

PDF hosted at the Radboud Repository of the Radboud University Nijmegen

The following full text is a publisher's version.

For additional information about this publication click this link.

<https://repository.ubn.ru.nl/handle/2066/283414>

Please be advised that this information was generated on 2022-11-14 and may be subject to change.

SUBSTANCE USE DISORDER AMONG PHYSICIANS



Pauline M. Geuijen

DONDERS
SERIES

SUBSTANCE USE DISORDER AMONG PHYSICIANS

Pauline M. Geuijen

Cover and layout: Wendy Schoneveld | wenz iD
Printing: ProefschriftMaken | www.proefschriftmaken.nl
ISBN: 978-94-6284-312-7

© P.M. Geuijen, 2022

For reasons of consistency within this thesis, some terms have been standardized throughout the text. As a consequence, the text may differ in this respect from the articles that have been published.

All rights reserved. No part of this thesis may be reproduced, distributed, stored in a retrieval system, or transmitted in any form or by any means, without the prior written permission of the author.

SUBSTANCE USE DISORDER AMONG PHYSICIANS

Proefschrift

ter verkrijging van de graad van doctor
aan de Radboud Universiteit Nijmegen
op gezag van de rector magnificus prof. dr. J.H.J.M. van Krieken,
volgens besluit van het college voor promoties
in het openbaar te verdedigen op
vrijdag 4 november 2022
om 10.30 uur precies

door

Pauline Maureen Geuijen

geboren op 27 oktober 1992
te Deventer

Promotoren

Prof. dr. A.F.A. Schellekens

Prof. dr. A.H. Schene †

Copromotor

Dr. F. Atsma

Manuscriptcommissie

Prof. dr. G.J. Scheffer

Prof. dr. C. Kramers

Prof. dr. H. van de Mheen (Tilburg University)

TABLE OF CONTENTS

CHAPTER 1	General introduction	7
PART I: EPIDEMIOLOGY AND MONITORING OF SUBSTANCE USE DISORDER AMONG PHYSICIANS		
CHAPTER 2	Diagnoses of substance use disorder and drinking patterns among Dutch physicians: a nationwide register-based study <i>Submitted for publication</i>	21
CHAPTER 3	Success rates of monitoring for healthcare professionals with a substance use disorder: a meta-analysis <i>Journal of Clinical Medicine. 2021;10(2):264</i>	45
PART II: SEEKING AND OFFERING HELP REGARDING PHYSICIANS WITH SUBSTANCE USE DISORDER		
CHAPTER 4	Barriers and facilitators to seek help for substance use disorder among Dutch physicians: a qualitative study <i>European Addiction Research. 2022;28(1):23</i>	85
CHAPTER 5	Physicians' norms and attitudes towards substance use in colleague physicians: a cross-sectional survey <i>PLoS One. 2020;15(4):e0231084</i>	109
DISCUSSION AND SUMMARY		
CHAPTER 6	General discussion	133
	Summary	151
	Samenvatting	155
APPENDIX		
	Dankwoord	161
	Curriculum Vitae	167
	PhD Portfolio	175
	Donders Graduate School for Cognitive Neuroscience	181
	Research Data Management	185

CHAPTER 1

General introduction

Substance use disorder (SUD) is defined as a “complex condition in which there is uncontrolled use of substances despite harmful consequences” (American Psychiatric Association, 2020). The global prevalence rate of SUD is estimated at 5-7%, largely consisting of alcohol use disorders (4-5%) and a much smaller proportion is allocated to drug use disorders (including prescription medicines; 1-2%) (de Graaf, ten Have, van Gool, & van Dorsselaer, 2012; United Nations Office on Drugs and Crime, 2021; World Health Organization, 2018). SUD causes considerable burden of disease, with 220 and 276 disability-adjusted life years (DALYs; a combination of years of life lost due to premature mortality and years of life lost due to disability) per 100,000 individuals for alcohol use disorders and drug use disorders respectively (Rehm & Shield, 2019). Thereby, alcohol use is linked to over 200 health conditions, ranging from liver diseases, road injuries and violence, to cancers, cardiovascular diseases, suicides, and infectious diseases (World Health Organization, 2018). Drug use is associated with infectious diseases, overdose, premature death, and comorbid mental disorders (United Nations Office on Drugs and Crime, 2021). In 2017, the societal burden of health care related to SUD in the Netherlands was €820 million, which equals approximately 0.9% of total health care costs (Volksgezondheidszorg.info, 2019).

The Netherlands Mental Health Survey and Incidence Study 2 (NEMESIS-2) showed that compared to a low socioeconomic status (SES), a high SES (higher education, higher income, employed) was protective for SUD (de Graaf et al., 2012). However, some high SES occupations, like medicine, involve occupational risk factors for SUD, i.e. high expectations at work, a disrupted lifestyle due to inconsistent working hours, and easy access to prescription medicines for physicians (Carinci & Christo, 2009; Shaw, McGovern, Angres, & Rawal, 2004). Additional impact of SUD in individuals with a responsible occupation includes, next to personal harm for these professionals, adverse effects on quality and safety in clinical practice and for individual patients (Dupont & Skipper, 2012).

A Physician Health Program in the Netherlands

Since 2011, the Royal Dutch Medical Association (RDMA) offers a Physician Health Program (PHP) for physicians with SUD (de Rond & Kuppens, 2021). This PHP, called ABS-physicians, aims to guide and motivate Dutch physicians with SUD and/or behavioral addiction for treatment. The ‘ABS’ abbreviation stands for abstinence of addictive substances (de Rond & Kuppens, 2021). Physicians with SUD can contact ABS-physicians by phone or e-mail and ABS-physicians is also open for questions from significant others (family, friends, and colleagues) of physicians with SUD (de Rond & Kuppens, 2021). Since 2017, the PHP also offers a five-year monitoring program after successful treatment completion. Participation in this monitoring program includes

regular contact with a case manager, biological monitoring (urine, sputum and hair analysis), monitoring at work (workplace buddy and occupational physician), monitoring at home (personal buddy and general practitioner) and participation in self-help groups (de Rond & Kuppens, 2021).

So far, there is only limited insight into the magnitude of SUD among physicians, PHP users, and the effectiveness of the monitoring program. In 2017, the RDMA commissioned The Nijmegen Institute for Scientist-Practitioners in Addiction (NISPA) to perform an evaluation of ABS-physicians. Hereto, data from ABS-physicians' electronic records (Medisoft Dossier Manager) was selected of 5 calendar years (January 2015 up to December 2019). Three groups of PHP users were identified:

- 1) direct reporters: physicians who contacted ABS-physicians regarding their own problematic substance use or SUD;
- 2) indirect reporters: significant others who contacted ABS-physicians regarding a physician with problematic substance use or SUD;
- 3) monitoring participants.

These three groups were described with respect to demographic information and reported issues that were extracted from the electronic records, see Box 1. The local Medical Ethical Committee of the Radboudumc exempted this evaluation from ethical review (registration number: 2017-3293).

Epidemiology

Due to the potential negative impact of SUD in physicians on their functioning and patient safety, it is important to get insight in prevalence rates of SUD among physicians and to establish the magnitude of the problem. Additionally, prevalence rates provide insight into the occupational risk of SUD among physicians. It is hypothesized that prevalence rates of SUD are similar for physicians compared to the general population (Braquehais, Bruguera, & Casas, 2021; DuPont, McLellan, Carr, Gendel, & Skipper, 2009). The problem, however, with already reported prevalence rates of SUD among physicians is that they:

- 1) are outdated, i.e. an American study that was published almost three decades ago estimated the self-reported lifetime prevalence of SUD among physicians at 8% (Hughes et al., 1992);
- 2) do not give a clear indication of SUD, i.e. European research among physicians has been conducted on alcohol and drug misuse instead of SUD. Thereby, the estimated prevalence rates of alcohol misuse varied widely from 6% to 30% (Rosta & Aasland, 2013; Sebo, Bouvier Gallacchi, Goehring, Künzi, & Bovier, 2007);
- 3) lack decent comparison with a reference group; the reported prevalence rates of the general population in comparison studies on SUD or alcohol misuse among

physicians were estimated by other measures or methods than those used to estimate prevalence rates among physicians.

In order to assess the number of direct reports to ABS-physicians, it is essential to know how many Dutch physicians meet the criteria for SUD diagnosis and how many Dutch physicians receive treatment for SUD. Unfortunately, these numbers are not yet known. With respect to the monitoring program, the number of monitoring participants was too low and the follow-up period was too short to properly investigate its

Box 1. Description of ABS-physicians (January 2015 up to December 2019)

Direct reporters

In total, 139 physicians contacted ABS-physicians themselves due to problematic substance use or SUD. Most direct reports came from males (75%), physicians aged 40 to 59 years (47%), and physicians working in a Cluster 2* specialty (44%). Problematic use of alcohol was most frequently reported (57%) and about one-fourth (26%) reported anxiety, depression and/or stress complaints.

Indirect reporters

There were 122 reports from significant others of a physician with problematic substance use or SUD who contacted ABS-physicians. Most of these indirect reports came from females (52%) and physicians working in a Cluster 2* specialty (34%). These indirect reporters had a treatment (therapist/physician; 39%), work (colleague/manager/director; 39%), or private relationship (20%) with the physician in question. Problematic use of alcohol and opioids was most frequently reported (29% and 14% respectively).

Monitoring participants

Since 2017, 8 physicians started with the monitoring program. These participants were mainly males (63%), physicians aged 30 to 49 years (88%), and physicians working in a Cluster 1* specialty (63%). Participants mainly participated because of problematic use of opioids (75%) and over one-third (38%) reported anxiety, depression and/or stress complaints. The mean follow-up period of monitoring participants was 1.2 years (range: 0.3 to 2.8 follow-up years).

SUD = Substance Use Disorder.

* Cluster 1 = general practice, geriatric medicine, medicine for mental disability, addiction medicine, international health and tropical medicine, and cosmetic medicine; Cluster 2 = all specialties and profiles tied to hospitals; Cluster 3 = occupational medicine, insurance medicine, society and health and eight profiles for social physicians.

effectiveness. It is recommended to monitor a larger number of participants for a longer follow-up period, before drawing conclusions about the effectiveness of the monitoring program.

Monitoring

In order to prevent harm from SUD for physicians and their patients, the American Medical Association (AMA) initially proposed specialty care and supervision for physicians with SUD by publishing the seminal report “The Sick Physician: Impairment by Psychiatric Disorders, Including Alcoholism and Drug Dependence” in 1973 (American Medical Association, 1973; Brooks, Early, Gundersen, Shore, & Gendel, 2012; DuPont et al., 2009). In the following decades so called PHPs were established in various continents across the globe, i.e. North America (the United States and Canada), Oceania (Australia and New Zealand), and Europe (United Kingdom, Spain, Norway, Switzerland, Ireland, and the Netherlands) (Braquehais, Tresidder, & DuPont, 2015; Brooks, Gerada, & Chalder, 2011; de Rond & Kuppens, 2021). Common goal of all PHPs is that they aim to assist physicians with SUD and support safe medical practice (Braquehais et al., 2015; Goldenberg, Miotto, Skipper, & Sanford, 2020). Typically, the main functions of a PHP regarding SUD include offering general education programs and counseling, promoting early identification, evaluating treatment facilities, referring to evaluation and treatment, and facilitating long-term monitoring (Goldenberg et al., 2020). However, PHP designs differ per country in their organization and the services they offer (Braquehais et al., 2015).

In general, interventions are considered successful when the extra effort is balanced with the additional benefits. The question is whether this is also the case for PHPs. While the abstinence rate in the general population is less than 50% (DuPont et al., 2009; van Wamel, Croes, van Vugt, & van Rooijen, 2014), a systematic review found that abstinence rates of monitoring programs range from 56% to 94% for healthcare professionals (Weenink, Kool, Bartels, & Westert, 2017). Next to this wide variety in abstinence rates, the quality and nature of included studies also varies. In order to better understand the effectiveness of monitoring programs, studies should be meta-analyzed.

Seeking help

Despite the increasing availability of PHPs worldwide, and their encouraging results, physicians hardly use health services for mental health problems, including SUD (Dyrbye et al., 2017; Gold, Andrew, Goldman, & Schwenk, 2016; Tysen, 2007). It has been found that physicians’ reluctance to seek help begins early in medical training, due to the belief that disclosing a mental disorder could adversely affect a medical

student's professional career (Mehta & Edwards, 2018). Neglecting well-functioning PHPs would be a waste for physician-patients' health and the quality of care, so it is important that physicians with mental health problems reach out to PHPs. To achieve this, it is crucial to know why physicians with mental health problems are less willing to use healthcare services. In general, barriers for physicians to access regular mental healthcare have been found at the individual level, like embarrassment and fear of possible consequences, but also on the level of healthcare services, like worries about the quality of care and confidentiality (Kay, Mitchell, Clavarino, & Doust, 2008; Kay, Mitchell, Clavarino, & Frank, 2012).

In the case of SUD, denial or minimization of substance use problems is an additional barrier for seeking help (Motta-Ochoa et al., 2017). A systematic review of 8 qualitative and 23 quantitative studies among healthcare professionals with SUD identified embarrassment and fear of possible consequences as major barriers and specific events, like drunk driving or a positive drug screen, and supportive relationships as major facilitators for seeking help (Kunyk, Inness, Reisdorfer, Morris, & Chambers, 2016). However, less than half of the included studies described a sample of physicians, sometimes of only one specialty, and all included studies solely covered the viewpoint of healthcare professionals with SUD, but not of significant others (Kunyk et al., 2016). To further understand which barriers and facilitators specifically apply for physicians with SUD, it is important 1) to focus on a broad range of physicians with different specialties, 2) with experience in help seeking for SUD, and 3) to take into account the perspective of physician-patients' environment, like PHP employees and significant others in the professional and private context.

Offering help

The professional context of physicians with SUD might be crucial in the process of seeking help for SUD, as peer support and peer report showed to be important mechanisms for identifying SUD in physicians (DesRoches et al., 2010; Kunyk et al., 2016). Typical signs for SUD in healthcare professionals include frequent absences, inaccessibility to patients and staff, decreased performance, large quantities of medicines ordered, multiple prescriptions for family members, and vague letters of reference (Baldisserri, 2007; Carinci & Christo, 2009). Since colleagues may notice these signs earlier than formal agencies it is important that they take action upon a presumption of problematic substance use in a physician (DesRoches et al., 2010; Kunyk et al., 2016).

Although physicians feel ethically responsible of reporting substance use of a colleague physician (Rice, 1999), they described considerable difficulty in confronting the physician in question with their concerns because they fear retribution and

excessive punishment of the physician in question, assume that someone else is taking care of the problem, do not know how to report, believe it is not their responsibility or that nothing will happen as result of the report (DesRoches et al., 2010; Farber et al., 2005; Sanfey et al., 2015; Stanton & Randal, 2011; Weenink, Westert, Schoonhoven, Wollersheim, & Kool, 2015). Insight into factors that are associated with taking action upon a substance use presumption in a colleague is warranted, because this will contribute to tailoring education to increase physicians' knowledge, confidence, and ethical responsibility to take action.

THESIS OUTLINE

Taken together, SUD among physicians is an understudied area and further and in-depth insight on this topic is important to better understand the magnitude of this problem and implement appropriate interventions. Therefore, the aim of this thesis is twofold: I) to investigate the epidemiology and monitoring of SUD among physicians (Part I: *Chapters 2 - 3*); and II) to study the process of seeking and offering help regarding physicians with SUD (Part II: *Chapters 4 - 5*).

Part I: Epidemiology and monitoring of SUD among physicians

Chapter 2 is an investigation of prevalence rates of clinical SUD diagnoses and drinking patterns among Dutch physicians compared with a selected reference group of highly educated Dutch citizens using nationwide data on mental healthcare claims and health questionnaires. More specifically, descriptive analyses were performed to compare physicians to the reference group with respect to the prevalence of clinical SUD diagnoses, psychiatric and somatic comorbidity, general functioning, and the prevalence of drinking patterns, as well as sociodemographic characteristics.

In *Chapter 3*, we performed a meta-analysis on success rates of monitoring for healthcare professionals with SUD using a literature search in PubMed, Embase, PsycINFO, and CINAHL. More specifically, we summarized abstinence and work retention rates of monitoring, using biological testing, for healthcare professionals with SUD and explored whether specific monitoring elements and/or participant characteristics explain heterogeneity in success rates across studies.

Part II: Seeking and offering help regarding physicians with SUD

In *Chapter 4*, we investigated barriers and facilitators when seeking help for SUD among physicians from a multiple perspective approach using qualitative data. We included perspectives of physicians in general, physician-patients, PHP employees, and

significant others. More specifically, we 1) explored anticipated barriers and facilitators to seek help for SUD among physicians in general using 2 open-ended questions of an existing questionnaire, and 2) investigated experienced barriers and facilitators when actually seeking help for SUD among physician-patients, significant others, and PHP employees by means of semi-structured interviews.

Chapter 5 presents a cross-sectional study on factors that are associated with taking action upon substance use in a colleague physician. An online survey concerning “Addiction in physicians” was administered by the physician panel of the RDMA. More specifically, we investigated attitudes towards SUD and norms about work-related substance use among physicians, and explored their role and the role of physicians’ demographic characteristics in taking action upon a presumption of substance use in a colleague.

Finally, in *Chapter 6*, findings of this thesis will be integrated with insights from other studies, research considerations will be discussed, and recommendations will be made for practice, policy, and research.

