of AUD in studies that used information documented in medical records or self-report ranged from 37.8% in Poland (Kordel *et al.*, 2021) to 72.7% in China (Wu *et al.*, 2008).

Owing to the existing evidence on the effect of COVID-19 among HCPs and the potential to influence alcohol use in this population (Mongeau-Pérusse *et al.*, 2021; Cedrone *et al.*, 2022; Jaguga *et al.*, 2022), it was critical to compare the rates of AUD among HCPs before and during the COVID-19 pandemic. Using the AUDIT screening tool, the prevalence of AUD during the pre-COVID period ranged from 4.1% in Nigeria (Issa *et al.*, 2012) to 18.8% in Denmark (Pedersen *et al.*, 2016). During the COVID period, the prevalence of AUD ranged from 19.8% in the USA, the UK, Canada, Ireland and South Africa (Brooks *et al.*, 2023) to 43.9% in Kenya (Jaguga *et al.*, 2022) both using the AUDIT tool. Using the AUDIT-C screening tool, the prevalence of AUD during the pre-COVID period ranged from 3.7% in Italy (Cona *et al.*, 2013) to 78.8% in Norway (Buchvold *et al.*, 2015). During the COVID period, the prevalence of AUD ranged from 10.5% in Brazil (Cohen *et al.*, 2023) to 42.8% in the USA (Jaguga *et al.*, 2022) using the AUDIT-C tool (Figures 3 and 4).

The prevalence of AUD varied among different categories of HCP. For doctors, the prevalence rates using various screening tools were 13.1% (AUDIT) and 28.8% (AUDIT-C), while for other HCPs such as nurses, pharmacists and midwives, it was 20.2% (AUDIT) and 33.8% (AUDIT-C). Other HCPs had notably higher prevalence rates, with 20.2% (AUDIT) and 33.8% (AUDIT-C) (Figures 5 and 6).

Correlates of alcohol use disorders among healthcare professionals

The commonest reported correlates of AUD were age (Rosta and Aasland, 2005; Nash *et al.*, 2010; Buchvold *et al.*, 2015; Jones *et al.*, 2018; Hennein *et al.*, 2021; Lamb *et al.*, 2021) and male gender (Rosta and Aasland, 2005; Nash *et al.*, 2010; Galán-Rodas *et al.*, 2011; Tobias *et al.*, 2019; Lamb *et al.*, 2021; Tao *et al.*, 2021; Cedrone *et al.*, 2022; Jaguga *et al.*, 2022). Rosta and Aasland (2005) and Nash *et al.* (2010) reported two times higher odds, while Tobias *et al.* (2019) reported three times higher odds of AUD among male HCPs in Norway, Germany and Brazil, respectively. On the contrary, Hennein *et al.*, (2021) reported 45% higher odds while Albano reported over three times higher odds of AUD among females in the USA and Italy, respectively (Albano *et al.*, 2020). HCPs over 40 years of age had a higher likelihood of AUD, Joos and Dom (2013) reported a four times higher likelihood of AUD among HCPs aged 40 or more years. Smoking was reported to increase the odds of AUD (Tobias *et al.*, 2019; Cedrone *et al.*, 2022). According to Cedrone *et al.* (2022) and Tobias *et al.* (2019), HCPs who smoked had three and six times higher likelihood of having AUD, respectively. Other associated factors for AUD included not being married (Pedersen *et al.*, 2016; Hennein *et al.*, 2021; Tao *et al.*, 2021; Jaguga *et al.*, 2022), a higher number of years of practice (Jaguga *et al.*, 2022), working as a doctor or surgeon (Rosta and Aasland, 2005; Tao *et al.*, 2021; Jaguga *et al.*, 2022), Asian and White race in the American context (Lichstein *et al.*, 2020; Hennein *et al.*, 2021) and African-American race in the UK (Lamb *et al.*, 2021), Catholic religion (Tobias *et al.*, 2019), high resilience, stress (Unrath *et al.*, 2012), burnout (Pedersen *et al.*, 2016; Brooks *et al.*, 2023) and weekly working hours (Nash *et al.*, 2010; Unrath *et al.*, 2012; Albano *et al.*, 2020).