REFERENCES

- American Medical Association. (1973). The sick physician. Impairment by psychiatric disorders, including alcoholism and drug dependence. *JAMA*, *223*(6), 684-687.
- American Psychiatric Association. (2020). What Is a Substance Use Disorder? Retrieved from <https://www.psychiatry.org/patients-families/addiction/what-is-addiction>.
- Baldisserri, M. R. (2007). Impaired healthcare professional. *Critical Care Medicine*, *35*(2), S106-S116.
- Braquehais, M. D., Bruguera, E., & Casas, M. (2021). Addictions in Physicians: An Overview. *Textbook of Addiction Treatment*, 1451-1461.
- Braquehais, M. D., Tresidder, A., & DuPont, R. L. (2015). Service provision to physicians with mental health and addiction problems. *Curr Opin Psychiatry*, *28*(4), 324-329. doi:10.1097/YCO.0000000000000166.
- Brooks, E., Early, S. R., Gundersen, D. C., Shore, J. H., & Gendel, M. H. (2012). Comparing substance use monitoring and treatment variations among physician health programs. *Am J Addict*, *21*(4), 327-334. doi:10.1111/j.1521-0391.2012.00239.x.
- Brooks, S. K., Gerada, C., & Chalder, T. (2011). Review of literature on the mental health of doctors: are specialist services needed? *J Ment Health*, *20*(2), 146-156. doi:10.3109/09638237.2010.541300.
- Carinci, A. J., & Christo, P. J. (2009). Physician impairment: is recovery feasible? *Pain Physician*, *12*(3), 487-491.
- de Graaf, R., ten Have, M., van Gool, C., & van Dorsselaer, S. (2012). Prevalence of mental disorders and trends from 1996 to 2009. Results from the Netherlands Mental Health Survey and Incidence Study-2. *Soc Psychiatry Psychiatr Epidemiol*, *47*(2), 203-213. doi:10.1007/s00127-010-0334-8.
- de Rond, M., & Kuppens, J. (2021). Substance Use Disorders and Addiction in Physicians: a Dutch Physician Health Programme. *World Medical Journal*, *67*(1), 30.
- DesRoches, C. M., Rao, S. R., Fromson, J. A., Birnbaum, R. J., Iezzoni, L., Vogeli, C., & Campbell, E. G. (2010). Physicians' perceptions, preparedness for reporting, and experiences related to impaired and incompetent colleagues. *JAMA*, *304*(2), 187-193. doi:10.1001/jama.2010.921.
- DuPont, R. L., McLellan, A. T., Carr, G., Gendel, M., & Skipper, G. E. (2009). How are addicted physicians treated? A national survey of Physician Health Programs. *J Subst Abuse Treat*, *37*(1), 1-7. doi:10.1016/j.jsat.2009.03.010.
- Dupont, R. L., & Skipper, G. E. (2012). Six lessons from state physician health programs to promote long-term recovery. *J Psychoactive Drugs*, *44*(1), 72-78. doi:10.1080/02791072.2012.660106.
- Dyrbye, L. N., West, C. P., Sinsky, C. A., Goeders, L. E., Satele, D. V., & Shanafelt, T. D. (2017). Medical Licensure Questions and Physician Reluctance to Seek Care for Mental Health Conditions. *Mayo Clin Proc*, *92*(10), 1486-1493. doi:10.1016/j.mayocp.2017.06.020.
- Farber, N. J., Gilibert, S. G., Aboff, B. M., Collier, V. U., Weiner, J., & Boyer, E. G. (2005). Physicians' willingness to report impaired colleagues. *Soc Sci Med*, *61*(8), 1772-1775. doi:10.1016/j.socscimed.2005.03.029.
- Gold, K. J., Andrew, L. B., Goldman, E. B., & Schwenk, T. L. (2016). "I would never want to have a mental health diagnosis on my record": A survey of female physicians on mental health diagnosis, treatment, and reporting. *Gen Hosp Psychiatry*, *43*, 51-57. doi:10.1016/j.genhosppsych.2016.09.004.
- Goldenberg, M., Miotto, K., Skipper, G. E., & Sanford, J. (2020). Outcomes of Physicians with Substance Use Disorders in State Physician Health Programs: A Narrative Review. *J Psychoactive Drugs*, *52*(3), 195-202. doi:10.1080/02791072.2020.1734696.
- Hughes, P. H., Storr, C., Baldwin, D. C., Williams, K. M., Conard, S., & Sheehan, D. (1992). Patterns of substance use in the medical profession. *Md Med J*, *41*(4), 311-314.
- Kay, M., Mitchell, G., Clavarino, A., & Doust, J. (2008). Doctors as patients: a systematic review of doctors' health access and the barriers they experience. *Br J Gen Pract*, *58*(552), 501-508. doi:10.3399/bjgp08X319486.
- Kay, M., Mitchell, G., Clavarino, A., & Frank, E. (2012). Developing a framework for understanding doctors' health access: a qualitative study of Australian GPs. *Australian Journal of Primary Health*, *18*(2), 158-165. doi:10.1071/PY11003.
- Kunyk, D., Inness, M., Reisdorfer, E., Morris, H., & Chambers, T. (2016). Help seeking by health professionals for addiction: A mixed studies review. *Int J Nurs Stud*, *60*, 200-215. doi:10.1016/j.ijnurstu.2016.05.001.
- Mehta, S. S., & Edwards, M. L. (2018). Suffering in silence: mental health stigma and physicians' licensing fears. *American Journal of Psychiatry Residents' Journal*.

- Motta-Ochoa, R., Bertrand, K., Flores-Aranda, J., Patenaude, C., Brunelle, N., Landry, M., & Brochu, S. (2017). A Qualitative Study of Addiction Help-Seeking in People with Different Co-occurring Mental Disorders and Substance Use Problems. *International Journal of Mental Health and Addiction*, 15(4), 883-899. doi:10.1007/s11469-017-9762-y.
- Rehm, J., & Shield, K. D. (2019). Global Burden of Disease and the Impact of Mental and Addictive Disorders. *Curr Psychiatry Rep*, 21(2), 10. doi:10.1007/s11920-019-0997-0.
- Rice, B. (1999). Doctor policing: too tough? Too easy? Impaired physicians: giving rehab programs a new look. *Med Econ*, 76(9), 173-174, 179-180, 185.
- Rosta, J., & Aasland, O. G. (2013). Changes in alcohol drinking patterns and their consequences among Norwegian doctors from 2000 to 2010: a longitudinal study based on national samples. *Alcohol Alcohol*, 48(1), 99-106. doi:10.1093/alcalc/ags084.
- Sanfey, H., Fromson, J. A., Mellinger, J., Rakinic, J., Williams, M., & Williams, B. (2015). Residents in distress: an exploration of assistance-seeking and reporting behaviors. *Am J Surg*, 210(4), 678-684. doi:10.1016/j.amjsurg.2015.05.011.
- Sebo, P., Bouvier Gallacchi, M., Goehring, C., Künzi, B., & Bovier, P. A. (2007). Use of tobacco and alcohol by Swiss primary care physicians: a cross-sectional survey. *BMC Public Health*, 7, 5. doi:10.1186/1471-2458-7-5.
- Shaw, M. F., McGovern, M. P., Angres, D. H., & Rawal, P. (2004). Physicians and nurses with substance use disorders. *J Adv Nurs*, 47(5), 561-571. doi:10.1111/j.1365-2648.2004.03133.x.
- Stanton, J., & Randal, P. (2011). Doctors accessing mental-health services: an exploratory study. *BMJ Open*, 1(1), e000017. doi:10.1136/bmjopen-2010-000017.
- Tyssen, R. (2007). Health problems and the use of health services among physicians: a review article with particular emphasis on Norwegian studies. *Ind Health*, 45(5), 599-610.
- United Nations Office on Drugs and Crime. (2021). *World drug report 2021*. Retrieved from <https://www.unodc.org/unodc/en/data-and-analysis/wdr2021.html>.
- van Wamel, A., Croes, E., van Vugt, M., & van Rooijen, S. (2014). *Prevalentie, zorgaanbod, effectiviteit en trends in de verslavingszorg. Achtergrondstudie in opdracht van het College van Zorgverzekering*. Retrieved from Trimbos Instituut.
- Volksgezondheidszorg.info. (2019). Zorguitgaven alcohol- en drugsverslaving naar sector. Retrieved from <https://www.volksgezondheidszorg.info/onderwerp/alcoholverslaving/kosten/zorguitgaven#node-zorguitgaven-alcohol-en-drugsverslaving-naar-sector>.
- Weenink, J. W., Kool, R. B., Bartels, R. H., & Westert, G. P. (2017). Getting back on track: a systematic review of the outcomes of remediation and rehabilitation programmes for healthcare professionals with performance concerns. *BMJ Qual Saf*, 26(12), 1004-1014. doi:10.1136/bmjqs-2017-006710.
- Weenink, J. W., Westert, G. P., Schoonhoven, L., Wollersheim, H., & Kool, R. B. (2015). Am I my brother's keeper? A survey of 10 healthcare professions in the Netherlands about experiences with impaired and incompetent colleagues. *BMJ Qual Saf*, 24(1), 56-64. doi:10.1136/bmjqs-2014-003068.
- World Health Organization. (2018). *Global status report on alcohol and health 2018*. Retrieved from <https://www.who.int/publications/i/item/9789241565639>.



**PART I: EPIDEMIOLOGY AND MONITORING
OF SUBSTANCE USE DISORDER
AMONG PHYSICIANS**



CHAPTER 2

Substance use disorder and alcohol consumption patterns among Dutch physicians: a nationwide register-based study

Pauline M. Geuijen
Aart H. Schene †
Arnt F.A. Schellekens
Femke Atsma

Submitted for publication

ABSTRACT

Introduction

Substance use disorders are common in all layers of the population. Several studies suggest higher prevalence rates of substance use among physicians compared to the general population, which is harmful for themselves and potentially impairs quality of care. However, nationwide comparison with a highly educated reference group is lacking. Using nationwide register data, this study compared the prevalence of clinical substance use disorder diagnoses and alcohol consumption patterns between physicians and a highly educated reference population.

Methods

From the data, a highly educated reference group was selected and those with an active medical doctor registration were identified as “physicians”.

Results

Using descriptive analyses, clinical substance use disorder diagnoses were found for 0.3% of the physicians and 0.5% of the reference population, with higher proportions of sedative use disorder among physician patients. Among drinkers, the prevalence rates of heavy and excessive drinking were respectively 4.0% and 4.3% for physicians and 7.7% and 6.4% for the reference population.

Conclusions

Prevalence rates of substance use disorder diagnoses were fairly comparable between physicians and the highly educated reference population, but physicians displayed more favorable alcohol consumption patterns. The use of sedatives by physicians might deserve attention, given the relatively higher prevalence of sedative use disorder among physicians.

INTRODUCTION

Substance use disorders (SUDs) are a common mental disorder, affecting all layers of the population. SUDs are associated with personal harm and impaired general functioning (Jørgensen, Nordentoft, & Hjorthøj, 2018). For several professions the impairing effects of SUD are of particular societal relevance. For instance, in pilots and physicians SUD-induced impairment can have tremendous consequences for others dependent on the quality of their work for their safety. Consequently, specific care programs have been developed for such professionals, including Physician Health Programs (PHPs) (Braquehais, Tresidder, & DuPont, 2015; Brooks, Gerada, & Chalder, 2011; DuPont, McLellan, Carr, Gendel, & Skipper, 2009).

While data from the United States suggests lower prevalence rates of SUD among physicians compared to the general population, these data are hampered by several methodological shortcomings, including variation in assessment between groups. The self-reported lifetime prevalence of SUD in a large sample of physicians ($n=5,426$) (8%), was much lower than the SUD prevalence in the general population (16%), which was estimated by diagnostic interviews (Hughes et al., 1992; Regier et al., 1990). In addition, higher socioeconomic status (SES) among physicians compared to the general population might be a confounding factor (Hughes et al., 1992). In contrast, European data suggested that alcohol misuse was higher among physicians (13-30%) compared to the general population (7-15%) (Joos, Glazemakers, & Dom, 2013; Sebo, Bouvier Gallacchi, Goehring, Künzi, & Bovier, 2007; Unrath, Zeeb, Letzel, Claus, & Escobar Pinzón, 2012; Wurst et al., 2013), though again different measures were used for both groups.

So far, only two small scale observational studies among physicians ($n=99$) and healthcare professionals ($n=94$) addressed a decent comparison to a reference population by including an educational status-matched community sample of non-physicians ($n=99$) and a clinical sample of highly educated non-healthcare professionals ($n=45$) (Cottler et al., 2013; Rojas, Brand, Jeon-Slaughter, & Koos, 2014). Physicians and healthcare professionals showed significantly higher odds of SUD of opioids and sedatives, compared to the control group (Cottler et al., 2013; Rojas et al., 2014).

Taken together, inconclusiveness exists about the SUD prevalence among physicians and how this prevalence relates to the one in the general population. On the one hand, physicians might be more at risk for developing SUD due to an extensive work load, irregular working hours, and easy access to prescription drugs (Carinci & Christo, 2009; Shaw, McGovern, Angres, & Rawal, 2004), and on the other hand, physicians might be at lower risk for SUD because of their SES (high level of education, high income, and favorable position on the labor market) (Tuithof, Ten Have, van den Brink, Vollebergh, & de Graaf, 2016; van Oers, Bongers, van de Goor, & Garretsen, 1999).

In the current study, we used nationwide register data provided by Statistics Netherlands to investigate clinical SUD diagnoses and alcohol consumption patterns among Dutch physicians. To explore whether physicians might be more at risk for developing SUD due to work related factors, we selected a reference population of Dutch citizens with an educational level comparable to that of physicians. A comparison between the physicians and a highly educated reference population was made with respect to the prevalence of clinical SUD diagnoses and alcohol consumption patterns as well as psychiatric and somatic comorbidity, general functioning, and sociodemographic characteristics.

METHODS

Data source

A retrospective study was performed using data, provided by Statistics Netherlands. We selected data about highly educated Dutch citizens, physician registrations, clinical SUD diagnoses, psychiatric and somatic comorbidity, general functioning, alcohol consumption patterns, and sociodemographic characteristics. These data were available from five different registers:

- 1) Demographics register containing demographics (gender, year of birth, country of birth, educational level, and educational direction) of all legally residing citizens in the Netherlands from 2011 up to and including 2019 (Statistics Netherlands, 2011-2019a, 2011-2019c). Statistics Netherlands derives these data from the municipal population registers, educational level registers, and the Labor Force Survey (a rotating panel that is surveyed every quarter).
- 2) Individual Healthcare Professions register containing data from the Central Information Point for Healthcare Professions (Statistics Netherlands, 2011-2019b). This register includes dates of registration and deregistration, medical profession, and medical specialty.
- 3) Mental healthcare claims register containing data about diagnoses in Dutch mental healthcare from 2011 up to and including 2016 (Statistics Netherlands, 2011-2016a, 2011-2016b). These diagnoses are based on the Diagnostic and Statistical Manual of Mental Disorders 4th Edition (DSM-IV).
- 4) Public Health Monitor register containing data on (determinants of) health, social situation, and lifestyle in a sample of Dutch citizens in 2012 and 2016 (Community Health Services, Statistics Netherlands, & the National Institute for Public Health and the Environment, 2012, 2016). The Public Health Monitor is conducted once every four years by Community Health Services, Statistics Netherlands, and the National Institute for Public Health and the Environment.

5) Health Survey register containing data on health, medical contacts, lifestyle, and preventive behavior in a sample of Dutch citizens from 2014 up to and including 2019 (Statistics Netherlands, the National Institute for Public Health and the Environment, & Trimbos Institute, 2014-2019). The Health Survey is an annual survey conducted by Statistics Netherlands, which is part of the Lifestyle Monitor (de Hollander et al., 2022).

Study population

We identified a reference and a physician population. The demographics register was used to select all Dutch citizens aged between 25 and 65 years with a high educational level (Master or PhD degree) in the period from 2011 up to and including 2016. This population was defined as the “reference population”. Citizens with an active registration as physician between 1 January 2011 and 31 December 2016 were identified as “physicians”, based on the Individual Healthcare Professionals register (*Total population*). In the reference and physician population, SUD patients were identified based on DSM-IV coding of the Mental healthcare claims register (*SUD patients*). The same selections of reference citizens and physicians were made in the period from 2012 up to and including 2019 for the Public Health Monitor and Health Survey registers and subsequently drinkers were identified (*Questionnaire respondents*).

Sociodemographic characteristics

Available sociodemographic characteristics included gender, age, country of birth, medical specialty, and educational background. The continuous variable age was recoded into a categorical variable (25 to 34 years, 35 to 44 years, 45 to 54 years, and 55 to 65 years) and country of birth was categorized into three categories (The Netherlands, European, and Non-European). For physicians, medical specialties were divided into five categories: 1) general practice; 2) (psycho) social medicine; 3) contemplative somatic medicine; 4) surgical and supportive medicine; and 5) no specialty (Geuijen et al., 2020). Educational background was presented in eight categories for the reference population: 1) teaching; 2) humanities and arts; 3) social sciences, business and law; 4) science, mathematics and computing; 5) engineering, manufacturing and construction; 6) agriculture and veterinary; 7) health and welfare (including medicine); and 8) services.

From the Public Health Monitor and Health Survey registers information was also available on working hours per week (not working or less than 1 hour, 1 to 12 hours, 12 to 31 hours, and 32 or more hours) and household income quintile (1st (lowest income), 2nd, 3rd, 4th, and 5th (highest income) quintile).

Definition of SUD diagnoses and alcohol consumption patterns

SUD patients and accompanying comorbidity and functioning were identified by a clinical diagnosis of SUD in the Mental healthcare claims register. Substances of abuse and comorbid psychiatric disorders were identified by DSM-IV codes (Table S1). DSM-IV codes of comorbid somatic disorders were recoded into a dichotomous variable ("complex" + "singular" versus "none"). DSM-IV codes of start and end scores on the Global Assessment of Functioning (GAF) were divided into three categories: 1) persistent danger to major impairment (GAF 0-40); 2) serious to moderate symptoms (GAF 41-60); and 3) mild to no symptoms (GAF 61-100).

Drinkers were identified by the Public Health Monitor and Health Survey registers as those who reported having consumed at least one alcohol unit in the past 12 months (Community Health Services et al., 2012, 2016; Statistics Netherlands et al., 2014-2019). Among drinkers, those compliant with the alcohol consumption recommendation, heavy drinkers, and excessive drinkers were identified. Compliance with the alcohol consumption recommendation was defined as drinking up to maximum one unit of alcohol per day, in line with the recommendation of the Public Health Council of the Netherlands (Community Health Services et al., 2012, 2016; Statistics Netherlands et al., 2014-2019). Heavy drinking was defined as consuming six (males) or four (females) or more units of alcohol per day at least once a week in the last 6 months, in line with the definition of the Public Health Monitor and the Health Survey (Community Health Services et al., 2012, 2016; Statistics Netherlands et al., 2014-2019). Consuming more than 21 (males) or 14 (females) units of alcohol per week was defined as excessive drinking (Community Health Services et al., 2012, 2016; Statistics Netherlands et al., 2014-2019). The groups of heavy and excessive drinkers were not mutually exclusive and therefore we did not present a group of moderate drinkers, which results in row percentages that do not add up to 100%.

Data analysis

First, we used descriptive statistics to compare the total reference population with the physicians and to compare SUD patients in the reference population with those among the physicians. The prevalence of clinical SUD diagnoses was calculated by dividing the number of (reference or physician) citizens with a clinical SUD diagnosis between 2011 and 2016 by the total number of (reference or physician) citizens between 2011 and 2016. Mean years of clinical SUD diagnosis between 2011 and 2016 were calculated by dividing the total number of clinical SUD diagnoses between 2011 and 2016 by the total number of (reference or physician) SUD patients between 2011 and 2016. Next, clinical SUD diagnoses, psychiatric and somatic comorbidity, and general functioning were compared between reference and physician SUD patients.

Second, respondents of the Public Health Monitor and the Health Survey were taken together and representatives from the reference population and the physicians were identified. First, characteristics of the total sample of questionnaire respondents and drinkers were presented. Next, we performed subgroup analyses for the distribution of alcohol consumption patterns (compliance with the alcohol consumption recommendation, heavy drinkers, and excessive drinkers) within drinkers.

We decided not to present p-values to test statistical significant differences in means and proportions, since p-values are prone to sample sizes and misleading conclusions could be drawn. Due to large numbers in the *Total population*, we noticed all comparisons between physicians and the reference population were statistically significant ($p < 0.001$), including small irrelevant differences. Numbers were smaller among *SUD patients* and *Questionnaire respondents*, which also affects statistical significance. Given the large sample sizes, the differences in numbers between subgroups in our samples, and the fact that a non-significant difference does not necessarily demonstrate that there is no effect (Schober, Bossers, & Schwarte, 2018; Atsma, Veldhuizen, de Vegt, Doggen, & de Kort, 2011), and vice versa, we decided to primarily focus on differences in means and proportions.

Small numbers (<5) are not reported to prevent disclosure of physicians, in some cases the second smallest cell had to be cleared to avoid retracing. Analyses were performed using the Statistical Package for Social Sciences (SPSS), version 25 for Windows (IBM Corporation, Amonk, NY).

RESULTS

General sample characteristics

The total reference population consisted of 810,188 highly educated citizens aged 25 to 65 years, of whom 38,455 (4.7%) had an active registration as physician between 2011 and 2016 (Table 1). The physicians had somewhat higher proportions of females, were slightly older (2.8 years), and were more often born in the Netherlands than the reference population. Among physicians, most common medical specialty groups were general practice (25.1%), no specialty (22.3%), and contemplative somatic medicine (20.5%). Almost half of the reference population completed education in the direction of social sciences, business and law (47.3%), and more than one-fifth completed education in the direction of health and welfare (12.6%) or humanities and arts (11.0%).

SUD

Our reference population included 4,436 SUD patients (0.5%) and among physicians we observed 133 SUD patients (0.3%) with a clinical SUD diagnosis between 2011 and

2016 (Table 1). Physicians with SUD were more or less comparable to reference SUD patients in terms of demographics. Physician SUD patients were overrepresented in the specialty groups (psycho) social medicine and no specialty. In the reference population, SUD diagnosis was more common among those with an educational background in humanities and arts.

In the period between 2011 and 2016, SUD patients among physicians and in the reference population had on average 1.7 years of a clinical SUD diagnosis (Table 2). Physician patients were more often than reference patients diagnosed with a SUD on

Table 1. Sociodemographic characteristics of total population and SUD patients

	Total population		SUD patients	
	Reference (n=810,188)	Physicians (n=38,455)	Reference (n=4,436; 0.5%)	Physicians (n=133; 0.3%)
Gender (n (%))				
Male	410,783 (50.7)	17,138 (44.6)	2,992 (67.4)	82 (61.7)
Female	399,405 (49.3)	21,317 (55.4)	1,444 (32.6)	51 (38.3)
Age at cohort entry in years (mean (SD))	37.7 (10.7)	40.5 (10.1)	42.9 (10.3)	45.2 (10.1)
25 - 34 (n (%))	376,129 (46.4)	13,071 (34.0)	1,096 (24.7)	25 (18.8)
35 - 44 (n (%))	227,568 (28.1)	13,024 (33.9)	1,425 (32.1)	39 (29.3)
45 - 54 (n (%))	128,731 (15.9)	7,675 (20.0)	1,184 (26.7)	36 (27.1)
55 - 65 (n (%))	77,760 (9.6)	4,685 (12.2)	731 (16.5)	33 (24.8)
Country of birth (n (%))				
The Netherlands	692,960 (85.5)	34,205 (88.9)	3,734 (84.2)	118 (88.7)
European	32,982 (4.1)	726 (1.9)	204 (4.6)	4 (3.0)
Non-European	84,246 (10.4)	3,524 (9.2)	498 (11.2)	11 (8.3)
Specialty group (n (%))				
General practice		9,657 (25.1)		25 (18.8)
(Psycho) social		5,142 (13.4)		33 (24.8)
Contemplative somatic	NA	7,868 (20.5)	NA	14 (10.5)
Surgical and supportive		7,225 (18.8)		10 (7.5)
No specialty		8,563 (22.3)		51 (38.3)
Educational background (n (%))				
Teaching	59,804 (7.4)		315 (7.1)	
Humanities and arts	88,877 (11.0)		789 (17.8)	
Social sciences, business and law	382,871 (47.3)		2,170 (48.9)	
Science, mathematics and computing	67,919 (8.4)		350 (7.9)	
Engineering, manufacturing and construction	73,070 (9.0)	NA	267 (6.0)	NA
Agriculture and veterinary	13,534 (1.7)		46 (1.0)	
Health and welfare (including medicine)	102,420 (12.6)		367 (8.3)	
Services	13,549 (1.7)		91 (2.1)	

n = number, NA = Not Applicable, SD = Standard Deviation, SUD = Substance Use Disorder.

sedative, hypnotic, or anxiolytic drugs (16.5% versus 6.8%) and less often diagnosed with a SUD on alcohol and cannabis (67.7% and 10.5% versus 75.7% and 17.6%, respectively). Psychiatric comorbidity and symptom severity at the time of diagnosis were more or less comparable between physician SUD patients and reference SUD patients. At the end of treatment, a somewhat higher proportion of physician patients experienced mild to no symptoms on the Global Assessment of Functioning compared to reference patients (39.8% versus 33.3%).

Table 2. Clinical diagnoses of SUD patients

	SUD patients	
	Reference (n=4 436)	Physicians (n=133)
Years of clinical SUD diagnosis between 2011 and 2016 (mean (SD))	1.7 (1.1)	1.7 (1.1)
Substance of abuse (n (%))		
Alcohol	3,357 (75.7)	90 (67.7)
Amphetamine	112 (2.5)	*
Cannabis	779 (17.6)	14 (10.5)
Cocaine	387 (8.7)	7 (5.3)
Opioid	150 (3.4)	*
Sedative, hypnotic, or anxiolytic	302 (6.8)	22 (16.5)
Other or unknown substance(s)	177 (4.0)	10 (7.5)
Comorbid psychiatric disorder (n (%))		
Developmental disorder	372 (8.4)	10 (7.5)
Cognitive disorder	53 (1.2)	*
Psychotic disorder	196 (4.4)	*
Mood disorder	1,177 (26.5)	42 (31.6)
Anxiety disorder	626 (14.1)	15 (11.3)
Somatoform and/or dissociative disorder	91 (2.1)	6 (4.5)
Personality disorder	1,100 (24.8)	37 (27.8)
Other psychiatric disorder	650 (14.7)	15 (11.3)
Somatic comorbidity (n (%))		
Complex	350 (7.9)	13 (9.8)
Singular	791 (17.8)	24 (18.0)
Start score Global Assessment of Functioning (n (%))		
Constant danger to major impairment (0-40)	391 (8.8)	9 (6.8)
Serious to moderate symptoms (41-60)	3,220 (72.6)	95 (71.4)
Mild to no symptoms (61-100)	681 (15.4)	23 (17.3)
End score Global Assessment of Functioning (n (%))		
Persistent danger to major impairment (0-40)	334 (7.5)	6 (4.5)
Serious to moderate symptoms (41-60)	2,435 (54.9)	66 (49.6)
Mild to no symptoms (61-100)	1,476 (33.3)	53 (39.8)

n = number, SD = Standard Deviation, SUD = Substance Use Disorder.

* small numbers are not reported to prevent disclosure.

Table 3. Sociodemographic characteristics of questionnaire respondents and drinkers

	Questionnaire respondents		Drinkers	
	Reference (n=32,309)	Physicians (n=1,947)	Reference (n=29,168; 90.3%)	Physicians (n=1,759; 90.3%)
Gender (n (%))				
Male	15,238 (47.2)	662 (34.0)	14,121 (48.4)	607 (34.5)
Female	17,071 (52.8)	1,285 (66.0)	15,047 (51.6)	1,152 (65.5)
Age in years (mean (SD))				
	41.9 (10.7)	42.1 (10.2)	41.9 (10.8)	42.2 (10.2)
25 - 34 (n (%))	9,865 (30.5)	559 (28.7)	8,877 (30.4)	505 (28.7)
35 - 44 (n (%))	9,924 (30.7)	631 (32.4)	8,874 (30.4)	559 (31.8)
45 - 54 (n (%))	7,593 (23.5)	479 (24.6)	6,884 (23.6)	441 (25.1)
55 - 65 (n (%))	4,927 (15.2)	278 (14.3)	4,533 (15.5)	254 (14.4)
Country of birth (n (%))				
The Netherlands	29,381 (90.9)	1,785 (91.7)	26,892 (92.2)	1,629 (92.6)
European	834 (2.6)	37 (1.9)	729 (2.5)	31 (1.8)
Non-European	2,094 (6.5)	125 (6.4)	1,547 (5.3)	99 (5.6)
Specialty group (n (%))				
General practice		466 (23.9)		412 (23.4)
(Psycho) social		271 (13.9)		248 (14.1)
Contemplative somatic	NA	415 (21.3)	NA	379 (21.5)
Surgical or supportive		503 (25.8)		265 (15.1)
No specialty		292 (15.0)		455 (25.9)
Educational background (n (%))				
Teaching	2,852 (8.8)		2,506 (8.6)	
Humanities and arts	3,221 (10.0)		2,845 (9.8)	
Social sciences, business and law	13,878 (43.0)		12,637 (43.3)	
Science, mathematics and computing	2,774 (8.6)		2,459 (8.4)	
Engineering, manufacturing and construction	3,134 (9.7)	NA	2,916 (10.0)	NA
Agriculture and veterinary	741 (2.3)		673 (2.3)	
Health and welfare (including medicine)	4,548 (14.1)		4,090 (14.0)	
Services	567 (1.8)		514 (1.8)	
Working hours per week (n (%))				
None or less than 1	3,089 (9.6)	78 (4.0)	2,607 (8.9)	67 (3.8)
1 to 12	522 (1.6)	16 (0.8)	445 (1.5)	14 (0.8)
12 to 31	5,332 (16.5)	299 (15.4)	4,733 (16.2)	267 (15.2)
32 or more	21,856 (67.6)	1,462 (75.1)	20,459 (70.1)	1,347 (76.6)
Household income (n (%))				
1 st quintile (lowest income)	2,102 (6.5)	69 (3.5)	1,781 (6.1)	60 (3.4)
2 nd quintile	1,663 (5.1)	30 (1.5)	1,380 (4.7)	20 (1.1)
3 rd quintile	3,493 (10.8)	89 (4.6)	3,105 (10.6)	78 (4.4)
4 th quintile	6,875 (21.3)	272 (14.0)	6,172 (21.2)	243 (13.8)
5 th quintile (highest income)	17,812 (55.1)	1,477 (75.9)	16,433 (56.3)	1,350 (76.7)

n = number, NA = Not Applicable, SD = standard deviation.

Survey sample characteristics (Public Health Monitor and Health Survey)

Our total sample of questionnaire respondents consisted of 32,309 reference citizens (Public Health Monitor $n=29,597$; Health Survey $n=2,712$) of whom 1,947 (6.0%) were physicians (Public Health Monitor $n=1,808$; Health Survey $n=139$) (Table S2). Compared to the reference population, physician respondents showed higher proportions of females, working 32 hours or more per week, and the highest household income (5th quintile) (Table 3).

Alcohol consumption

Overall, the vast majority (90.3%) of respondents among physicians and the reference population regularly drank alcohol (Table 3). When looking at the distribution of alcohol consumption patterns within drinkers, physician drinkers complied somewhat more often with the alcohol consumption recommendation (36.5%) and showed somewhat lower proportions of heavy (4.0%) and excessive drinking (4.3%) compared to drinkers in the reference population (32.5%, 7.7%, and 6.4% respectively) (Table 4). Compliance with the alcohol consumption recommendation was overrepresented among drinkers aged 35-54 years, born in European and non-European countries, working less than 32 hours per week, and with a household income lower than the 5th quintile. Among heavy and/or excessive drinkers, the specialty groups (psycho)social medicine and no specialty and educational backgrounds social sciences, business and law, services, and humanities and arts were overrepresented.

DISCUSSION

This study aimed to investigate clinical SUD diagnoses and alcohol consumption patterns among Dutch physicians and a reference population of highly educated Dutch citizens. Using nationwide mental healthcare claims data and health questionnaires, the overall prevalence of clinical SUD diagnoses was low and comparable between physicians and the reference population. Physician SUD patients more often had a sedative use disorder compared to SUD patients in the reference population. Physicians generally had healthier alcohol consumption patterns compared to the reference population. SUD patients and heavy and/or excessive drinking were overrepresented among the specialty group (psycho)social medicine and physicians with no specialty.

Our results showed similar findings for physicians and a comparable reference population with regard to the prevalence of SUD diagnoses. We observed relatively low prevalence rates of SUD diagnoses (0.3% and 0.5% respectively) and alcohol misuse (3.6% and 6.9% heavy drinkers and 3.9% and 5.8% excessive drinkers respectively) in

Table 4. Distribution of alcohol consumption patterns^s within drinkers by sociodemographic characteristics

	Drinkers		Compliance with alcohol consumption recommendation		Heavy drinkers		Excessive drinkers	
	Reference (n=29,168)	Physicians (n=1,759)	Reference (n=9,477; 32.5%)	Physicians (n=642; 36.5%)	Reference (n=2,240; 7.7%)	Physicians (n=70; 4.0%)	Reference (n=1,864; 6.4%)	Physicians (n=76; 4.3%)
Gender (n %)								
Male	14,121	607	3,170 (22.4)	147 (24.2)	1,250 (8.9)	21 (3.5)	908 (6.4)	22 (3.6)
Female	15,047	1,152	6,307 (41.9)	495 (43.0)	990 (6.6)	49 (4.3)	956 (6.4)	54 (4.7)
Age in years (mean (SD))	41.9 (10.8)	42.2 (10.2)	42.0 (10.2)	42.6 (10.0)	40.3 (12.0)	41.2 (12.3)	46.4 (12.3)	47.3 (11.9)
25 – 34 (n %)	8,877	505	2,624 (29.6)	163 (32.3)	955 (10.8)	31 (6.1)	434 (4.9)	14 (2.8)
35 – 44 (n %)	8,874	559	3,218 (36.3)	224 (40.1)	474 (5.3)	11 (2.0)	347 (3.9)	16 (2.9)
45 – 54 (n %)	6,884	441	2,308 (33.5)	162 (36.7)	430 (6.2)	15 (3.4)	496 (7.2)	21 (4.8)
55 – 65 (n %)	4,533	254	1,327 (29.3)	93 (36.6)	381 (8.4)	13 (5.1)	587 (12.9)	25 (9.8)
Country of birth (n %)								
The Netherlands	26,892	1,629	8,149 (30.3)	570 (35.0)	2,093 (7.8)	65 (4.0)	1,719 (6.4)	68 (4.2)
European	729	31	307 (42.1)	14 (45.2)	50 (6.9)	*	53 (7.3)	*
Non-European	1,547	99	1,021 (66.0)	58 (58.6)	97 (6.3)	*	92 (5.9)	*
Specialty group (n %)								
General practice		412		153 (37.1)		16 (3.9)		16 (3.9)
(P-sycho) social		248		86 (34.7)		14 (5.6)		16 (6.5)
Contemplative somatic	NA	379	NA	154 (40.6)	NA	*	NA	13 (3.4)
Surgical or supportive		265		75 (28.3)		*		11 (4.2)
No specialty		455		174 (38.2)		28 (6.2)		20 (4.4)
Educational background (n %)								
Teaching	2,506		1,032 (41.2)		164 (6.5)		160 (6.4)	
Humanities and arts	2,845		1,115 (39.2)		217 (7.6)		239 (8.4)	
Social sciences, business and law	12,637		3,574 (28.3)		1,176 (9.3)		902 (7.1)	
Science, mathematics and computing	2,459		909 (37.0)		161 (6.5)		123 (5.0)	
Engineering, manufacturing and construction	2,916	NA	777 (26.6)	NA	209 (7.2)	NA	149 (5.1)	NA
Agriculture and veterinary	673		248 (36.8)		26 (3.9)		31 (4.6)	
Health and welfare	4,090		1,459 (35.7)		223 (5.5)		191 (4.7)	
Services	514		172 (33.5)		42 (8.2)		35 (6.8)	

Table 4. Continued

	Drinkers		Compliance with alcohol consumption recommendation		Heavy drinkers		Excessive drinkers	
	Reference	Physicians	Reference	Physicians	Reference	Physicians	Reference	Physicians
	(n=29,168)	(n=1,759)	(n=9,477; 32.5%)	(n=642; 36.5%)	(n=2,240; 7.7%)	(n=70; 4.0%)	(n=1,864; 6.4%)	(n=76; 4.3%)
Working hours per week (n (%))								
None or less than 1	2,607	67	1,233 (47.3)	35 (52.2)	227 (8.7)	*	284 (10.9)	*
1 to 12	445	14	211 (47.4)	9 (64.3)	30 (6.7)	*	44 (9.9)	*
12 to 31	4,733	267	2,149 (45.4)	125 (46.8)	271 (5.7)	10 (3.7)	271 (5.7)	14 (5.2)
32 or more	20,459	1,347	5,574 (27.2)	457 (33.9)	1,620 (7.9)	52 (3.9)	1,186 (5.8)	51 (3.8)
Household income (n (%))								
1 st quintile (lowest income)	1,781	60	672 (37.7)	26 (43.3)	265 (14.9)	6 (10.0)	184 (10.3)	*
2 nd quintile	1,380	20	617 (44.7)	14 (70.0)	129 (9.3)	*	93 (6.7)	*
3 rd quintile	3,105	78	1,164 (37.5)	32 (41.0)	281 (9.0)	*	197 (6.3)	*
4 th quintile	6,172	243	2,185 (35.4)	101 (41.6)	397 (6.4)	8 (3.3)	311 (5.0)	*
5 th quintile (highest income)	16,433	1,350	4,703 (28.6)	463 (34.3)	1,150 (7.0)	53 (3.9)	1,064 (6.5)	67 (5.0)

n = number, NA = not applicable, SD = standard deviation.

^s Row percentages do not add up to 100%, since the alcohol consumption patterns were not mutually exclusive and moderate drinkers were not presented.

* small numbers are not reported to prevent disclosure.

both physicians and the reference population, compared to the general population that meets the criteria for SUD diagnosis (alcohol use disorder 5.1% and drug use disorder 0.7%) and alcohol misuse (18.2%) worldwide (United Nations Office on Drugs and Crime, 2021; World Health Organization, 2018). This lower prevalence of substance use related issues in our sample might be explained by protective effects for the development of SUD of high SES in our sample, a lower willingness to seek help (larger treatment gap) among highly educated citizens, or by the assessment procedure since only claims registrations were included. These findings however do not support the suggestion that physicians are at increased risk for alcohol misuse (Joos et al., 2013; Sebo et al., 2007; Unrath et al., 2012; Wurst et al., 2013), which is beneficial for physicians as well as for the quality of care and patient safety.

Compared to reference patients, physician patients were more often diagnosed with a SUD on sedative, hypnotic, or anxiolytic substances and less often with a SUD on alcohol. This is largely in line with studies among physicians in Australia and the United States, showing that a significant part of SUD diagnoses among physicians was related to other substance(s) than alcohol, including prescription drugs (Angres, McGovern, Shaw, & Rawal, 2003; Shaw et al., 2004; Wijesinghe & Dunne, 2001). It has been suggested that this might be the consequence of physicians' authority to prescribe drugs, which makes physicians more familiar with and gives them easier access to prescription drugs (Hartnett, Drakeford, Dunne, McLoughlin, & Kennedy, 2020). A cross-sectional survey among 729 young Irish physicians found that 3-7% of the respondents had prescribed themselves benzodiazepines, opioids, or other psychotropic medication (Hartnett et al., 2020). Male physicians and physicians with a surgical or supportive specialty were at higher risk of self-prescribing addictive medication (Hartnett et al., 2020). As previously found by a review about self-medication in physicians and medical students, physicians continue to self-prescribe medication despite clear professional guidelines (Montgomery, Bradley, Rochfort, & Panagopoulou, 2011), including addictive drugs (Hartnett et al., 2020).

Since a higher proportion of physician SUD patients experienced mild to no symptoms at the end of treatment compared to reference SUD patients, this might indicate a better prognosis for physician SUD patients than for reference SUD patients. This is consistent with our recent meta-analysis showing that healthcare professionals who participated in a monitoring program were about 1.5 times more likely to achieve long-term abstinence compared to general relapse rates of 50% in the first year after treatment (Geuijen et al., 2021; McKay, Knepper, Deneke, O'Reilly, & DuPont, 2016; Miller, Walters, & Bennett, 2001; National Institute on Drug Abuse, 2012; van Wamel, Croes, van Vugt, & van Rooijen, 2014). This better prognosis might not only be explained by participation in the monitoring program, but also by protective and supportive

socioeconomic factors (like educational level, income, and occupation).