Proposed recommendations from the included studies

The studies reviewed highlighted several recommendations for consideration. These include, implementing strategies for improved modifiable working environment and conditions through a redistribution of workloads, tasks and responsibilities (Buchvold *et al.*, 2015; Albano *et al.*, 2020), periodic screening of alcohol consumption for HCPs (Albano *et al.*, 2020; Silczuk, 2020; Jaguga *et al.*, 2022; Cohen *et al.*, 2023), promoting preventive measures like awareness and wellness programs, exercise, support groups, recreation rooms, good sleep and diet (Nash *et al.*, 2010; Buchvold *et al.*, 2015; Sørensen *et al.*, 2016; Talih, F.; Ajaltouni, J.; Farhood, 2018; Romero-rodríguez et al., 2019; Tao *et al.*, 2021; Cheong *et al.*, 2022; Jaguga *et al.*, 2022; Young *et al.*, 2022; Mc Magh *et al.*, 2023; Pachi *et al.*, 2023), activating policy action on health promotion programs (Hidalgo *et al.*, 2012; Cedrone *et al.*, 2022), enhancing emotional self-awareness in physicians during medical school and residency training programs

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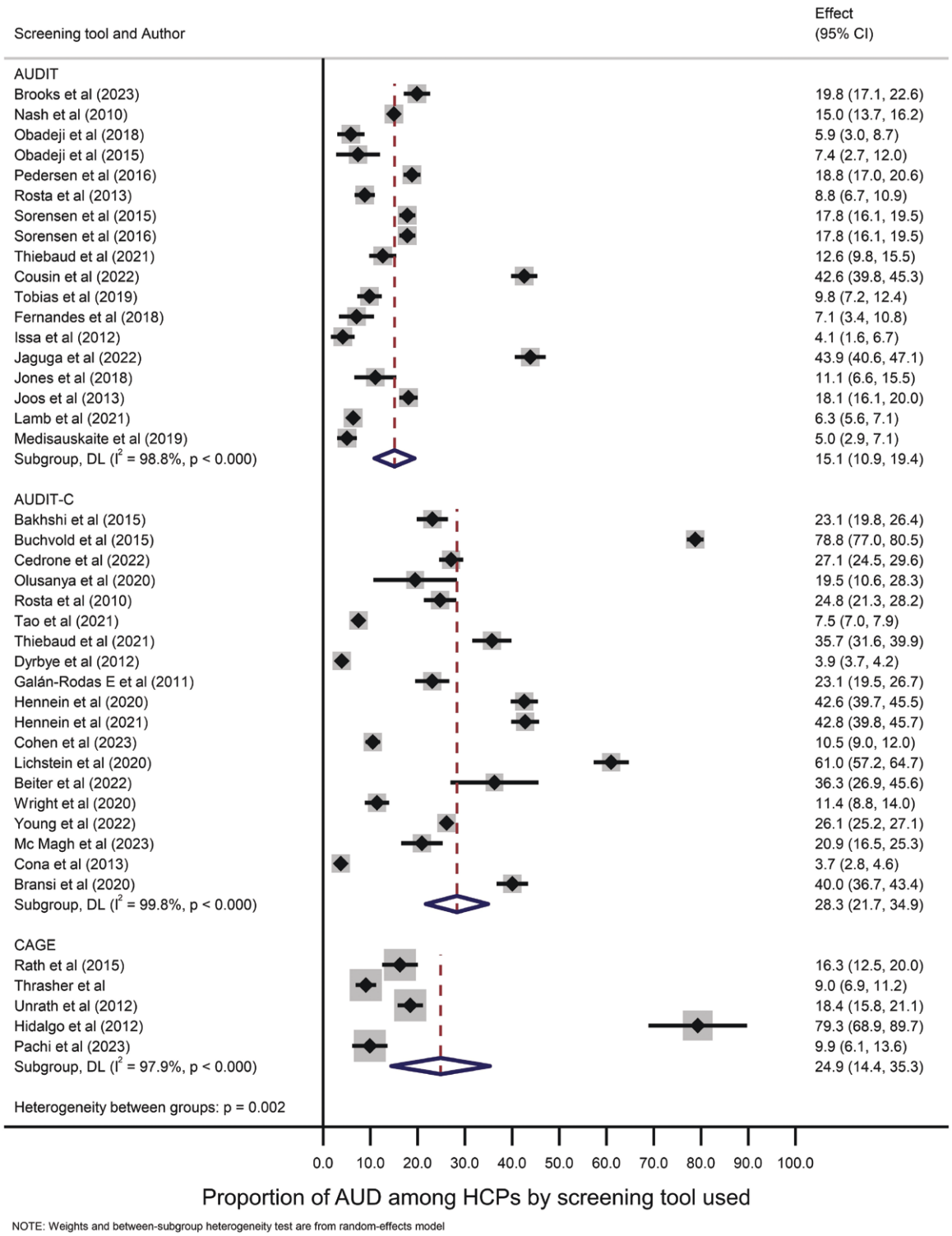


Fig. 2: The proportion of alcohol use disorders among healthcare professionals (HCPs) using different screening tools.

(Issa *et al*., 2012; Pedersen *et al*., 2016) and developing and implementing tailored interventions for at-risk HCPs (Cona *et al*., 2013; Hennein *et al*., 2021; Cousin et al., 2022; Pachi *et al*., 2023) (Table 3).

DISCUSSION

The burden of alcohol-related morbidity and mortality is particularly pronounced in vulnerable populations, with HCPs facing heightened risks due to their demanding work environments (Shoja *et al*., 2020; Doleman *et al*., 2023). The findings of this study underscore the significant burden of AUDs among HCPs, with implications for their professional performance and well-being.

The prevalence of AUDs among HCPs has emerged as a significant concern. This study contributes to the growing body of evidence demonstrating the increased risk of AUD among HCPs and underscores the need for targeted interventions to

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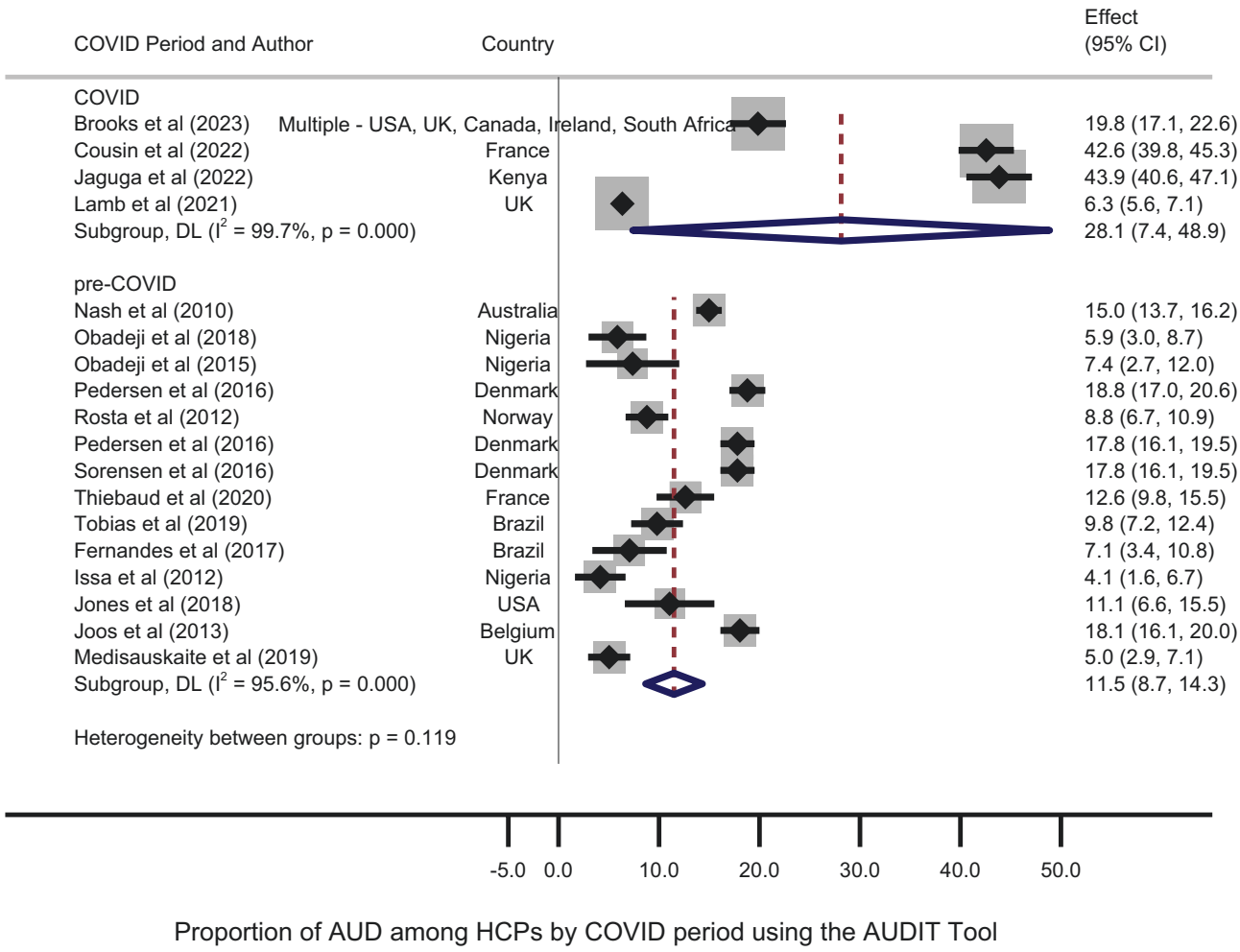


Fig. 3: The proportion of alcohol use disorder among healthcare professionals for the pre-COVID and COVID pandemic periods using the AUDIT tool.

address this issue. The findings from our study reveal that the prevalence of AUD among HCPs varies widely depending on the screening tools used, geographic location and professional cadre, with higher rates observed during the COVID-19 pandemic.