In this study, the specialty groups psycho(social) medicine and physicians with no specialty were associated with higher proportions of SUD diagnoses and heavy and/or excessive drinking. This observation may have several explanations, such as an actually higher SUD rate, a higher rate of SUD identification, and/or a higher rate of help seeking. It can also be speculated that development of an SUD hinders specialist training, resulting in physicians with no specialty being overrepresented among the SUD group, and showing higher alcohol consumption levels. Future studies should further investigate whether certain physicians are more at risk for substance use related problems than others, and why this is the case.

Strengths of the current study include the use of nationwide data with large sample sizes and the use of a highly educated reference population enabling decent comparison of the prevalence of SUD diagnoses and alcohol consumption patterns among physicians. We did not present a group of moderate drinkers, which is not a problem since heavy and excessive drinkers were our main interest. A potential limitation of this study is that some characteristics within SUD patients and within alcohol consumption patterns had relatively small numbers, which may lead to a higher level of uncertainty in the observed prevalence rates. Moreover, prevalence rates of clinical SUD diagnoses might be underestimated due to a treatment gap and prevalence rates of heavy and/or excessive drinking might be underestimated due to social desirable answers. It remains to be studied whether this affects prevalence rates more in physicians than in the general population.

Conclusions

This is the first study that investigated prevalence rates of clinical SUD diagnoses and alcohol consumption patterns among physicians using nationwide data and a highly educated reference population. Prevalence rates of clinical SUD diagnoses and alcohol consumption patterns were fairly comparable or slightly more favorable among physicians compared to the reference population. Despite the relatively low levels of SUD and heavy and/or excessive alcohol consumption, substance use related problems among physicians remain an important topic from a healthcare perspective. Special attention should be directed to the use of sedatives, since physician SUD patients were more often diagnosed with a sedative use disorder than reference SUD patients.

Author contributions

Conceptualization, P.G., A.F.S., A.H.S. and F.A.; methodology, P.G., A.F.S., A.H.S. and F.A.; formal analysis, P.G.; investigation, P.G., A.F.S., and F.A.; data curation, P.G.; writing - original draft preparation, P.G.; writing - review and editing, P.G., A.F.S., A.H.S. and F.A.; supervision, A.F.S. and F.A.; project administration, P.G. and A.F.S.; funding acquisition, P.G. and A.F.S.. All authors have read and agreed to the published version of the manuscript.

Ethics statement

This study is not subject to the Medical Research in Human Subjects as subjects were not subjected to actions or interventions. Consent to participate is deemed unnecessary according to national regulations that apply to Statistics Netherlands. To ensure the privacy of subjects, researchers received non-identifiable data. According to Dutch law no (written) informed consent to publish the material is needed in case anonymized data are used.

Data availability

The data that support the findings of this study are available from Statistics Netherlands but restrictions apply to the availability of these data, which were used under license for the current study and are not publicly available.

Conflict of interest

The authors declare no conflict of interest.

Funding

This work was supported by the Stichting Psychiatrie Nijmegen and the Nijmegen Institute for Scientist-Practitioners in Addiction (NISPA).

REFERENCES

- Angres, D. H., McGovern, M. P., Shaw, M. F., & Rawal, P. (2003). Psychiatric comorbidity and physicians with substance use disorders: a comparison between the 1980s and 1990s. *J Addict Dis*, 22(3), 79-87. doi:10.1300/J069v22n03_07.
- Atsma, F., Veldhuizen, I., de Vegt, F., Doggen, C., & de Kort, W. (2011). Cardiovascular and demographic characteristics in whole blood and plasma donors: results from the Donor InSight study. *Transfusion*, 51(2), 412-20.
- Braquehais, M. D., Tresidder, A., & DuPont, R. L. (2015). Service provision to physicians with mental health and addiction problems. *Curr Opin Psychiatry*, 28(4), 324-329. doi:10.1097/YCO.0000000000000166.
- Brooks, S. K., Gerada, C., & Chalder, T. (2011). Review of literature on the mental health of doctors: are specialist services needed? *J Ment Health*, 20(2), 146-156. doi:10.3109/09638237.2010.541300.
- Carinci, A. J., & Christo, P. J. (2009). Physician impairment: is recovery feasible? *Pain Physician*, 12(3), 487-491.
- Community Health Services, Statistics Netherlands, & the National Institute for Public Health and the Environment. (2012). *Public Health Monitor*. Retrieved from <https://www.cbs.nl/nl-nl/onze-diensten/maatwerk-en-microdata/microdata-zelf-onderzoek-doen/microdatabestanden/gemon-2012-gezondheidsmonitor-volwassenen-en-ouderen>.
- Community Health Services, Statistics Netherlands, & the National Institute for Public Health and the Environment. (2016). *Public Health Monitor*. Retrieved from <https://www.cbs.nl/nl-nl/onze-diensten/maatwerk-en-microdata/microdata-zelf-onderzoek-doen/microdatabestanden/gemon-2016-gezondheidsmonitor-volwassenen-en-ouderen>.
- Cottler, L. B., Ajinkya, S., Merlo, L. J., Nixon, S. J., Ben Abdallah, A., & Gold, M. S. (2013). Lifetime psychiatric and substance use disorders among impaired physicians in a physicians health program: comparison to a general treatment population: psychopathology of impaired physicians. *J Addict Med*, 7(2), 108-112. doi:10.1097/ADM.0b013e31827fad9.
- de Hollander, E., Hupkens, C., van Dorsselaer, S., Wendel-Vos, W., Kemler, E., de Graaf, H., . . . Hiemstra, M. (2022). De Leefstijlmonitor: Cijfers voor gezondheidsbeleid [The Lifestyle Monitor: prevalence rates for health policy]. *TSG : tijdschrift voor gezondheidswetenschappen*, 1-9. doi: 10.1007/s12508-022-00349-8
- DuPont, R. L., McLellan, A. T., Carr, G., Gendel, M., & Skipper, G. E. (2009). How are addicted physicians treated? A national survey of Physician Health Programs. *J Subst Abuse Treat*, 37(1), 1-7. doi:10.1016/j.jsat.2009.03.010.
- Geuijen, P., de Rond, M., Kuppens, J., Atsma, F., Schene, A., de Haan, H., . . . Schellekens, A. (2020). Physicians' norms and attitudes towards substance use in colleague physicians: A cross-sectional survey in the Netherlands. *PLoS One*, 15(4), e0231084. doi:10.1371/journal.pone.0231084.
- Geuijen, P. M., van den Broek, S. J. M., Dijkstra, B. A. G., Kuppens, J. M., de Haan, H. A., de Jong, C. A. J., . . . Schellekens, A. F. A. (2021). Success Rates of Monitoring for Healthcare Professionals with a Substance Use Disorder: A Meta-Analysis. *J Clin Med*, 10(2). doi:10.3390/jcm10020264.
- Hartnett, Y., Drakeford, C., Dunne, L., McLoughlin, D. M., & Kennedy, N. (2020). Physician, heal thyself: a cross-sectional survey of doctors' personal prescribing habits. *J Med Ethics*, 46(4), 231-235. doi:10.1136/medethics-2018-105064.
- Hughes, P. H., Storr, C., Baldwin, D. C., Williams, K. M., Conard, S., & Sheehan, D. (1992). Patterns of substance use in the medical profession. *Md Med J*, 41(4), 311-314.
- Joos, L., Glazemakers, I., & Dom, G. (2013). Alcohol use and hazardous drinking among medical specialists. *Eur Addict Res*, 19(2), 89-97. doi:10.1159/000341993.
- Jørgensen, K. B., Nordentoft, M., & Hjorthøj, C. (2018). Association between alcohol and substance use disorders and psychiatric service use in patients with severe mental illness: a nationwide Danish register-based cohort study. *Psychol Med*, 48(15), 2592-2600. doi:10.1017/S0033291718000223.
- McKay, J. R., Knepper, C., Deneke, E., O'Reilly, C., & DuPont, R. L. (2016). An Initial Evaluation of a Comprehensive Continuing Care Intervention for Clients with Substance Use Disorders: My First Year of Recovery (MyFYR). *J Subst Abuse Treat*, 67, 50-54. doi:10.1016/j.jsat.2016.04.003.
- Miller, W. R., Walters, S. T., & Bennett, M. E. (2001). How effective is alcoholism treatment in the United States? *J Stud Alcohol*, 62(2), 211-220. doi:10.15288/jsa.2001.62.211.

- Montgomery, A. J., Bradley, C., Rochfort, A., & Panagopoulou, E. (2011). A review of self-medication in physicians and medical students. *Occup Med (Lond)*, *61*(7), 490-497. doi:10.1093/occmed/kqr098.
- National Institute on Drug Abuse. (2012). *Treatment and Recovery*. Retrieved from Bethesda, Maryland:
- Regier, D. A., Farmer, M. E., Rae, D. S., Locke, B. Z., Keith, S. J., Judd, L. L., & Goodwin, F. K. (1990). Comorbidity of mental disorders with alcohol and other drug abuse. Results from the Epidemiologic Catchment Area (ECA) Study. *JAMA*, *264*(19), 2511-2518.
- Rojas, J. I., Brand, M., Jeon-Slaughter, H., & Koos, E. (2014). Substance Abuse Patterns and Psychiatric Symptomology Among Health Care Professionals and Non-Health Care Professionals Evaluated in an Outpatient Program for Impaired Professionals. *Addictive Disorders & Their Treatment*, *13*(2).
- Schober, P., Bossers, S. M., & Schwarte, L. A. (2018). Statistical significance versus clinical importance of observed effect sizes: what do P values and confidence intervals really represent? *Anesthesia & Analgesia*, *126*(3), 1068-1072.
- Sebo, P., Bouvier Gallacchi, M., Goehring, C., Künzi, B., & Bovier, P. A. (2007). Use of tobacco and alcohol by Swiss primary care physicians: a cross-sectional survey. *BMC Public Health*, *7*, 5. doi:10.1186/1471-2458-7-5.
- Shaw, M. F., McGovern, M. P., Angres, D. H., & Rawal, P. (2004). Physicians and nurses with substance use disorders. *J Adv Nurs*, *47*(5), 561-571. doi:10.1111/j.1365-2648.2004.03133.x
- Statistics Netherlands. (2011-2016a). *Geopende Diagnose Behandeling Combinatie-trajecten in de Geestelijke Gezondheidszorg*. Retrieved from <https://www.cbs.nl/nl-nl/onze-diensten/maatwerk-en-microdata/microdata-zelf-onderzoek-doen/microdatabestanden/ggzdbctraceutab-geopende-dbc-trajecten-in-de-ggz>.
- Statistics Netherlands. (2011-2016b). *Nevendagnosen bij Diagnose Behandeling Combinatie-trajecten in de Geestelijke Gezondheidszorg*. Retrieved from <https://www.cbs.nl/nl-nl/onze-diensten/maatwerk-en-microdata/microdata-zelf-onderzoek-doen/microdatabestanden/ggzdbcdiagnosetab-nevendagnosen-bij-dbc-trajecten-ggz>.
- Statistics Netherlands. (2011-2019a). *Hoogst behaald en hoogst gevolgd opleidingsniveau en opleidingsrichting van de bevolking in Nederland*. Retrieved from <https://www.cbs.nl/nl-nl/onze-diensten/maatwerk-en-microdata/microdata-zelf-onderzoek-doen/microdatabestanden/hogsteoptab-hoogst-behaald-gevolgd-opleidingsniveau>.
- Statistics Netherlands. (2011-2019b). *Inschrijvingen in het register Beroepen in de Gezondheidszorg (BIG-register)*. Retrieved from <https://www.cbs.nl/nl-nl/onze-diensten/maatwerk-en-microdata/microdata-zelf-onderzoek-doen/microdatabestanden/bigtab-beroepen-in-de-gezondheidszorg-inschrijvingen>.
- Statistics Netherlands. (2011-2019c). *Persoonskenmerken van alle in de Gemeentelijke Basis Administratie (GBA) ingeschreven personen, gecoördineerd*. Retrieved from <https://www.cbs.nl/nl-nl/onze-diensten/maatwerk-en-microdata/microdata-zelf-onderzoek-doen/microdatabestanden/gbapersoontab-persoonskenmerken-van-persoonen-in-de-brp>.
- Statistics Netherlands, the National Institute for Public Health and the Environment, & Trimbos Institute. (2014-2019). *Gezondheidsenquête/Leefstijlmonitor*. Retrieved from <https://www.cbs.nl/nl-nl/onze-diensten/methoden/onderzoeksomschrijvingen/korte-onderzoeksbeschrijvingen/gezondheidsenquete-vanaf-2014>.
- Tuithof, M., Ten Have, M., van den Brink, W., Vollebergh, W., & de Graaf, R. (2016). Treatment Seeking for Alcohol Use Disorders: Treatment Gap or Adequate Self-Selection? *Eur Addict Res*, *22*(5), 277-285. doi:10.1159/000446822.
- United Nations Office on Drugs and Crime. (2021). World drug report 2021. Retrieved from <https://www.unodc.org/unodc/en/data-and-analysis/wdr2021.html>.
- Unrath, M., Zeeb, H., Letzel, S., Claus, M., & Escobar Pinzón, L. C. (2012). Identification of possible risk factors for alcohol use disorders among general practitioners in Rhineland-Palatinate, Germany. *Swiss Med Wkly*, *142*, w13664. doi:10.4414/smw.2012.13664.
- van Oers, J. A., Bongers, I. M., van de Goor, L. A., & Garretsen, H. F. (1999). Alcohol consumption, alcohol-related problems, problem drinking, and socioeconomic status. *Alcohol Alcohol*, *34*(1), 78-88. doi:10.1093/alcalc/34.1.78.
- van Wamel, A., Croes, E., van Vugt, M., & van Rooijen, S. (2014). *Prevalentie, zorgaanbod, effectiviteit en trends in de verslavingszorg. Achtergrondstudie in opdracht van het College van Zorgverzekeringen*. Retrieved from Utrecht.

- Wijesinghe, C. P., & Dunne, F. (2001). Substance use and other psychiatric disorders in impaired practitioners. *Psychiatr Q*, 72(2), 181-189.
- World Health Organization. (2018). Global status report on alcohol and health 2018. Retrieved from <https://www.who.int/publications/i/item/9789241565639>.
- Wurst, F. M., Rumpf, H. J., Skipper, G. E., Allen, J. P., Kunz, I., Beschoner, P., & Thon, N. (2013). Estimating the prevalence of drinking problems among physicians. *Gen Hosp Psychiatry*, 35(5), 561-564. doi:10.1016/j.genhosppsy.2013.04.018

Table S1. Definitions of substance of abuse and comorbid psychiatric disorders by DSM-IV codes

	DSM-IV codes
Substance of abuse	
Alcohol	303.9x and 305.0x
Amphetamine	304.4x and 305.7x
Cannabis	304.3x and 305.2x
Cocaine	304.2x and 305.6x
Opioid	304.0x and 305.5x
Sedative, hypnotic, or anxiolytic	304.1x and 305.4x
Other or unknown substance(s)	304.5x, 304.6x, 304.8x, 304.9x, 305.3x, 305.9x
Comorbid psychiatric disorder	
Developmental disorder	299.x, 307.0, 307.2x, 307.3, 307.5x, 307.6, 307.7, 307.9, 309.21, 312.8, 312.9, 313.2x, 313.81, 313.89, 313.9, 314.x, 315.x, 317, 318.x, 319
Cognitive disorder	293.0, 290.x, 294.x, 780.0x
Psychotic disorder	293.81, 293.82, 295.x, 297.x, 298.x
Mood disorder	293.83, 296.x, 300.4, 301.1x, 311
Anxiety disorder	293.84, 293.89, 300.0x, 300.2x, 300.3, 308.3, 309.8x
Somatoform and/or dissociative disorder	300.11, 300.2x, 300.3, 300.4, 300.6, 300.7, 300.8x, 300.12, 300.14, 300.15, 307.8x
Personality disorder	301.0, 301.2x, 301.4, 301.5x, 301.6, 301.7, 301.8x, 301.9
Other psychiatric disorder	mental disorders due to a general medical condition, factitious disorders, sexual and gender identity disorders, eating disorders, sleep disorders, impulse-control disorders not else classified, and adjustment disorders

DSM-IV = Diagnostic and Statistical Manual of Mental Disorders 4th Edition

Table S2. Sociodemographic characteristics of questionnaire respondents

	Public Health Monitor respondents (2012 + 2016)		Health Survey respondents (2014 - 2019)		Questionnaire respondents (monitor + survey)	
	Reference (n=29,597)	Physicians (n=1,808)	Reference (n=2,712)	Physicians (n=139)	Reference (n=32,309)	Physicians (n=1,947)
Gender (n (%))						
Male	13,926 (47.1)	612 (33.8)	1,312 (48.4)	50 (36.0)	15,238 (47.2)	662 (34.0)
Female	15,671 (52.9)	1,196 (66.2)	1,400 (51.6)	89 (64.0)	17,071 (52.8)	1,285 (66.0)
Age in years (mean (SD))						
25 - 34 (n (%))	41.8 (10.7)	42.2 (10.3)	41.5 (10.6)	40.9 (9.0)	41.9 (10.7)	42.1 (10.2)
35 - 44 (n (%))	9,019 (30.5)	516 (28.5)	846 (31.2)	43 (30.9)	9,865 (30.5)	559 (28.7)
45 - 54 (n (%))	9,115 (30.8)	582 (32.2)	809 (29.8)	49 (35.3)	9,924 (30.7)	631 (32.4)
55 - 65 (n (%))	6,910 (23.3)	444 (24.6)	683 (25.2)	35 (25.2)	7,593 (23.5)	479 (24.6)
	4,553 (15.4)	266 (14.7)	374 (13.8)	12 (8.6)	4,927 (15.2)	278 (14.3)
Country of birth (n (%))						
The Netherlands	26,962 (91.1)	1,660 (91.8)	2,419 (89.2)	125 (89.9)	29,381 (90.9)	1,785 (91.7)
European	761 (2.6)	36 (2.0)	73 (2.7)	*	834 (2.6)	37 (1.9)
Non-European	1,874 (6.3)	112 (6.2)	220 (8.1)	*	2,094 (6.5)	125 (6.4)
Specialty group (n (%))						
General practice		432 (23.9)		34 (24.5)		466 (23.9)
(Psycho) social		250 (13.8)		21 (15.1)		271 (13.9)
Contemplative somatic	NA	383 (21.2)	NA	32 (23.0)	NA	415 (21.3)
Surgical and supportive		274 (15.2)		18 (12.9)		503 (25.8)
None		469 (25.9)		34 (24.5)		292 (15.0)
Educational background (n (%))						
Teaching	2,617 (8.8)		235 (8.7)		2,852 (8.8)	
Humanities and arts	2,956 (10.0)		265 (9.8)		3,221 (10.0)	
Social sciences, business and law	12,656 (42.8)		1,222 (45.1)		13,878 (43.0)	
Science, mathematics and computing	2,556 (8.6)	NA	218 (8.0)	NA	2,774 (8.6)	NA
Engineering, manufacturing and construction	2,899 (9.8)		235 (8.7)		3,134 (9.7)	
Agriculture and veterinary	693 (2.3)		48 (1.8)		741 (2.3)	
Health and welfare	4,209 (14.2)		339 (12.5)		4,548 (14.1)	
Services	516 (1.7)		51 (1.9)		567 (1.8)	

Table S2. Continued

	Public Health Monitor respondents (2012 + 2016)		Health Survey respondents (2014 - 2019)		Questionnaire respondents (monitor + survey)	
	Reference (n=29,597)	Physicians (n=1,808)	Reference (n=2,712)	Physicians (n=139)	Reference (n=32,309)	Physicians (n=1,947)
Working hours per week (n (%))						
Not working or less than 1	2,859 (9.7)	78 (4.3)	230 (8.5)	0 (0.0)	3,089 (9.6)	78 (4.0)
1 to 12	468 (1.6)	15 (0.8)	54 (2.0)	1 (0.7)	522 (1.6)	16 (0.8)
12 to 31	4,880 (16.5)	275 (15.2)	452 (16.7)	24 (17.3)	5,332 (16.5)	299 (15.4)
32 or more	19,880 (67.2)	1,348 (74.6)	1,976 (72.9)	114 (82.0)	21,856 (67.6)	1,462 (75.1)
Household income (n (%))						
1 st quintile (lowest income)	1,921 (6.5)	67 (3.7)	181 (6.7)	2 (1.4)	2,102 (6.5)	69 (3.5)
2 nd quintile	1,505 (5.1)	29 (1.6)	158 (5.8)	1 (0.7)	1,663 (5.1)	30 (1.5)
3 rd quintile	3,180 (10.7)	82 (4.5)	320 (11.5)	7 (5.0)	3,493 (10.8)	89 (4.6)
4 th quintile	6,285 (21.2)	247 (13.7)	609 (21.8)	25 (18.0)	6,875 (21.3)	272 (14.0)
5 th quintile (highest income)	16,371 (55.3)	1,373 (75.9)	1,483 (53.2)	104 (74.8)	17,812 (55.1)	1,477 (75.9)

n = number, NA = not applicable, SD = standard deviation.