Several recent studies have highlighted the heightened risk of AUD among HCPs, particularly during the pandemic. The increased stress, workload and emotional toll associated with the pandemic likely exacerbated alcohol use as a maladaptive coping mechanism (Cheong *et al*., 2022; Jaguga *et al*., 2022). Our findings align with these observations, showing a marked increase in AUD prevalence during the pandemic, with rates ranging from 19.8% to 43.9% depending on the screening tool and geographic location. This increase is concerning given the potential impact of AUD on patient care, professional conduct and the overall health of the healthcare workforce.

The study also highlights the differential impact of AUD on various HCP groups. Doctors and specialists were found to have a higher likelihood of AUD compared to other healthcare workers, such as nurses and allied health professionals (Nash *et al*., 2010; Jaguga *et al*., 2022). This finding suggests that the stressors associated with the medical profession, including long working hours, high responsibility and exposure to critical incidents, may place doctors at greater risk for developing AUDs. Moreover, male HCPs and those over 40 years of age were identified as being at particularly high risk for AUD (Lamb *et al*., 2021; Tao *et al*., 2021), indicating the need for targeted interventions for these vulnerable subgroups.

The implications of AUD among HCPs extend beyond individual health outcomes to the quality of care provided to patients. Alcohol use can impair cognitive function, decision-making and professional conduct, potentially leading to medical errors and compromised patient safety (Gossop *et al*., 2001; Kenna and Lewis, 2008). Therefore, addressing AUD in HCPs is not only a matter of personal health but also of public health and patient safety.

Interventions to mitigate AUD among HCPs should be multifaceted, incorporating both individual and organizational strategies. Periodic screening for AUDs, promotion of wellness programs and fostering a supportive work environment are essential components of an effective intervention framework (Albano *et al*., 2020; Cheong *et al*., 2022). Furthermore, enhancing resilience and stress management skills during medical training and providing accessible mental health support services can help reduce the reliance on alcohol as a coping mechanism (Pappa *et al*., 2020; Shoja *et al*., 2020).

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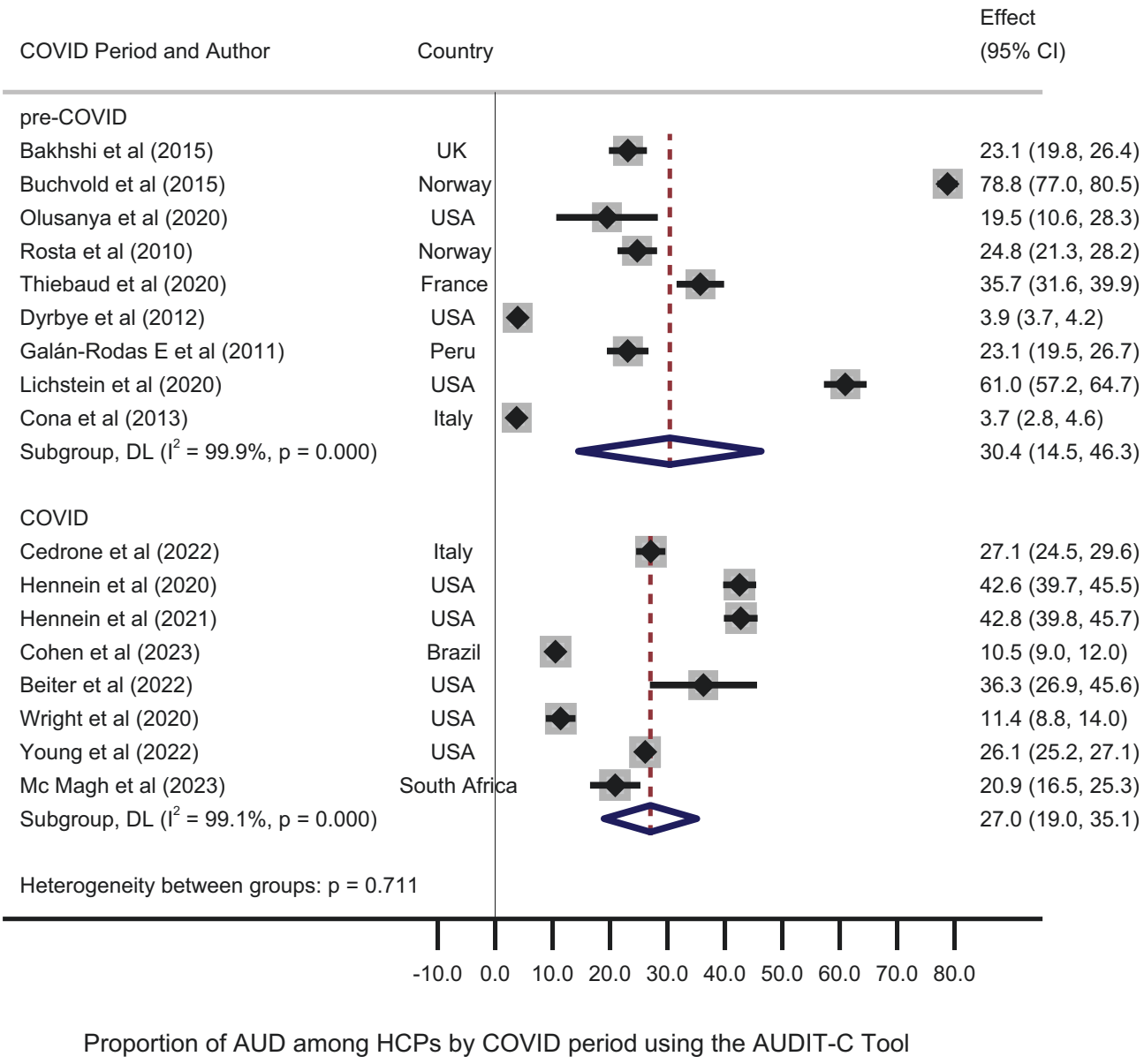


Fig. 4: The proportion of alcohol use disorder among healthcare professionals for the pre-COVID and COVID pandemic periods using the AUDIT-C tool.

This study underscores the urgent need for targeted interventions to address AUD among HCPs. Given the critical role of HCPs in patient care, ensuring their well-being is paramount. Future research should focus on developing and evaluating interventions tailored to the unique challenges faced by HCPs, particularly in low- and middle-income countries (LMICs) where data on AUD prevalence is limited.

The strength of this study is that it explores the prevalence of AUD among HCPs worldwide providing a global perspective across different healthcare systems and cultural contexts. Limitations include variation in terms of measurement tools leading to potential heterogeneity in the results therefore not supporting the interpretation of pooled data. Additionally, geographic variations in alcohol use norms, cultural attitudes towards alcohol and healthcare system differences are likely to have contributed to the observed disparities in AUD prevalence among HCPs.

CONCLUSION

AUDs remain prevalent issues among HCPs, with the COVID-19 pandemic having exacerbated these challenges. Our study highlights the urgent need to design and implement targeted interventions and support systems to address AUD among HCPs and more research in LMICs. The prevalence of AUD varied depending on the screening tool used, highlighting the importance of standardized assessment methods. Our findings indicated a significant increase in AUD prevalence during the COVID-19 pandemic, which could be potentially due to increased stress on HCP and thus influenced maladaptive coping mechanisms. The pandemic exacerbated existing challenges, leading to increased workload, fatigue and social isolation among HCPs who worked at the frontline of the pandemic, which likely contributed to higher rates of AUDs. Moreover, our study identified differences in AUD prevalence between doctors and other HCPs,

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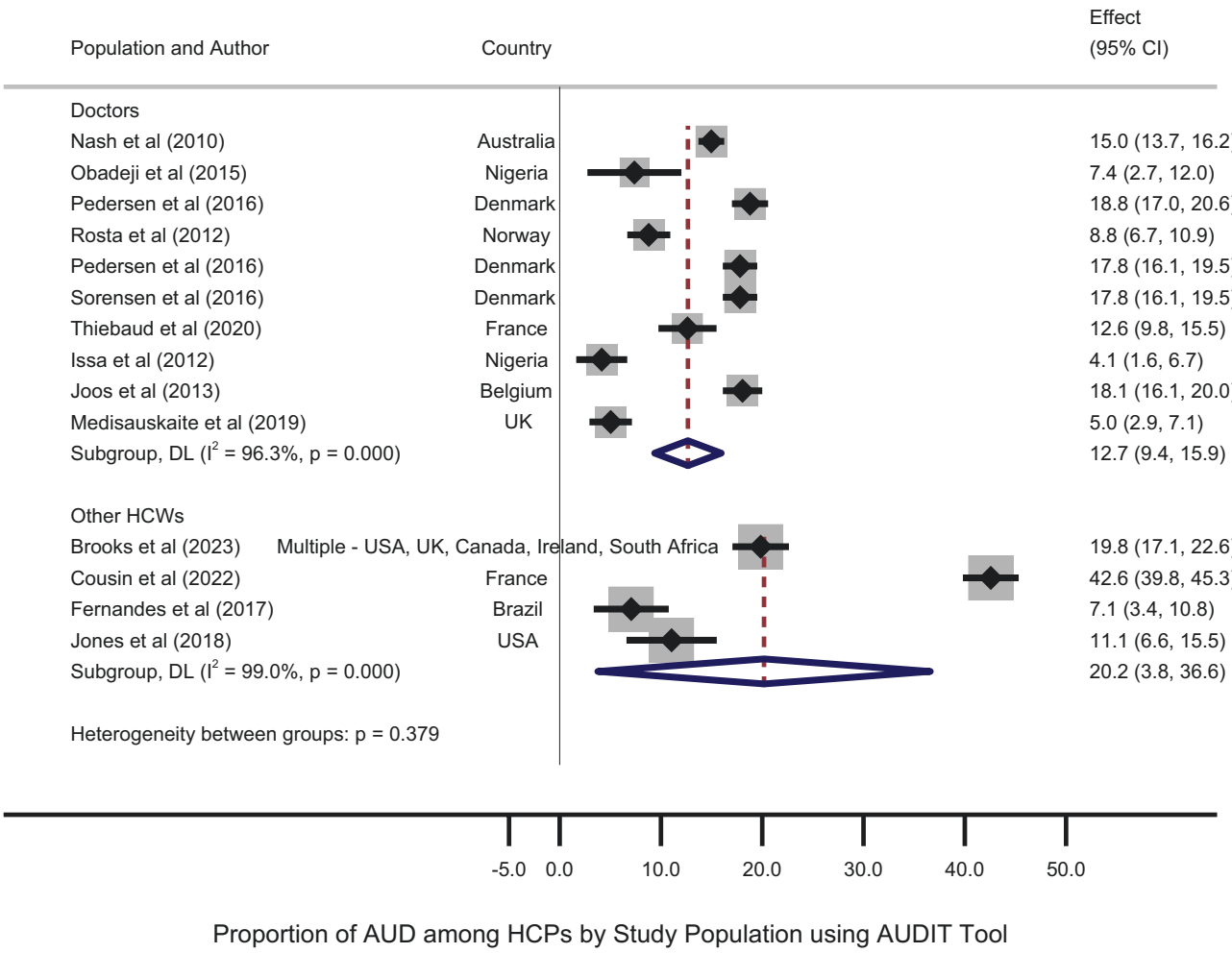