* small numbers are not reported to prevent disclosure.

CHAPTER 3

Success rates of monitoring for healthcare professionals with a substance use disorder: a meta-analysis

Pauline M. Geuijen
Sophie J.M. van den Broek
Boukje A.G. Dijkstra
Joanneke M. Kuppens
Hein A. de Haan
Cornelis A.J. de Jong
Aart H. Schene †
Femke Atsma
Arnt F.A. Schellekens

Journal of Clinical Medicine. 2021;10(2):264

ABSTRACT

Introduction

In the past decades, monitoring programs have been developed for healthcare professionals with substance use disorders. We aimed to explore estimates of abstinence and work retention rates after participation in such monitoring programs.

Methods

A literature search was performed using PubMed, Embase, PsycINFO and CINAHL. Twenty-nine observational studies reporting on success rates (abstinence and work retention) of monitoring for healthcare professionals with a substance use disorder were included in the meta-analysis. Quality effects models calculated pooled success rates and corresponding 95%-confidence intervals, with subgroup analyses on monitoring elements and patient characteristics.

Results

Pooled success rates were 72% for abstinence (95%-CI=63%-80%) and 77% for work retention (95%-CI=61%-90%). Heterogeneity across studies was partly explained by the starting moment of monitoring, showing higher abstinence rates for studies that started monitoring after treatment completion (79%; 95%-CI=72%-85%) compared to studies that started monitoring with treatment initiation (61%; 95%-CI=50%-72%).

Conclusions

About three-quarters of healthcare professionals with substance use disorders participating in monitoring programs is abstinent during follow-up and working at the end of the follow-up period. Due to selection and publication bias, no firm conclusions can be drawn about the effectiveness of monitoring for healthcare professionals with substance use disorders.

INTRODUCTION

Substance Use Disorders (SUDs) are a major health burden, also among healthcare providers, not only affecting their own health, but also their professional image and potentially patient safety (Kunyk, 2015; Wallace, Lemaire, & Ghali, 2009). Although the prevalence of SUD in healthcare professionals is estimated to be similar to that in the general population (about 10%) (Kunyk, 2015; Oreskovich et al., 2015) they more often abuse alcohol and addictive medication, like sedatives and opioids, compared to other SUD patients (Hughes et al., 1992; Trinkoff, Eaton, & Anthony, 1991).

In the 1970s, the first so-called Physician Health Programs (PHPs) were initiated in the United States. PHPs aim to facilitate early identification and adequate treatment of psychiatric disorders, including SUD, among physicians (American Medical Association, 1973). Subsequently, health programs were established for other healthcare disciplines and in many more, mainly Western, countries across the globe (Braquehais, Tresidder, & DuPont, 2015; Brooks, Gerada, & Chalder, 2011). The content and scope of these health programs vary widely. In the United States (US), professionals are commonly referred to inpatient and/or outpatient treatment in regular care and participate in monitoring provided by the health program (DuPont, McLellan, White, Merlo, & Gold, 2009). In Europe, some programs mainly provide advice, others provide treatment themselves, and some offer monitoring (Braquehais et al., 2015). A key difference between US health programs and some European programs (e.g. in Norway, Spain, and the United Kingdom (UK)), is that European programs encourage voluntary help seeking by offering free services and that they have high rates of self-referrals (45%-75%) (Braquehais et al., 2015). Additionally, the UK program also guarantees confidentiality by not having any formal links with regulating authorities (Gerada, 2018).

Monitoring offers the opportunity to follow the rehabilitation of healthcare professionals with SUD by using biological testing as an objective measure for substance use or abstinence (Jarvis et al., 2017). Monitoring can be started simultaneously with treatment, as well as after successful treatment completion. In addition to biological monitoring of substance use, health programs might also monitor a participants' fitness to practice at work (by an employer or colleague) or require participation in self-help groups. Health programs usually report outcomes of rehabilitation in terms of abstinence or relapse, return to clinical practice, and/or program completion. A systematic review on rehabilitation outcomes for healthcare professionals found a variety of success rates: abstinence rates of 56% to 94% and work retention rates at the end of follow-up of 74% to 90% (Weenink, Kool, Bartels, & Westert, 2017). Previous research suggests that this variation in success rates might be influenced by both monitoring elements and participant characteristics (Knight, Sanchez, Sherritt,

Bresnahan, & Fromson, 2007; Weenink et al., 2017). Unfortunately, success rates in the systematic review were only presented as ranges per outcome and no thorough examination of the actual data was performed.

So far, there is no meta-analysis performed about success rates of monitoring for healthcare professionals with SUD. Therefore, the current meta-analysis aims to explore success rates of monitoring, using biological testing, for healthcare professionals with SUD, in terms of abstinence and work retention. Furthermore, we explored whether specific monitoring elements and/or participant characteristics explained heterogeneity in success rates across studies.

METHODS

Search strategy and selection criteria

For this meta-analysis a review protocol was written, but not published or pre-registered before the review was conducted. This protocol adopted a broad search strategy, in order to maximize identification of potentially relevant papers. The search strategy, including the definition of outcome measures, was based on a set of a priori identified publications on outcomes of PHPs. The search strategy was developed by a multidisciplinary team with expertise in bibliography (medical librarian), epidemiology (PG, SB, FA), and addiction studies (BD, AS). The search was performed on December 8, 2020 using the following databases: PubMed, Embase, PsycINFO and CINAHL.

To be eligible, studies were required 1) to aim at adult healthcare professionals with a SUD diagnosis, 2) to clearly describe their (biological) monitoring, and 3) to use well-defined outcome measures in terms of abstinence (no relapse during the follow-up period) and/or work retention (working at the end of the follow-up period). Studies were excluded if 1) they concerned tobacco use disorder only, 2) no biological testing was applied, 3) the study solely reported on outcomes of care as usual, or 4) when outcomes were assessed by surveying third parties (i.e. a survey distributed among anesthesia program directors). Studies were limited to English-language research articles published in peer-reviewed journals. Details of the search strategy can be found in Box 1.

Study selection, data extraction and quality assessment

A flow chart of the study selection procedure is provided in Figure 1. First, duplicates were removed, using Rayyan software for citation screening (Ouzzani, Hammady, Fedorowicz, & Elmagarmid, 2016). Next, three authors (PG, SB, and BD) screened 5,907 unique titles and abstracts on the selection criteria mentioned above. Discrepancies

Box 1. Search strategy*

<i>Population</i>	<p>(("Health personnel"[MeSH] OR "Medical staff"[MeSH] OR Dentist*[tiab] OR Doctor*[tiab] OR General practitioner*[tiab] OR Health personnel[tiab] OR Healthcare personnel[tiab] OR Healthcare provider*[tiab] OR Healthcare professional*[tiab] OR Medical staff[tiab] OR Nurse*[tiab] OR Nursing staff[tiab] OR Pharmacist*[tiab] OR Physician*[tiab] OR Physician assistant*[tiab]) AND ("Alcohol-related disorders"[MeSH] OR "Alcoholism"[MeSH] OR "Opioid-related disorders"[MeSH] OR "Substance-related disorders"[MeSH] OR Alcohol abuse*[tiab] OR Alcohol addict*[tiab] OR Alcohol dependen*[tiab] OR Alcohol impair*[tiab] OR Alcohol misuse[tiab] OR Alcohol use disorder*[tiab] OR Alcohol-related disorders[tiab] OR Alcoholism[tiab] OR Drug abuse*[tiab] OR Drug addict*[tiab] OR Drug dependen*[tiab] OR Drug impair*[tiab] OR Drug misuse[tiab] OR Drug use disorder*[tiab] OR Opiate abuse*[tiab] OR Opioid abuse*[tiab] OR Opiate addict*[tiab] OR Opioid addict*[tiab] OR Opiate dependen*[tiab] OR Opioid dependen*[tiab] OR Opiate impair*[tiab] OR Opioid impair*[tiab] OR Opiate misuse[tiab] OR Opioid misuse[tiab] OR Opioid-related disorders[tiab] OR Substance abuse*[tiab] OR Substance addict*[tiab] OR Substance dependen*[tiab] OR Substance impair*[tiab] OR Substance misuse[tiab] OR Substance use disorder*[tiab] OR Substance-related disorders[tiab])) OR ("Professional impairment"[MeSH] OR Dentist impair*[tiab] OR Doctor impair*[tiab] OR Nurse impair*[tiab] OR Pharmacist impair*[tiab] OR Physician impair*[tiab] OR Physician assistant impair*[tiab] OR Professional impairment[tiab])</p>
	AND
<i>Intervention</i>	<p>("Health services"[MeSH] OR "Occupational health"[MeSH] OR "Mental disorders"[MeSH] OR "Referral and consultation"[MeSH] OR Employee assistance program*[tiab] OR Employee health service*[tiab] OR Health agenc*[tiab] OR Health program*[tiab] OR Health service*[tiab] OR Occupational health[tiab] OR Occupational health service*[tiab] OR Mental disorders[tiab] OR Referral and consultation[tiab]) OR ("Biological monitoring"[MeSH] OR "Mental health recovery"[MeSH] OR "Psychiatric rehabilitation"[MeSH] OR Biological monitor*[tiab] OR Mental health rehabilitation[tiab] OR Mental health recovery[tiab] OR Physiologic monitor*[tiab] OR Psychiatric rehabilitation[tiab] OR Psychosocial rehabilitation[tiab] OR Recover*[tiab]) OR ("Self-help groups"[MeSH] OR Self-help group*[tiab] OR Support group*[tiab] OR Alcoholics anonym*[tiab] OR Narcotics anonym*[tiab])</p>
	AND
<i>Outcome</i>	<p>("Outcome assessment, health care"[MeSH] OR "Program evaluation"[MeSH] OR "Treatment outcome"[MeSH] OR Outcome assessment*[tiab] OR Outcome measure*[tiab] OR Program effect*[tiab] OR Program evaluation[tiab] OR Treatment effect*[tiab] OR Treatment failure*[tiab] OR Treatment outcome*[tiab] OR Recovery rate*[tiab] OR Rehabilitation outcome*[tiab]) OR ("Alcohol abstinence"[MeSH] OR "Recurrence"[MeSH] OR Abstinence[tiab] OR Alcohol abstinence[tiab] OR Drug abstinence[tiab] OR Opioid abstinence[tiab] OR Substance use abstinence[tiab] OR Recurrence[tiab] OR Relaps*[tiab]) OR ("Return to work"[MeSH] OR "Work performance"[MeSH] OR Job perform*[tiab] OR Job retention[tiab] OR Return to work[tiab] OR Work perform*[tiab] OR Work resum*[tiab] OR Work retention[tiab])</p>

* This strategy is related to the PubMed search. Very similar versions were used to search Embase, PsycINFO and CINAHL but adapted for the specific search terms used in these databases.

in the identified eligible records were discussed until consensus was reached. When in doubt, records moved on to the next phase of assessing the eligibility, based on the full-text articles. Full-text assessment of 94 remaining records was performed by two authors (PG and SB). Discrepancies were discussed until consensus was reached. This resulted in 29 studies eligible for the meta-analysis, published in 24 articles. Next, data-extraction was performed by one researcher (PG). The data of each study was documented in Microsoft Excel 2016, which was subsequently checked by a second researcher (SB).

Extracted information included study characteristics: name of first author, year of publication, country (state) of first author, design of the study, time frame of the study, number of included subjects, percentage of males, type of healthcare professional, type of substance use, and source of referral. In addition, characteristics of monitoring were summarized: name of the health program, recommended type of treatment, starting moment of monitoring, type of biological testing, monitoring at work, and additional agreements were extracted. Finally, the outcomes of monitoring programs were extracted: percentage of abstinence and work retention specified with the (exact or range of) duration of follow-up. Since the information was not always presented in the same manner, we categorized monitoring elements and participant characteristics in order to perform subgroup analyses: program elements (biological, at work, and additional agreements; biological and additional agreements; biological and at work; biological), starting moment of monitoring (before treatment; after treatment; unknown), duration of follow-up (less than 2 years; 2 to 5 years; more than 5 years; other duration), gender (more than 50% males; other or unknown), type of healthcare professional (more than 50% physicians; other or mixed), and type of substance use (more than 50% alcohol; more than 50% opioids; mixed or unknown).

All included studies were assessed on their quality in order to account for study quality in the meta-analysis. The initial assessment was performed by one researcher (PG), and subsequently checked by a second researcher (SB). The Health states Quality scale (Barendregt & Doi, 2016) was used to assess study quality. Assessment parameters include a clear definition of the target population and observation period (yes or no), use of diagnostic criteria (diagnostic system or symptom based/not specified), method of case selection (attempting all cases, convenience sampling, or not specified), type of outcome assessment (administered interview, register/case record, or not specified), size of the study area (broad, small, or not specified), and type of prevalence measure (exact follow-up duration, average follow-up duration, or range of follow-up duration). The quality index of each study is calculated as the total quality score of that study divided by the maximum total quality score, see Table S1. The instrument was slightly adjusted for a good fit to our meta-analysis. The higher the score, the higher the study

quality. We report our study in accordance with the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) and the proposal for reporting Meta-analyses of Observational Studies in Epidemiology (MOOSE) were applicable (Moher, Liberati, Tetzlaff, Altman, & Group, 2009; Stroup et al., 2000).

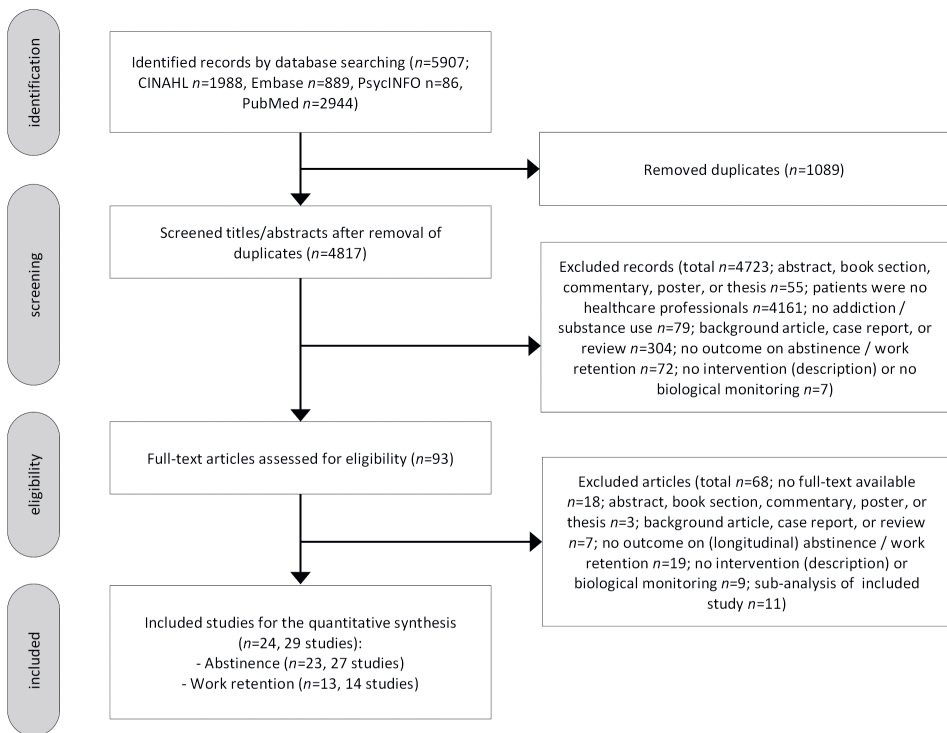


Figure 1. PRISMA flowchart of the selection of studies

Data-analysis

Statistical analyses were performed using MetaXL (version 5.3) within Microsoft Excel 2016 (Barendregt & Doi, 2016; Barendregt, Doi, Lee, Norman, & Vos, 2013). For every study, the total number of participants, the number of participants with a successful outcome (abstinence or work retention), and the quality index were entered in MetaXL. Quality effects models were used in order to address heterogeneity caused by differences in study quality. The quality effects model is a modified version of the fixed-effects inverse variance method and gives greater weight to the studies that were judged as being of high quality (Doi & Thalib, 2008). The models were applied to analyze

the data and calculate pooled abstinence and work retention rates, and accompanying 95%-Confidence Intervals (CI).

The heterogeneity assumption was assessed by Cochrane's Q-test (which verifies the presence of heterogeneity) and I² statistic (which shows the amount of heterogeneity between studies). A significant Q-test ($p < 0.10$) and an I² > 50% indicated the presence of substantial heterogeneity. Subgroup analyses were explored by stratifying the data on monitoring elements (start of monitoring, type of monitoring, and duration of follow-up) and participant characteristics (gender, type of healthcare professional, and type of substance use).

Publication bias was assessed using the Doi plot and Luis Furuya-Kanamori asymmetry (LFK) index. In case of a symmetric shape, no publication bias is indicated. In case of an asymmetric shape, publication bias is indicated. An LFK index within -1 and +1 indicates no publication bias, an LFK of -1 to -2 or +1 to +2 minor asymmetry, and an LFK of < -2 or > +2 major asymmetry (Barendregt & Doi, 2016).

RESULTS

Description of the included studies

The study and monitoring characteristics of the 29 included studies (out of 24 articles) are summarized in Table 1a and Table 1b. Studies were published between 1982 and 2020 and mainly conducted in the United States, one in Canada, one in Australia, and one in Spain. The design of most studies was observational (either retrospective or prospective data collection). One study had a descriptive design (survey among healthcare professionals engaged in a monitoring program), and one performed an experiment (single-arm multisite, open label study of injectable naltrexone in healthcare professionals with opioid dependence). None of the included studies used randomized controlled trial or quasi-experimental designs.