Fig. 5: The proportion of alcohol use disorders among healthcare workers by study population using the AUDIT tool.

with the latter group exhibiting higher rates. Being a doctor or a specialist over a nurse or other HCP was associated with a two-fold higher likelihood of AUD. This underscores the need for urgent interventions among the groups of HCPs (doctors or specialists) with the highest rates of AUD. Our study underscores a notable dearth of research on AUD amongst HCPs carried out in LMICs.

Addressing alcohol-related problems among HCPs requires a comprehensive approach that considers individual and organizational factors. By implementing evidence-based global interventions and support mechanisms, healthcare institutions can promote a healthier workforce and enhance the quality of patient care. Integrating interventions for AUD into primary health care and mental health services is crucial to ensure that HCPs do not miss opportunities to access these interventions. Moreover, it is imperative to provide education, training and support programs to equip HCPs with coping strategies and resilience-building skills, enabling them to effectively navigate the challenges inherent in their profession. Furthermore, offering effective human resource management support services to HCPs would significantly enhance their well-being and help prevent alcohol use and AUDs.

SUPPLEMENTARY MATERIAL

Supplementary material is available at *Health Promotion International* online.

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CONFLICT OF INTEREST

J.M.F. holds the position of Deputy Editor-in-Chief for *Health Promotion International Journal* and will be involved neither in the review process nor in any decision-making on the manuscript.

DATA AVAILABILITY

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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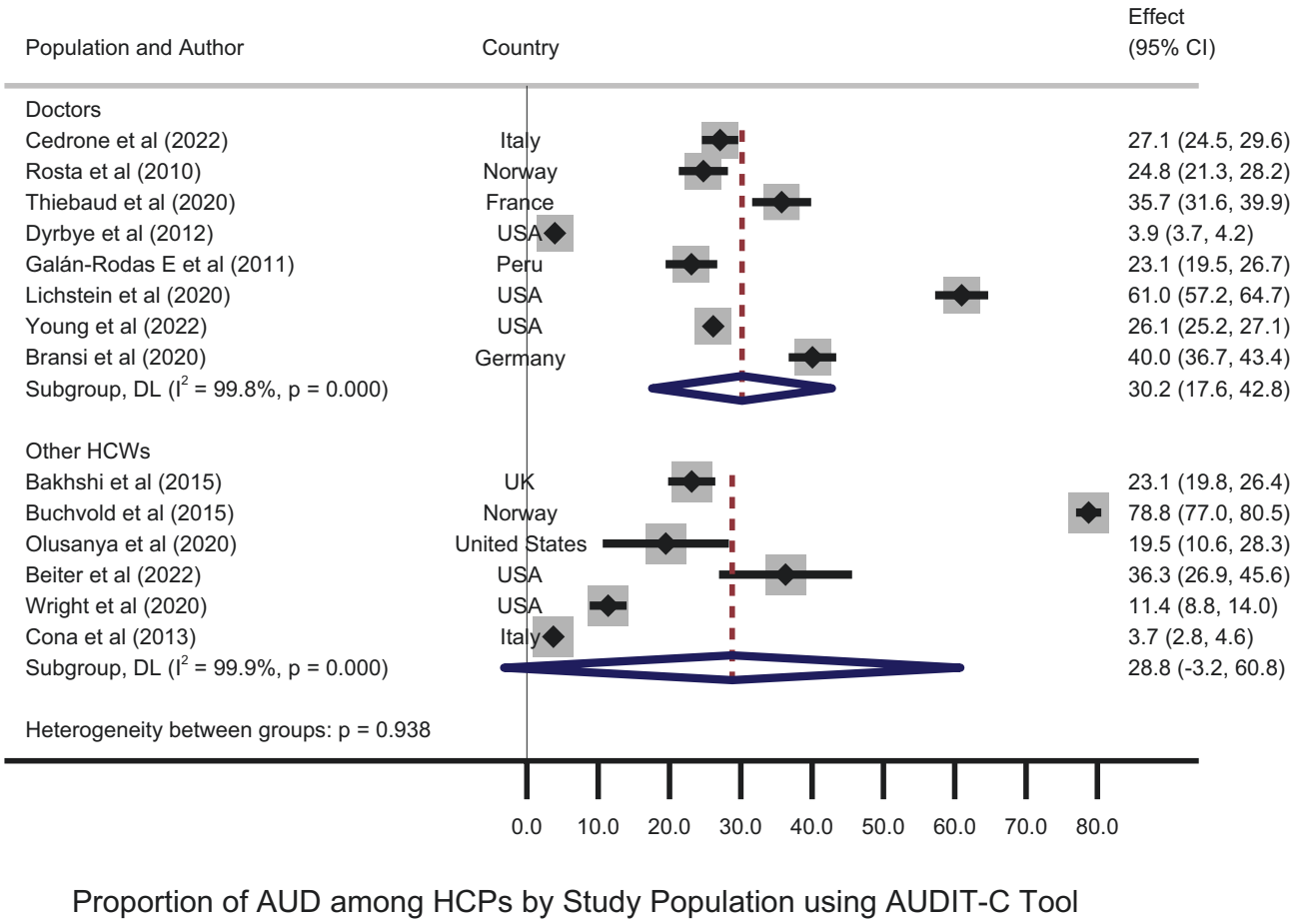


Fig. 6: The proportion of alcohol use disorders among healthcare professionals by study population using the AUDIT-C tool.

Table 3: Summary of recommendations from the included studies

First author (year)	Country	Recommendations
Albano *et al.* (2020) (1)	Italy	Implement intervention programs that include factual strategies for improved modifiable working environment and conditions through a redistribution of workloads, tasks and responsibilities. Health facilities should include a periodic screening of alcohol consumption in their employees.
Bakhshi *et al.* (2015) (2)	UK	
Brooks *et al.* (2023) (3)	USA, UK, Canada, Ireland, South Africa	
Buchvold *et al.* (2015) (4)	Norway	Introduction of possible counter-measures; for example exercise or, if possible, changes in shift schedule may be needed.
Cedrone *et al.* (2022) (5)	Italy	Implement company policies with health promotion programs (managed by an occupational doctor) through seminars, focus groups and personal interviews, where workers are exposed to education about the harmful effects of alcohol abuse on health, in order to raise workers' awareness of alcohol-related dangers and provide educational tools that have the task of preventing the damage caused by alcohol.
Nash *et al.* (2010) (7)	Australia	Implement positive coping strategies to actively manage stressful life events. These strategies include stress reduction techniques, regular exercise, good sleep and diet, as well as working fewer hours a week, being well informed about the legal process, seeking advice from one's own doctor to ameliorate distress and anxiety and avoiding negative coping strategies like excessive alcohol consumption and self-medication.
Obadeji *et al.* (2018) (8)	Nigeria	
Obadeji *et al.*, (2015) (9)	Nigeria	Implement measures aimed at alleviating all forms of stress particularly career related.
Olusanya and Barry, (2020) (10)	USA	Design and implement comprehensive programs that change perceptions about treatment efficacy and mental health stigma should continue to target all healthcare providers.
Pedersen *et al.*, (2016) (11)	Denmark	Enhance emotional self-awareness in physicians during medical school and residency training programs in order to improve their mental and physical wellness.