About half of the studies mainly included male subjects (14 studies) and physicians only (20 studies). The most commonly reported substances of abuse were opioids (22 studies) and alcohol (16 studies). Studies that indicated the source of referral to monitoring reported licensing boards (8 studies), employers (5 studies), colleagues (7 studies), family members (6 studies), treatment providers (2 studies), and self-referrals (9 studies). All health programs offered biological monitoring, whether or not in combination with monitoring at work (10 studies), and/or other monitoring arrangements (28 studies). Monitoring started either simultaneously with treatment initiation (8 studies) or after treatment completion (17 studies). Four studies did not indicate when monitoring started. Sample size varied widely between 11 to 904

healthcare professionals, with data available for a total of 3027 healthcare professionals for abstinence, and 1728 for work retention. Follow-up range also varied widely between 0 to 8 years; including 5 studies on abstinence and 2 studies on work retention with a follow-up of 5 years or more. The quality index of the included studies ranged from 0.2 to 0.9, see Table S1.

Abstinence

Abstinence rates in the individual studies ranged from 30% to 94% with a substantial heterogeneity across studies ($Q = 312.1$; $p < 0.001$; $I^2 = 92\%$). The overall pooled abstinence rate across studies was 72% (95%-CI = 63%-80%), with a follow-up duration up to 8 years, see Figure 2. When stratified by starting moment of monitoring, the subgroup analysis slightly reduced heterogeneity across studies and showed a higher abstinence rate among studies that started monitoring after treatment completion (79%; 95%-CI = 72%-85%; $Q = 74.0$; $p < 0.001$; $I^2 = 80\%$), compared to studies that started monitoring at treatment initiation (53%; 95%-CI = 40%-67%; $Q = 60.3$; $p < 0.001$; $I^2 = 88\%$).

Subgroup analyses on type of monitoring did slightly reduce heterogeneity across studies (Figure S1). Heterogeneity across studies was not significantly reduced by duration of follow-up, gender, type of healthcare professional, and type of substance use (Figure S2-S5). Risk of bias across studies was visualized in a Doi plot, indicating an asymmetric shape for the pooled abstinence rate (Figure S6). The LFK index was -1.59, also indicating minor publication bias.

Work retention

Work retention rates of the individual studies ranged from 43% to 96% with a substantial heterogeneity across studies ($Q = 162.7$; $p < 0.001$; $I^2 = 92\%$). The overall pooled work retention rate was 77% (95%-CI = 61%-90%), with a follow-up duration up to 8 years (Figure 3).

Subgroup analyses on type of monitoring and type of substance use did slightly reduce heterogeneity across studies (Figure S7 and Figure S11). Subgroup analyses on starting moment of monitoring, duration of follow-up, gender, and type of healthcare professional did not significantly reduce heterogeneity across studies (Figures 3, S8-S10). Risk of bias across studies was visualized in a Doi plot, indicating an asymmetric shape for the pooled work retention rate (Figure S12). The LFK index was -2.70, also indicating major publication bias.

Table 1a. Study characteristics

Year, study Country (state)	Design	Time frame	Subjects (n)	Males (%)	Type of healthcare professional (%)	Type of substance use (%)	Source of referral (%)
1982, Herrington et al. US (Wisconsin)	retrospective review	1979-1982	40	95	general practitioner (28); anesthesiologist (13); psychiatrist (10); internal medicine (8); dentist (8); obstetrics-gynecology (8); surgeon (5); other (20)	alcohol (58); narcotics (38); other (5)	co-worker (63); family member (18); legal system (13); self-referral (8)
1984, Washton et al. US (New York, New Jersey)	retrospective review	1979-1981	15	100	physician (100)	opioids (100)	-
1985, Crowley US (Colorado)	prospective descriptive	-	15	100	physician (60); dentist (33); veterinarian (7)	-	licensing board (40); hospital or co-workers (33); family member (7); treatment provider (7); self-referral (13)
1987, Shore US (Oregon)	retrospective review	1977-1985	25	-	physician (100)	-	-
1991, Pelton & Ikeda US (California)	retrospective review	1980-1990	51	-	anesthesiologist (100)	opioids (49)	-
1992, Gallegos et al. US (Georgia)	retrospective review	1982-1992	100	92	family and general practitioner (23); surgeon (22); anesthesiologist (17); psychiatrist (15); internal medicine (12); emergency medicine (4); pediatrician (3); radiologist (1); dermatologist (1); occupational medicine (1); rehabilitation medicine (1)	alcohol (71); cocaine (21); meperidine hydrochloride (19); diazepam (18); marijuana (17); percodan (12); fentanyl citrate (11); codeine sulfate (9); amphetamine (7)	-
1994, Roy US (Louisiana)	retrospective review	>1989	37	89	physician (68); dentist (16); pharmacist (5); veterinarian (3); other (8)	prescription drug (43); alcohol (27); polysubstance (16); cocaine (14)	-
1996, Nelson et al. (1) US (Oregon)	retrospective review	1990-1992	56	91	surgery (59); internal medicine (32); family practitioner (21); emergency medicine (7); anesthesiology (6); pathology (4); pediatrician (4); obstetrics-gynecology (3); psychiatry (2); neurology (2); dermatology (1); radiology (1); unknown (1)	alcohol (75); opioids and cocaine (21); amphetamines and sedatives (4)	self-referral (15); immediate contact (39); third party (46)
1996, Nelson et al. (2) US (Oregon)	retrospective review	1990-1992	41	90	psychiatry (2); neurology (2); dermatology (1); radiology (1); unknown (1)	alcohol (87); opioids and cocaine (8); amphetamines and sedatives (5)	self-referral (7); immediate contact (15); third party (73); unknown (5)
1997, Roth et al. US (Connecticut)	retrospective review	-	20	15	nurse (85); anesthesiology nurse (10); pharmacist (5)	opioids (100); alcohol (85); cocaine (40); benzodiazepines (30)	licensing board (90); self-referral (10)
1999, Paris & Canavan (1) US (New Jersey)	retrospective review	1982-1994	32	-	anesthesiologist (59); anesthesiology residents (41)	opioids (78)	-
1999, Paris & Canavan (2) US (New Jersey)	retrospective review	1982-1994	36	-	physician (75); resident (25)	opioids (42)	-

Table 1a. Continued

Year, study Country (state)	Design	Time frame	Subjects (n)	Males (%)	Type of healthcare professional (%)	Type of substance use (%)	Source of referral (%)
2004, Warhaft Australia	retrospective review	2001-2004	58	86	general practitioner (34); anesthesiologist (10); surgeon (7); pathologist (5); radiologist (5); physician (3); obstetrics-gynecology (2); occupational medicine (2); pediatrician (2); psychiatry (2); other (28)	alcohol (36); pethidine (31); heroin (12); codeine (5); benzodiazepines (5); amphetamines (3); cocaine (3); nitrous oxide (2); ketamine (2)	-
2005, Domino et al. US (Washington)	retrospective cohort	1991-2001	292	84	physician (79); physician assistant (11); veterinarian (5); osteopath (2); dentist/dental surgeon (1); podiatrist/ pharmacist (1)	alcohol (56); opioids (32); cocaine (3); benzodiazepines (2); other (7)	-
2005, Ganley et al. (1) US (North Carolina)	retrospective review	1991-2001	233	87	physician (100)	alcohol (50); opioids (25); polysubstance (16); other (8)	licensing board; hospital; co-worker; family member; self-referral
2005, Ganley et al. (2) US (North Carolina)	retrospective review	1991-2001	34	74	physician assistant (100)	alcohol (44); opioids (35); polysubstance (6); other (15)	licensing board; hospital; co-worker; family member; self-referral
2006, Clark et al. US (Idaho)	retrospective review	1985-2000	147	18	registered nurse (57); licensed practical nurse (38); advanced practice registered nurse (3)	alcohol (72); legal oral opioids (45); inhalants (8); stimulants (23); marijuana (21); legal injected narcotics (31); illegal injected opioids (33); prescription drugs (20)	employer (50); licensing board (14); co-worker (6); treatment provider (6); self-referral (14)
2007, Galanter et al. US (New York; Nevada)	retrospective review	2003-2004	104	92	anesthesiologist (21); internal medicine (15); surgeon (14); family practitioner (10); obstetrics-gynecology (9); pediatrician (8); psychiatrist (8); general practitioner (4); emergency medicine (4); radiologist (3); other (5)	alcohol (36); opioids (34); other or mixed (30)	-
2007, Knight et al. US (Massachusetts)	retrospective observations	1993-2003	132	82	internal medicine (31); psychiatrist (12); surgeon (12); anesthesiologist (11); emergency medicine (8); family practitioner (6); obstetrics-gynecology (6); radiologist (4); pediatrician (3); other (6)	-	-
2008, Brewster et al. Canada	prospective descriptive	1995-2007	100	90	general or family practitioner (51); specialist (49)	alcohol (51); opioids (37); other (13)	-
2009, DuPont et al. US (Maryland; Pennsylvania; Indiana; Florida)	retrospective review	1995-2001	904	86	family practitioner (20); internal medicine (13); anesthesiologist (11); emergency medicine (7); psychiatrist (7); other (42)	alcohol (50); opioids (33); stimulants (8); other (9)	licensing board, hospital, malpractice insurance company (55); family member, co-worker, employer (45)

Table 1a. Continued

Year, study Country (state)	Design	Time frame	Subjects (n)	Males (%)	Type of healthcare professional (%)	Type of substance use (%)	Source of referral (%)
2009, Fogger & Mc-Guinness (1) US (Alabama)	cross-sectional survey	-	127	-	registered nurse (77); licensed practical nurse (13); advanced practice registered nurse (8)	opioids (36)	-
2009, Fogger & Mc-Guinness (2) US (Alabama)	cross-sectional survey	-	45	-	registered nurse (78); licensed practical nurse (18); advanced practice registered nurse (4)	-	-
2011, Merlo et al. US (Florida)	retrospective review	≥ 2005	11	100	anesthesiologist (100)	opioids (100)	-
2013, Angres et al. US (Illinois)	prospective cohort	-	116	68	physician (48); nurse (24); pharmacist (18); dentist (7); optometrist (1); physician assistant (1); other (1)	-	licensing board (100)
2013, Cross et al. US (Illinois)	prospective descriptive	1994-2011	116	78	pharmacist (100)	oral opioids (71); alcohol (22); illegal drugs (9); stimulants (8); injected opioids (3)	-
2017, Earley et al. US (Georgia)	single-arm multisite, open label	2009-2012	38	18	nurse (79); physician (11); pharmacist (3); other (8)	opioids (100)	-
2020, Bruguera et al. Spain	prospective descriptive	2008-2016	126	60	family practitioner (17); psychiatrist (9); anesthesiologist (9); pediatrician (6); orthopedic surgeons (6); internal medicine (3); resident (4); other (47)	alcohol (63); sedatives, hypnotics, anxiolytics (15); opioids (7); stimulants (6); cannabis (4); cocaine (2); mixed (3)	self-referral (75); co-worker or family member (20); other (6)

n = number, US = United States.

Table 1b. Characteristics of monitoring

Year, study	Name of the health program	Recommended type of treatment	Monitoring elements			Monitoring outcomes	
			Start of monitoring	Biological monitoring	Monitoring at work	Other agreements	Follow-up : % abstinence
1982, Herrington et al.	Impaired Physician Treatment Program	inpatient (95%)	after treatment completion	urine	yes	- participate in Alcoholics or Narcotics Anonymous groups - attendance of local meetings in the community - attendance of weekly sessions of Milwaukee Doctors in Alcoholics Anonymous	0 to 3 years : 68% no relapse 0 to 3 years : 78% working
1984, Washton et al.	Regent or Fair Oaks Hospital	inpatient 4-10 weeks	after treatment completion	urine	-	- pharmacotherapy with naltrexone - group therapy - individual therapy - family/couples therapy	0 to 1.5 years : 87% no relapse 0 to 1.5 years : 87% working
1985, Crowley	Halsted Clinic	outpatient	with treatment initiation	urine	-	- counseling sessions	2 years (average) : 47% no relapse
1987, Shore	rehabilitation program	-	-	urine	-	- long term supervision by the medical board	0 to 8 years : 75% working
1991, Pelton & Ikeda	California Physicians Diversion Program	-	with treatment initiation	urine	yes	- attendance of two diversion group meetings per week - two or more 12-step meetings per week	3 to 5 years : 51% no relapse 18% brief relapse
1992, Gallegos et al.	Georgia Impaired Physicians Program continuing care program	Georgia Impaired Physicians Treatment Program	after treatment completion	urine	-	- primary care physician attends to their medical needs - recovery mentor - five Alcoholics or Narcotics Anonymous meetings per week - one Caduceus Club meeting per week	more than 5 years : 77% no relapse more than 5 years : 91% working

Table 1b. Continued

Year, study	Name of the health program	Recommended type of treatment	Monitoring elements			Monitoring outcomes		
			Start of monitoring	Biological monitoring	Monitoring at work	Monitoring Other agreements	Follow-up: % abstinence	Follow-up: % work retention
1994, Roy	reentry monitoring	-	after treatment completion	urine	-	- group therapy	2-years (average): 81% no relapse 8% brief relapse	2-years (average): 95% working
1996, Nelson et al. (1)	Diversion Program	inpatient and/or outpatient	after treatment completion	urine	-	- group therapy	1.5 years (average): 86% no relapse	-
1996, Nelson et al. (2)	Probationary Program	inpatient and/or outpatient	after treatment completion	urine	-	- group therapy	2.3 years (average): 78% no relapse	-
1997, Roth et al.	special treatment program	inpatient and/or outpatient	with treatment initiation	urine	-	- pharmacotherapy with naltrexone for 6 months	1.8 years (average): 60% no relapse	1.8 years (average): 60% working
1999, Paris & Canavan (1)	Physician Health Program	-	after treatment completion	urine	-	- participate in an aftercare group for 1 year - monthly face-to-face appointment with Physician Health Program employee - attendance of Alcoholics Anonymous meetings	7.8 years (average): 59% no relapse	-
1999, Paris & Canavan (2)	Physician Health Program	-	after treatment completion	urine	-	- participate in an aftercare group for 1 year - monthly face-to-face appointment with Physician Health Program employee - attendance of Alcoholics Anonymous meetings	7.2 years (average): 56% no relapse	-

Table 1b. Continued

Year, study	Name of the health program	Recommended type of treatment	Monitoring elements			Monitoring outcomes		
			Start of monitoring	Biological monitoring	Monitoring at work	Other agreements	Follow-up: % abstinence	Follow-up: % work retention
2004, Warhaft	Case Management, Aftercare and Monitoring Program	-	after treatment completion	urine and/or breath	yes	- attendance at Caduceus group - attendance at mutual help group (Alcoholics or Narcotics Anonymous)	0 to 3 years: 79% 0 to 3 years: 78% relapse	0 to 3 years: 78% 0 to 3 years: 78% working
2005, Domino et al. (1)	Washington Physician Health Program	-	after treatment completion	urine	yes	- frequent contact for behavioral assessment - regulatory board reports	0 to 5 years: 78% 0 to 5 years: 78% no relapse	-
2005, Domino et al. (2)	Washington Physician Health Program	-	after treatment completion	urine	yes	- frequent contact for behavioral assessment - regulatory board reports	more than 5 years: 68% more than 5 years: 68% no relapse	more than 5 years: 88% more than 5 years: 88% working
2005, Ganley et al. (1)	North Carolina Physician Health Program	inpatient and/or outpatient	-	urine hair	-	- meetings with volunteer monitor - participate in Alcoholics Anonymous and other self-help groups - participate in Caduceus meetings	1 to 6 years: 65% 1 to 6 years: 65% no relapse	-
2005, Ganley et al. (2)	North Carolina Physician Health Program	inpatient and/or outpatient	-	urine hair	-	- meetings with volunteer monitor - participate in Alcoholics Anonymous and other self-help groups - participate in Caduceus meetings	1 to 6 years: 50% 1 to 6 years: 50% no relapse	-
2006, Clark et al.	Program for Recovering Nurses	mainly outpatient (69%)	with treatment initiation	urine	yes	- aftercare counseling - attendance at recovery nursing support groups	3.8 years (average): 48% 3.8 years (average): 48% no relapse	3.8 years (average): 43% 3.8 years (average): 43% working
2007, Galanter et al.	Committee for Physician Health	inpatient and/or outpatient	with treatment initiation	urine	yes	- 12-step/therapy monitor	3.4 years (average): 63% 3.4 years (average): 63% no relapse	-

Table 1b. Continued

Year, study	Name of the health program	Recommended type of treatment	Monitoring elements			Monitoring outcomes		
			Start of monitoring	Biological monitoring	Monitoring at work	Monitoring Other agreements	Follow-up: % abstinence	Follow-up: % work retention
2007, Knight et al.	Physician Health Services	individual psychotherapy	with treatment initiation	urine	yes	- attendance at Caduceus meetings or Alcoholics Anonymous	0 to 3 years : 56% no relapse	-
2008, Brewster et al.	Ontario Physician Health Program	usually inpatient abstinence based 4-6 weeks	after treatment completion	urine	yes	- visits to addiction medicine doctor - visits to a family doctor for routine health needs - attendance at mutual support groups in community	5 years (exact) : 71% no relapse and 14% brief relapse	-
2009, DuPont et al.	16 American Physician Health Programs	inpatient and/or outpatient	after treatment completion	urine	-	- participate in Alcoholics or Narcotics Anonymous groups - participate in aftercare groups - follow-up from Physician Health Program monitor	4.5 years (average): 78% no relapse	4.5 years (average): 72% working
2009, Fogger & McGuinness (1)	Voluntary Discipline Alternative Program	inpatient and/or outpatient	after treatment completion	urine	-	- attendance of 12-steps meetings at least three times per week - attendance aftercare meeting at least one time per week for one year	3 years (average): 94% no relapse	2.5 years (average): 90% working
2009, Fogger & McGuinness (2)	Probationary Program	inpatient and/or outpatient	after treatment completion	urine	-	-	3.4 years (average): 91% no relapse	4.4 years (average): 96% working
2011, Merlo et al.	Professional Resource Network	-	after treatment completion	urine	-	- pharmacotherapy with naltrexone for at least 2 years	3.4 years (average): 91% no relapse	3.4 years (average): 82% working

Table 1b. Continued

Year, study	Name of the health program	Recommended type of treatment	Monitoring elements			Monitoring outcomes		
			Start of monitoring	Biological monitoring	Monitoring at work	Monitoring Other agreements	Follow-up : % abstinence	Follow-up : % work retention
2013, Angres et al.	After-Care program	abstinence based 6-8 weeks	after treatment completion	urine	-	- participate in Caduceus aftercare group weekly	2 years (exact): 73% no relapse	-
2013, Cross et al.	Chicago treatment program for professionals	inpatient abstinence based 8-10 weeks	after treatment completion	urine	-	- participate in Alcoholics or Narcotics Anonymous groups - participate in Caduceus aftercare group - follow-up from Physician Health Program monitor	2 years (exact): 87% no relapse	-
2017, Earley et al.	Injectable extended-release naltrexone	intensive outpatient	with treatment initiation	urine	-	- attendance at mutual support meetings	2 years (exact): 89% no relapse	2 years (exact) : 63% working
2020, Bruguera et al.	Galatea Addiction Programme	inpatient (62%) and/or outpatient 7-8 weeks	with treatment initiation	urine hair	yes	- participate in psychotherapy group weekly	2 years (average): 30% no relapse	-

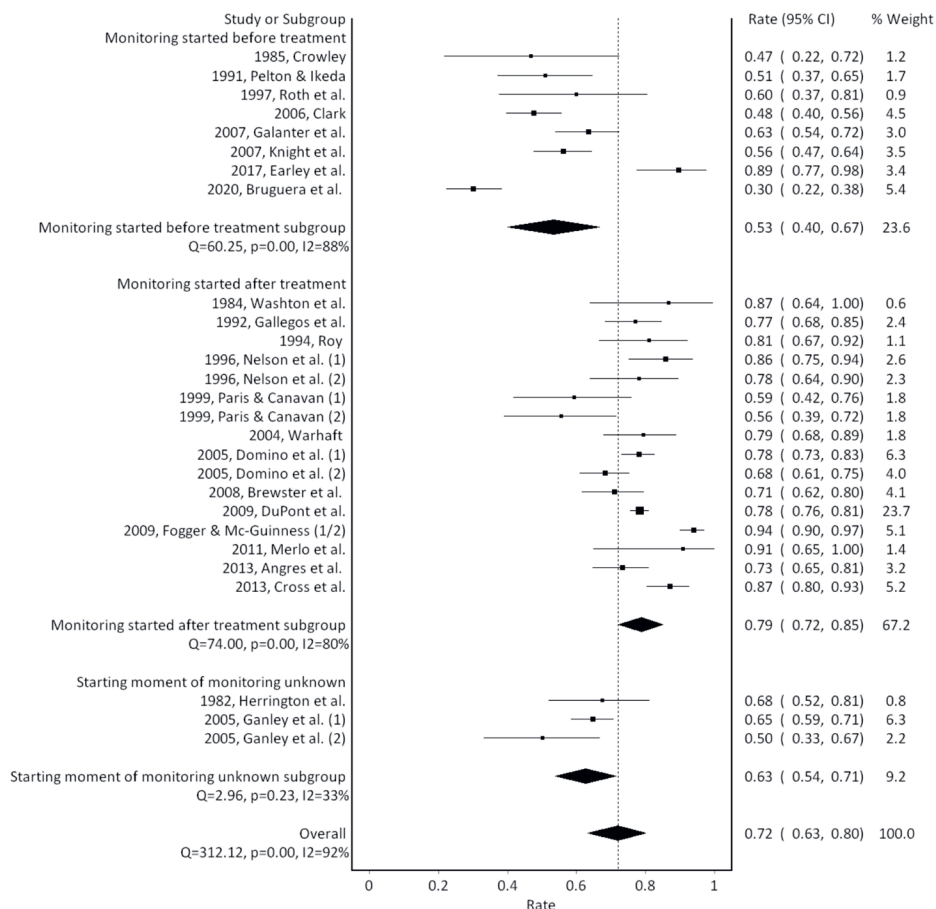


Figure 2. Forest plot of the pooled abstinence rate - subgroup analysis based on starting moment of monitoring

DISCUSSION

This study aimed to identify the success rate of monitoring for healthcare professionals with SUD, as indexed by abstinence and work retention. Furthermore, possible explaining variables for heterogeneity were explored. On average, three quarters of the healthcare professionals who engaged in a monitoring program remained abstinent and was working at follow-up. Follow-up duration varied widely between 0 to 8 years. We identified significant heterogeneity across studies, as well as indication for publication bias. Heterogeneity within abstinence rates was partly explained by the starting moment of monitoring. Monitoring that started after successful initial

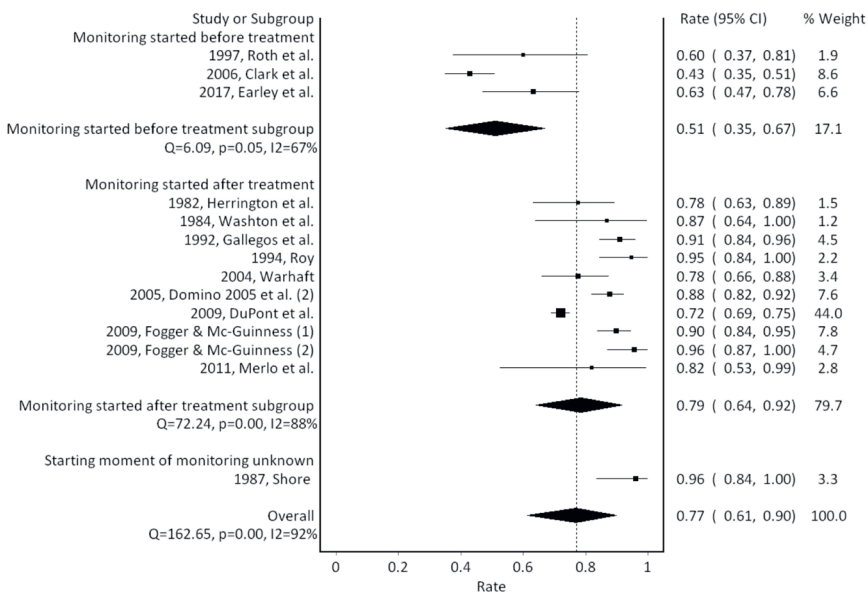


Figure 3. Forest plot of the pooled work retention rate - subgroup analysis based on starting moment of monitoring

treatment had better outcomes compared to those that started monitoring simultaneously with treatment. Duration of follow-up, gender, and type of healthcare professional did not significantly decrease the heterogeneity in success rates.

Unfortunately, none of the included studies used a randomized control trial or quasi-experimental design, and due to the naturalistic design of the studies included in this meta-analysis we cannot draw firm conclusions on the effectiveness of monitoring programs for healthcare professionals with SUD. If the actual effectiveness of monitoring turns out to be comparable to the success rates we found, this would be promising. In general, SUD patients show relapse rates over 50% within the first year after treatment initiation, and they remain at increased risk for relapse throughout the early years of recovery (Miller, Walters, & Bennett, 2001; National Institute on Drug Abuse, 2012; van Wamel, Croes, van Vugt, & van Rooijen, 2014). Professionals in monitoring were thus about 1.5 times more successful in maintaining abstinence when compared to regular addiction care patients without monitoring. Biological monitoring has also been applied in regular addiction care patients, showing a one-year abstinence rate of 46% (McKay, Knepper, Deneke, O'Reilly, & DuPont, 2016; McKay, Knepper, Deneke, O'Reilly, & DuPont, 2017). This is far less successful as observed here among healthcare professionals. This may be partly attributed to the starting moment of

monitoring (during treatment), but might also be the result of a difference in effectiveness of the intervention. Furthermore, work retention is a major incentive for healthcare professionals, which might apply to a lesser extent in regular addiction care patients. Indeed, studies on Contingency Management (CM) and Community Reinforcement Approach (CRA) indicate that positive reinforcement increases abstinence rates (Fazzino, Bjorlie, & Lejuez, 2019).

We only included studies that applied biological monitoring of substance use. Biological testing is the most reliable and objective measure for abstinence (Jarvis et al., 2017). The studies included in this meta-analysis mostly reported urine toxicology as method of biological testing. Yet, abstinence rates might be inflated due to false-negative urine toxicology (Kale, 2019). On the other hand, biological testing might be more effective in promoting abstinence than self-report. Indeed, studies on monitoring without biological testing among healthcare professionals showed somewhat less positive results (i.e. abstinence rates ranging from 13% to 76% and work retention rates ranging from 36% to 89%) (Brooks, Gerada, & Chalder, 2013; Gross, Wolff, Strang, & Marshall, 2009; Johnson & Connelly, 1981; Kliner, Spicer, & Barnett, 1980; Lloyd, 2002; Morse, Martin, Swenson, & Niven, 1984; Murray, 1976; Smith & Smith, 1991; Stuyt, Gundersen, Shore, Brooks, & Gendel, 2009; Wilson et al., 2008). This might indicate that monitoring programs should preferably include biological monitoring of substance use.

Heterogeneity in abstinence rates across studies was partially explained by the starting moment of monitoring. This suggests a potential source of selection bias, depending on the timing of monitoring. Participants who start monitoring after successful treatment completion might be strongly motivated to achieve abstinence and have high chances to maintain their good treatment outcome. Moreover, the group who starts monitoring simultaneously with treatment initiation also includes participants who will drop out of treatment, or relapse during treatment. This will lead to lower success rates of monitoring. Indeed, many continuing care studies limited their participants to those who had successfully completed the initial treatment phase, thus introducing selection bias (Blodgett, Maisel, Fuh, Wilbourne, & Finney, 2014). Other variables included in the subgroup analyses (duration of follow-up, gender, and type of healthcare professional) did not explain a substantial part of the heterogeneity across studies. Unfortunately, the data reported in the included studies did not enable us to perform subgroup analyses on type of initial treatment (inpatient, outpatient, pharmacological intervention, etc.) and on the mandatory status of monitoring.

Several other sources of bias might affect our findings. First, it has been suggested that many physicians who are forced to participate in a PHP might not actually have a SUD (Lawson & Boyd, 2018). Not all PHPs use diagnostic criteria to assess their participants. Indeed, more than two-thirds of the studies included in our meta-analysis

did not specify the diagnostic process of SUD assessment. Secondly, some of the studies we included did not take into account participants who were lost to follow-up in calculating the overall success rate of monitoring. It is unclear how this may have influenced the outcomes. Participants may have become lost to follow-up either because they are doing well and feel they no longer need monitoring or, on the other end of the spectrum, because they have relapsed and cannot be located or do not want to reveal their condition (Blodgett et al., 2014). Thirdly, the duration of follow-up varied widely within and between the included studies and durations were either presented as range, average, or exact follow-up between 0 to 8 years. A follow-up of 0 years meant that some participants recently started monitoring, whereas other participants in the same study were followed-up for 3 or 5 years. Fourthly, three very small studies either showed high (Merlo et al., 2011; Washton et al., 1984) or low (Crowley, 1985) success rates, thereby possibly skewing the results. Though some success rates changed slightly, the sensitivity analyses showed that the main findings still hold, indicating the robustness of findings. Lastly, our meta-analysis showed asymmetry for both abstinence and work retention, suggesting publication bias. Taken together, this raises concerns of potential overestimation of the effectiveness of monitoring in the current literature (Lawson & Boyd, 2018). In order to reduce reporting and publication bias, we strongly encourage health programs to systematically assess effectiveness and publish about the outcomes of their monitoring.

The current study results should be interpreted in the light of several limitations. First, we identified a considerable amount of heterogeneity between studies, but were able to explain only a small fraction by the starting moment of monitoring. Other potential sources of heterogeneity like the severity of the SUD, the presence of comorbidity, a (family) history of SUD, the type of initial treatment (inpatient, outpatient, pharmacological and/or psychological intervention), and the status of monitoring (mandatory or voluntary) could not be analyzed since this information was generally not available across studies (Clark & Farnsworth, 2006; Domino et al., 2005; Mumba, Baxley, CIPHER, & Snow, 2019). Secondly, we included only English-language research articles published in peer-reviewed journals. This might have increased bias in our study results, because we did not include foreign language studies, unpublished studies, partially published studies, and studies published in 'grey' literature sources (Higgins et al., 2019). Thirdly, the definition of the abstinence outcome measure (no relapse during follow-up) was quite strict, so some abstinence rates included in the meta-analysis were lower than reported in the conclusions of the individual studies. Furthermore, the overall quality of the included studies was moderate, with 60% of the studies scoring 0.5 or lower on the Quality Index. Thus, future studies with more rigorous designs are highly needed, in order to support effectiveness of monitoring

for healthcare professionals with SUD. Finally, we focused only on healthcare professionals with SUD. Therefore, we cannot say anything about behavioral addictions or other psychiatric problems among healthcare professionals. Yet, some studies investigated the success of monitoring for other psychiatric problems among healthcare professionals, showing high recovery rates ranging from 88% to 94% and work retention rates ranging from 77% to 90% (Weenink et al., 2017). The current positive findings may thus indicate good prognosis of mental health issues in general among healthcare professionals.

Conclusions

Three quarters of the healthcare professionals who engaged in monitoring for SUD remained abstinent and was working at follow-up. There was significant heterogeneity across studies, as well as indication for major publication bias. The heterogeneity in success rates of monitoring was slightly explained by the starting moment of monitoring, with studies starting monitoring after treatment completion showing higher success rates than studies starting monitoring at treatment initiation. Given the heterogeneity across studies and indication for major publication bias, no firm conclusions can be drawn about the effectiveness of monitoring for healthcare professionals with SUD. Future studies should apply controlled comparisons, using more rigorous measurements and substantially long follow-up rates.

Author contributions

Conceptualization, P.G., S.B., B.D., J.K., A.H.S, F.A., A.F.S.; methodology, P.G., F.A. and A.F.S.; validation, P.G., S.B. and B.D.; formal analysis, P.G. and F.A.; investigation, P.G., S.B. and B.D.; data curation, P.G.; writing - original draft preparation, P.G.; writing - review and editing, S.B., B.D., J.K., H.H., C.J., A.H.S., F.A. and A.F.S.; visualization, P.G.; supervision, A.F.S., F.A., and A.H.S.; project administration, P.G. and A.F.S; funding acquisition, A.F.S, C.J., and H.H. All authors have read and agreed to the published version of the manuscript.

Acknowledgements

The authors wish to thank Marlies de Rond, PhD from the Royal Dutch Medical Association for facilitating the writing and discussion process.

Data availability

Data is contained within the supplementary material (Dataset S1: Search strategy, Dataset S2: Forest plots abstinence, Dataset S3: Forest plots work retention).

Conflicts of interest

The authors declare no conflict of interest.

Funding

This study was funded by a grant of the Dutch Ministry of Health, Welfare and Sport (grant number 328622) to the Royal Dutch Medical Association.

REFERENCES

- American Medical Association. (1973). The sick physician. Impairment by psychiatric disorders, including alcoholism and drug dependence. *JAMA*, *223*(6), 684-687.
- Angres, D., Bologeorges, S., & Chou, J. (2013). A two year longitudinal outcome study of addicted health care professionals: an investigation of the role of personality variables. *Subst Abuse*, *7*, 49-60. doi:10.4137/sart.s10556.
- Barendregt, J. J., & Doi, S. A. (2016). MetaXL User Guide.
- Barendregt, J. J., Doi, S. A., Lee, Y. Y., Norman, R. E., & Vos, T. (2013). Meta-analysis of prevalence. *J Epidemiol Community Health*, *67*(11), 974-978. doi:10.1136/jech-2013-203104.
- Blodgett, J. C., Maisel, N. C., Fuh, I. L., Wilbourne, P. L., & Finney, J. W. (2014). How effective is continuing care for substance use disorders? A meta-analytic review. *J Subst Abuse Treat*, *46*(2), 87-97. doi:10.1016/j.jsat.2013.08.022.
- Braquehais, M. D., Tresidder, A., & DuPont, R. L. (2015). Service provision to physicians with mental health and addiction problems. *Curr Opin Psychiatry*, *28*(4), 324-329. doi:10.1097/ycp.000000000000166.
- Brewster, J. M., Kaufmann, I. M., Hutchison, S., & MacWilliam, C. (2008). Characteristics and outcomes of doctors in a substance dependence monitoring programme in Canada: Prospective descriptive study. *BMJ: British Medical Journal*, *337*(7679).
- Brooks, S. K., Gerada, C., & Chalder, T. (2011). Review of literature on the mental health of doctors: are specialist services needed? *J Ment Health*, *20*(2), 146-156. doi:10.3109/09638237.2010.541300.
- Brooks, S. K., Gerada, C., & Chalder, T. (2013). Doctors and dentists with mental ill health and addictions: outcomes of treatment from the Practitioner Health Programme. *J Ment Health*, *22*(3), 237-245. doi:10.3109/09638237.2012.734647.
- Bruguera, E., Heredia, M., Llavayol, E., Pujol, T., Nieva, G., Valero, S., . . . Braquehais, M. D. (2020). Integral Treatment Programme for Addicted Physicians: Results from the Galatea Care Programme for Sick Physicians. *European Addiction Research*, *26*(3), 122-130.
- Clark, C., & Farnsworth, J. (2006). Program for recovering nurses: an evaluation. *Medsurg Nurs*, *15*(4), 223-230.
- Cross, W., Bologeorges, S., & Angres, D. (2012). Issues and data associated with addictive disease in pharmacists. *American Journal on Addictions*, *21*(4), 383. doi:http://dx.doi.org/10.1111/j.1521-0391.2012.00241.x
- Crowley, T. J. (1985). Doctors' drug abuse reduced during contingency-contracting treatment. *Alcohol Drug Res*, *6*(4), 299-307.
- Doi, S. A., & Thalib, L. (2008). A quality-effects model for meta-analysis. *Epidemiology*, *19*(1), 94-100. doi:10.1097/EDE.0b013e31815c24e7.
- Domino, K. B., Hornbein, T. F., Polissar, N. L., Renner, G., Johnson, J., Alberti, S., & Hankes, L. (2005). Risk factors for relapse in health care professionals with substance use disorders. *JAMA*, *293*(12), 1453-1460. doi:10.1001/jama.293.12.1453.
- DuPont, R. L., McLellan, A. T., White, W. L., Merlo, L. J., & Gold, M. S. (2009). Setting the standard for recovery: Physicians' Health Programs. *J Subst Abuse Treat*, *36*(2), 159-171. doi:10.1016/j.jsat.2008.01.004.
- Earley, P. H., Zummo, J., Memisoglu, A., Silverman, B. L., & Gastfriend, D. R. (2017). Open-label study of injectable extended-release naltrexone (XR-NTX) in healthcare professionals with opioid dependence. *J Addict Med*, *11*(3), 224-230. doi:http://dx.doi.org/10.1097/ADM.0000000000000302.
- Fazzino, T. L., Bjorlie, K., & Lejuez, C. W. (2019). A systematic review of reinforcement-based interventions for substance use: Efficacy, mechanisms of action, and moderators of treatment effects. *J Subst Abuse Treat*, *104*, 83-96. doi:10.1016/j.jsat.2019.06.016.
- Fogger, S. A., & McGuinness, T. (2009). Alabama's nurse monitoring programs: the nurse's experience of being monitored. *J Addict Nurs*, *20*(3), 142-149.
- Galanter, M., Dermatis, H., Mansky, P., McIntyre, J., & Perez-Fuentes, G. (2007). Substance-abusing physicians: monitoring and twelve-step-based treatment. *Am J Addict*, *16*(2), 117-123. doi:10.1080/10550490601184456.
- Gallegos, K. V., Lubin, B. H., Bowers, C., Blevins, J. W., Talbott, G. D., & Wilson, P. O. (1992). Relapse and recovery: five to ten year follow-up study of chemically dependent physicians--the Georgia experience. *Md Med J*, *41*(4), 315-319.
- Ganley, O. H., Pendergast, W. J., Wilkerson, M. W., & Mattingly, D. E. (2005). Outcome study of substance impaired physicians and physician assistants under contract with North Carolina Physicians Health Program for the period 1995-2000. *J Addict Dis*, *24*(1), 1-12. doi:10.1300/J069v24n01_01.