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Table 3. Continued

First author (year)	Country	Recommendations
Rath *et al.*, (2015) (13)	USA	Increase physician awareness of the problems and implement educational programs regarding strategies to prevent burnout and the associated psychosocial morbidity.
Rosta and Aasland, (2010) (15)	Norway	
Rosta and Aasland, (2010) (15)	German	
Rosta and Aasland, (2005) (16)	Norway	
Rosta and Aasland, (2012) (17)	Norway	
Silczuk, (2020) (21)	Poland	Enable early identification of people at a risk of drinking problem and dependence development.
Sørensen et al., (2015) (22)	Denmark	
Sørensen *et al.*, (2016) (23)	Denmark	Include more knowledge of SUD in basic medical education, and also in graduate and continuing medical education. Additionally, more research is needed to develop and test interventions within, for example, medical education and at physicians' different workplaces.
Stelnicki *et al.*, (2020) (24)	Canada	
Talih *et al.* (2018) (25)	Lebanon	Nursing and healthcare administrators should routinely educate and raise awareness among nurses regarding depression and burnout and provide better working conditions such as better pay, better scheduling and stress free environments. Providing mental health interventions for those at risk is an important investment for healthcare systems in developing countries.
Tao *et al.* (2021) (26)	China	Hold awareness campaign and interventions targeting risk groups, explore most effective interventions for mental health professionals.
Thiebaud *et al.*, (2020) (27)	France	
Cousin et al. (2022) (28)	France	Develop tailored interventions for night shift HCPs to reduce alcohol use.
Thrasher *et al.*, (2016) (29)	USA	
Tobias *et al.* (2019) (30)	Brazil	
Unrath *et al.* (2012) (31)	Germany	Implement programmes to reduce stress and increase physicians' resilience by improving coping strategies.
Dyrbye *et al.*, (2012) (34)	USA	
Fernandes *et al.*, (2017) (35)	Brazil	
Galán-Rodas E *et al.* (2011) (36)	Peru	
Geuijen *et al.*, (2023) (37)	Netherlands	
Romero-Rodríguez *et al.* (2019) (38)	Spain	Preventive strategies and awareness-raising and training interventions must be developed. Those responsible for occupational health of the SNHS should become conscious of the magnitude of the problem, offering the necessary advice and help to providers with hazardous drinking through occupational healthcare units or services.
Hennein *et al.*, (2020) (40)	USA	
Hennein *et al.* (2021) (41)	USA	Implement targeted interventions that promote healthcare workers' psychological resilience during disease outbreaks.
Hidalgo *et al.* (2012) (42)	South America	Formulation and implementation of corporate policy within the framework of occupational health work of these institutions, aimed at reducing and preventing the consumption of psychoactive substances.
Issa *et al.* (2012) (43)	Nigeria	Periodic education on safe drug use should be incorporated into hospital interdepartmental seminars, which must be regular and participatory.
Jaguga *et al.* (2022) (44)	Kenya	Implemented (i) health education be done on the harmful effects of alcohol use and on strategies for promoting mental health, (ii) screening and brief interventions for harmful alcohol use. Virtual platforms and mobile health strategies could be utilized to deliver these interventions in light of the COVID-19 preventive measures.
Jones *et al.* (2018) (46)	USA	
Joos *et al.* (2013) (47)	Belgium	
Kenna and Wood, (2005) (49)	USA	
Kordel *et al.*, (2020) (50)	Poland	
Lamb *et al.* (2021) (51)	UK	
Cohen *et al.* (2023) (52)	Brazil	Incorporation of screening instruments for psychiatric symptoms among staff.
Lichstein *et al.* (2020) (53)	USA	Programs should capitalize on the modifiable elements to combat burnout and improve overall wellbeing. Programs should educate residents on burnout, focus on work volume, protect access to health maintenance, nurture those in the early years of training and remain acutely aware of the risk of substance abuse.
Medisauskaite and Kamau, (2019) (54)	UK	Doctors' mentors, supervisors, peers and occupational health support services recognize and act on (1) the prevalence of occupational distress and health problems among doctors; (2) the possibility that occupational distress raises the risk of several health problems and (3) the need to provide early interventions that prevent doctors who are experiencing occupational distress from suffering the long-term health effects of sleep disturbances, frequent symptoms of ill health and adopting negative health behaviours, such as binge drinking or eating in order to cope.
Beiter *et al.*, (2022) (57)	USA	
Wright *et al.*, (2020) (58)	USA	
Wu *et al.* (2008) (60)	China	Avail safe and effective alternative methods of stress reduction.
Young *et al.* (2022) (61)	USA	All stakeholders (staff, trainees, administration) should be involved in development, implementation and evaluation of future wellness programs.

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Table 3. Continued

First author (year)	Country	Recommendations
Pachi *et al.* (2023) (62)	Greece	For alcohol use disorders among healthcare workers, it is important that both diagnostic tests and therapeutic interventions are implemented as an appropriate approach to this important health problem [185]. These programs targeting high-risk populations should include monitoring, screening and counselling on the harmful effects of alcohol consumption, and health education about healthy nutrition, sleep quality, physical exercise and stress reduction techniques to dissuade alcohol use as a management strategy [4 186]. Health education training and counselling interventions should be personalized and adjusted to the population at risk.
Mc Magh *et al.* (2023) (63) Cona *et al.* (2013) (64) Bransi *et al.*, (2020) (65)	South Africa Italy Germany	Increasing awareness of the availability of alcohol use and mental health wellness programs/psychological services and to strengthen/create EWPs. Lastly, there is also a need for integration of screening, brief interventions and referral for treatment of alcohol use and mental disorders in employee wellness programme.

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