- Gerada, C. (2018). *The wounded healer: report on the first 10 years of Practitioner Health Service*. Retrieved from London.
- Gross, S. R., Wolff, K., Strang, J., & Marshall, E. J. (2009). Follow-up of provision of inpatient treatment for UK healthcare professionals with alcohol dependence: Snapshot of a pilot specialist national health service. *Subst Use Misuse*, *44*(13), 1916-1925. doi:<http://dx.doi.org/10.3109/10826080902961609>.
- Herrington, R. E., Benzer, D. G., Jacobson, G. R., & Hawkins, M. K. (1982). Treating substance-use disorders among physicians. *JAMA*, *247*(16), 2253-2257.
- Higgins, J. P. T., Thomas, J., Chandler, J., Cumpston, M., Li, T., Page, M. J., & Welch, V. A. (2019). *Cochrane Handbook for Systematic Reviews of Interventions version 6.0 (updated July 2019)*.
- Hughes, P. H., Storr, C., Baldwin, D. C., Williams, K. M., Conard, S., & Sheehan, D. (1992). Patterns of substance use in the medical profession. *Md Med J*, *41*(4), 311-314.
- Jarvis, M., Williams, J., Hurford, M., Lindsay, D., Lincoln, P., Giles, L., . . . Safarian, T. (2017). Appropriate Use of Drug Testing in Clinical Addiction Medicine. *J Addict Med*, *11*(3), 163-173. doi:10.1097/adm.0000000000000323.
- Johnson, R. P., & Connelly, J. C. (1981). Addicted physicians. A closer look. *JAMA*, *245*(3), 253-257.
- Kale, N. (2019). Urine Drug Tests: Ordering and Interpreting Results. *Am Fam Physician*, *99*(1), 33-39.
- Kliner, D. J., Spicer, J., & Barnett, P. (1980). Treatment outcome of alcoholic physicians. *J Stud Alcohol*, *41*(11), 1217-1220. doi:10.15288/jsa.1980.41.1217.
- Knight, J. R., Sanchez, L. T., Sherritt, L., Bresnahan, L. R., & Fromson, J. A. (2007). Outcomes of a monitoring program for physicians with mental and behavioral health problems. *J Psychiatr Pract*, *13*(1), 25-32. doi:10.1097/00131746-200701000-00004.
- Kunyk, D. (2015). Substance use disorders among registered nurses: prevalence, risks and perceptions in a disciplinary jurisdiction. *J Nurs Manag*, *23*(1), 54-64. doi:10.1111/jonm.12081.
- Lawson, N., & Boyd, J. W. (2018). Physician health program outcome data should be viewed with caution. *The Judges' Journal*, *57*(4), 36-36.
- Lloyd, G. (2002). One hundred alcoholic doctors: A 21-year follow-up. *Alcohol and Alcoholism*, *37*(4), 370-374. doi:<http://dx.doi.org/10.1093/alcac/37.4.370>.
- McKay, J. R., Knepper, C., Deneke, E., O'Reilly, C., & DuPont, R. L. (2016). An initial evaluation of a comprehensive continuing care intervention for clients with substance use disorders: My First Year of Recovery (MyFYR). *J Subst Abuse Treat*, *67*, 50-54. doi:<http://dx.doi.org/10.1016/j.jsat.2016.04.003>.
- McKay, J. R., Knepper, C., Deneke, E., O'Reilly, C., & DuPont, R. L. (2017). Corrigendum to "an initial evaluation of a comprehensive continuing care intervention for clients with substance use disorders: My first year of recovery (MyFYR)" [journal of substance abuse treatment 67 (2016) 50-54]. *J Subst Abuse Treat*, *75*, 97. doi:10.1016/j.jsat.2017.01.010.
- Merlo, L. J., Greene, W. M., & Pomm, R. (2011). Mandatory naltrexone treatment prevents relapse among opiate-dependent anesthesiologists returning to practice. *J Addict Med*, *5*(4), 279-283. doi:10.1097/ADM.0b013e31821852a0.
- Miller, W. R., Walters, S. T., & Bennett, M. E. (2001). How effective is alcoholism treatment in the United States? *J Stud Alcohol*, *62*(2), 211-220. doi:10.15288/jsa.2001.62.211.
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & Group, P. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *BMJ*, *339*, b2535. doi:10.1136/bmj.b2535.
- Morse, R. M., Martin, M. A., Swenson, W. M., & Niven, R. G. (1984). Prognosis of physicians treated for alcoholism and drug dependence. *JAMA*, *251*(6), 743-746.
- Mumba, M. N., Baxley, S. M., CIPHER, D. J., & Snow, D. E. (2019). Personal Factors as Correlates and Predictors of Relapse in Nurses With Impaired Practice. *J Addict Nurs*, *30*(1), 24-31. doi:10.1097/jan.0000000000000262.
- Murray, R. M. (1976). Characteristics and prognosis of alcoholic doctors. *Br Med J*, *2*(6051), 1537-1539. doi:10.1136/bmj.2.6051.1537.
- National Institute on Drug Abuse. (2012). Retrieved from Bethesda, Maryland: <https://www.drugabuse.gov/publications/principles-drug-addiction-treatment-research-based-guide-third-edition>.
- Nelson, H. D., Matthews, A. M., Girard, D. E., & Bloom, J. D. (1996). Substance-impaired physicians probationary and voluntary treatment programs compared. *West J Med*, *165*(1-2), 31-36.
- Oreskovich, M. R., Shanafelt, T., Dyrbye, L. N., Tan, L., Sotile, W., Satele, D., . . . Boone, S. (2015). The prevalence of substance use disorders in American physicians. *Am J Addict*, *24*(1), 30-38. doi:10.1111/ajad.12173.
- Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan-a web and mobile app for systematic reviews. *Syst Rev*, *5*(1), 210. doi:10.1186/s13643-016-0384-4.

- Paris, R. T., & Canavan, D. I. (1999). Physician substance abuse impairment: anesthesiologists vs. other specialties. *J Addict Dis*, *18*(1), 1-7. doi:10.1300/J069v18n01_01.
- Pelton, C., & Ikeda, R. M. (1991). The California Physicians Diversion Program's experience with recovering anesthesiologists. *J Psychoactive Drugs*, *23*(4), 427-431. doi:http://dx.doi.org/10.1080/02791072.1991.10471613.
- Roth, A., Hogan, I., & Farren, C. (1997). Naltrexone plus group therapy for the treatment of opiate-abusing health-care professionals. *J Subst Abuse Treat*, *14*(1), 19-22. doi:10.1016/s0740-5472(96)00164-x.
- Roy, A. K., 3rd. (1994). Reentry monitoring in the treatment of physicians with substance dependence. *South Med J*, *87*(9), 881-883. doi:10.1097/00007611-199409000-00003.
- Shore, J. H. (1987). The Oregon experience with impaired physicians on probation. An eight-year follow-up. *JAMA*, *257*(21), 2931-2934.
- Smith, P. C., & Smith, J. D. (1991). Treatment outcomes of impaired physicians in Oklahoma. *J Okla State Med Assoc*, *84*(12), 599-603.
- Stroup, D. F., Berlin, J. A., Morton, S. C., Olkin, I., Williamson, G. D., Rennie, D., . . . Thacker, S. B. (2000). Meta-analysis of observational studies in epidemiology: a proposal for reporting. Meta-analysis Of Observational Studies in Epidemiology (MOOSE) group. *JAMA*, *283*(15), 2008-2012. doi: 2010.1001/jama.2283.2015.2008.
- Stuyt, E. B., Gundersen, D. C., Shore, J. H., Brooks, E., & Gendel, M. H. (2009). Tobacco use by physicians In a physician health program, implications for treatment and monitoring. *Am J Addict*, *18*(2), 103-108. doi:http://dx.doi.org/10.1080/10550490902773015.
- Trinkoff, A. M., Eaton, W. W., & Anthony, J. C. (1991). The prevalence of substance abuse among registered nurses. *Nurs Res*, *40*(3), 172-175.
- van Wamel, A., Croes, E., van Vugt, M., & van Rooijen, S. (2014). *Prevalentie, zorgaanbod, effectiviteit en trends in de verslavingszorg. Achtergrondstudie in opdracht van het College van Zorgverzekeringen*. Retrieved from Utrecht: Trimbos Insituut
- Wallace, J. E., Lemaire, J. B., & Ghali, W. A. (2009). Physician wellness: a missing quality indicator. *Lancet*, *374*(9702), 1714-1721. doi:10.1016/S0140-6736(09)61424-0.
- Warhaft, N. J. (2004). The Victorian Doctors Health Program: the first 3 years. *Med J Aust*, *181*(7), 376-379.
- Washton, A. M., Gold, M. S., & Pottash, A. C. (1984). Naltrexone in addicted physicians and business executives. *NIDA Res Monogr*, *55*, 185-190.
- Weenink, J. W., Kool, R. B., Bartels, R. H., & Westert, G. P. (2017). Getting back on track: a systematic review of the outcomes of remediation and rehabilitation programmes for healthcare professionals with performance concerns. *BMJ Qual Saf*, *26*(12), 1004-1014. doi:10.1136/bmjqs-2017-006710.
- Wilson, J. E., Kiselanova, N., Stevens, Q., Lutz, R., Mandler, T., Tran, Z. V., & Wischmeyer, P. E. (2008). A survey of inhalational anaesthetic abuse in anaesthesia training programmes. *Anaesthesia*, *63*(6), 616-620. doi:10.1111/j.1365-2044.2008.05444.x.

APPENDIX

Table S1. The Health States Quality Index

Year, study	Variables						Total (max = 10)	Quality Index
	1	2	3	4	5	6		
1982, Herrington et al.	1	0	1	0	0	0	2	.2
1984, Washton et al.	1	0	1	0	0	0	2	.2
1985, Crowley	0	0	1	1	1	1	4	.4
1987, Shore	0	1	2	1	1	0	5	.5
1991, Pelton & Ikeda	0	0	2	1	1	0	4	.4
1992, Gallegos et al.	1	0	1	1	1	0	4	.4
1994, Roy	0	0	1	0	1	1	3	.3
1996, Nelson et al. (1)	1	0	2	1	1	1	6	.6
1996, Nelson et al. (2)	1	0	2	1	1	1	6	.6
1997, Roth et al.	0	0	1	1	0	1	3	.3
1999, Paris & Canavan (1)	0	0	2	1	1	1	5	.5
1999, Paris & Canavan (2)	0	0	2	1	1	1	5	.5
2004, Warhaft	1	0	2	0	1	0	4	.4
2005, Domino et al. (1)	1	0	2	1	1	0	5	.5
2005, Domino et al. (2)	1	0	2	1	1	0	5	.5
2005, Ganley et al. (1)	1	1	2	1	1	0	6	.6
2005, Ganley et al. (2)	1	1	2	1	1	0	6	.6
2006, Clark et al.	1	0	2	1	1	1	6	.6
2007, Galanter et al.	1	0	1	1	1	1	5	.5
2007, Knight et al.	1	0	2	1	1	0	5	.5
2008, Brewster et al.	1	1	1	1	1	2	7	.7
2009, DuPont et al.	1	0	2	1	2	1	7	.7
2009, Fogger & Mc-Guinness (1)	0	0	2	2	1	1	6	.6
2009, Fogger & Mc-Guinness (2)	0	0	2	2	1	1	6	.6
2011, Merlo et al.	0	0	2	1	1	1	5	.5
2013, Cross et al.	1	1	2	1	1	2	8	.8
2013, Angres et al.	0	1	1	1	0	2	5	.5
2017, Earley et al.	1	1	1	2	2	2	9	.9
2020, Bruguera et al.	1	1	2	1	2	1	8	.8

Variables	0	1	2
1. Clear definition of target population and observation period	No	Yes	
2. Use of diagnostic criteria	Symptom based Not specified	Use of diagnostic system reported	
3. Method of case selection	Not specified	Convenience sampling	Attempts all cases
4. Type of outcome assessment	Not specified	Register Case record	Administered interview
5. Size of study area	Not specified	Small (single site)	Broad (national or multi-site)
6. Type of prevalence measure	Range of follow-up duration	Average follow-up duration	Exact follow-up duration

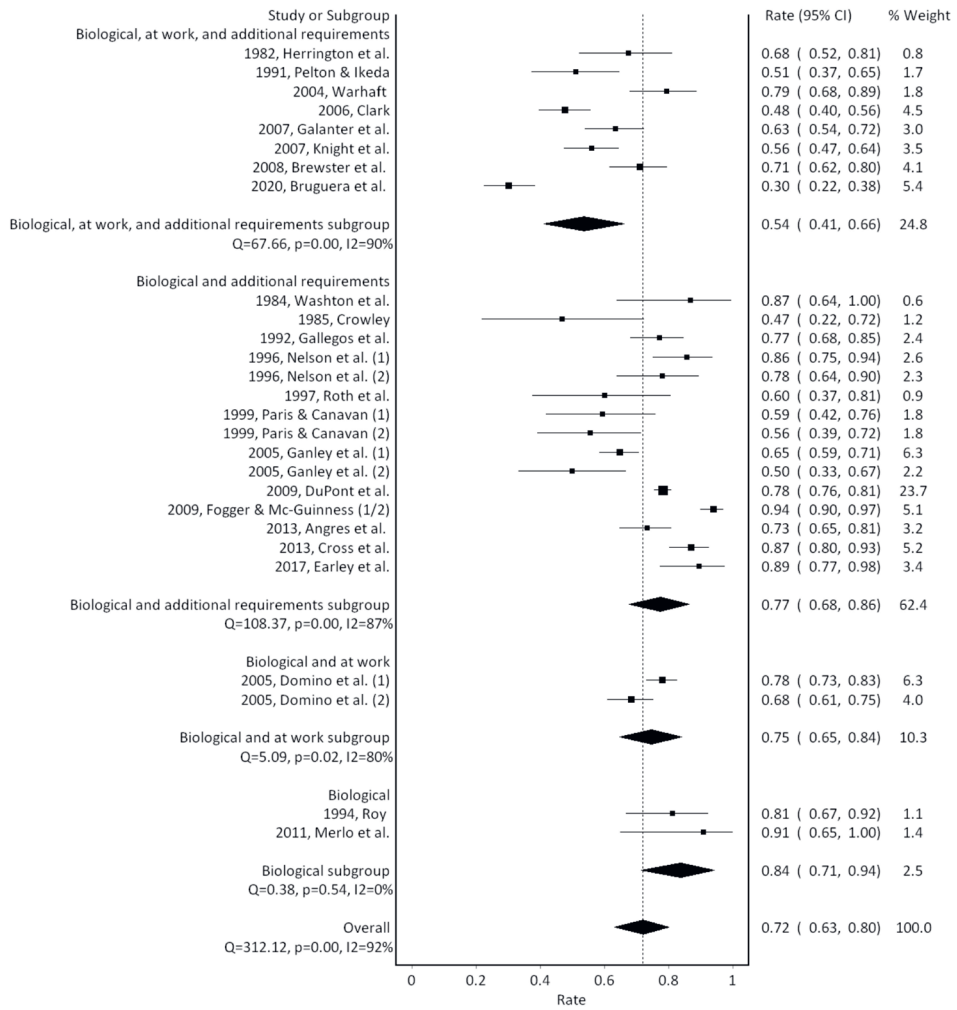


Figure S1. Forest plot of the pooled abstinence rate - subgroup analysis based on type of monitoring

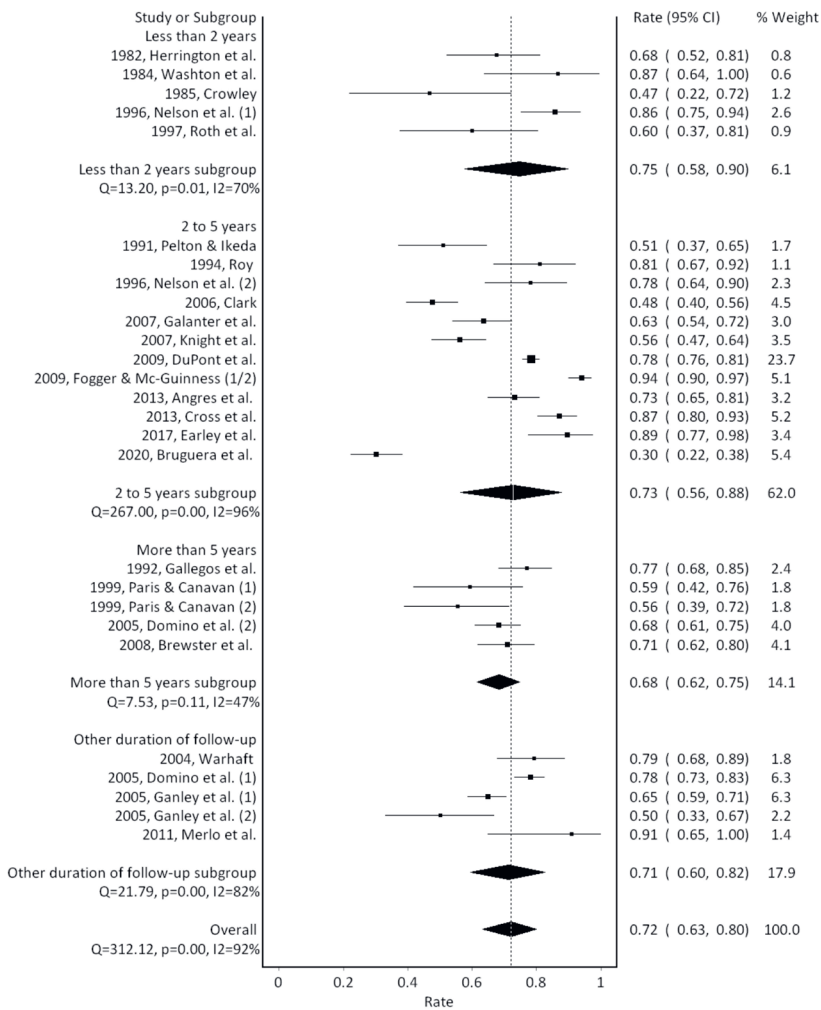


Figure S2. Forest plot of the pooled abstinence rate - subgroup analysis based on duration of follow-up

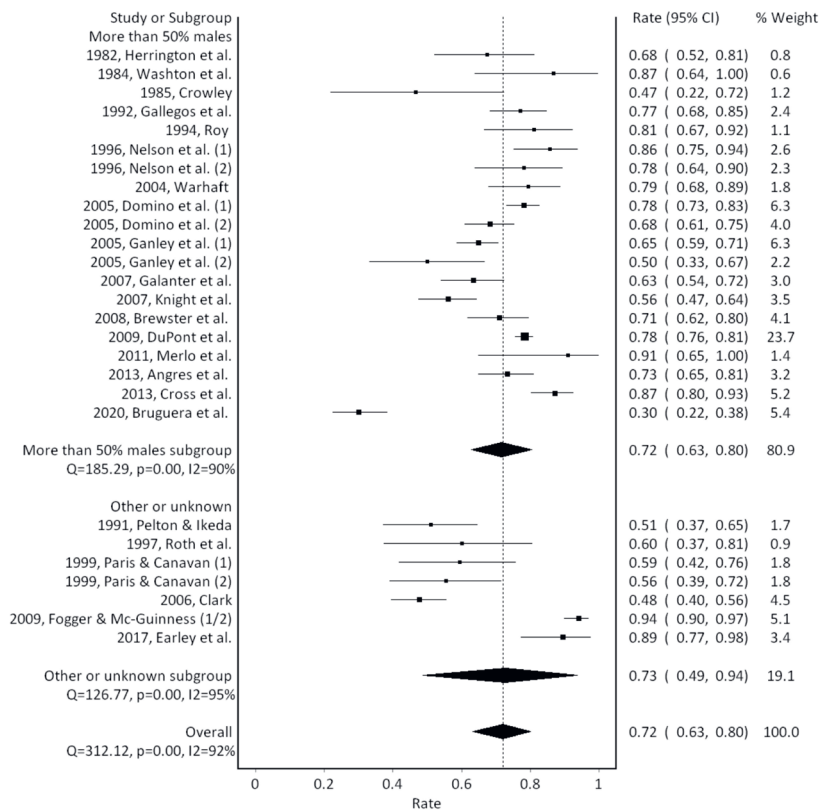


Figure S3. Forest plot of the pooled abstinence rate - subgroup analysis based on gender

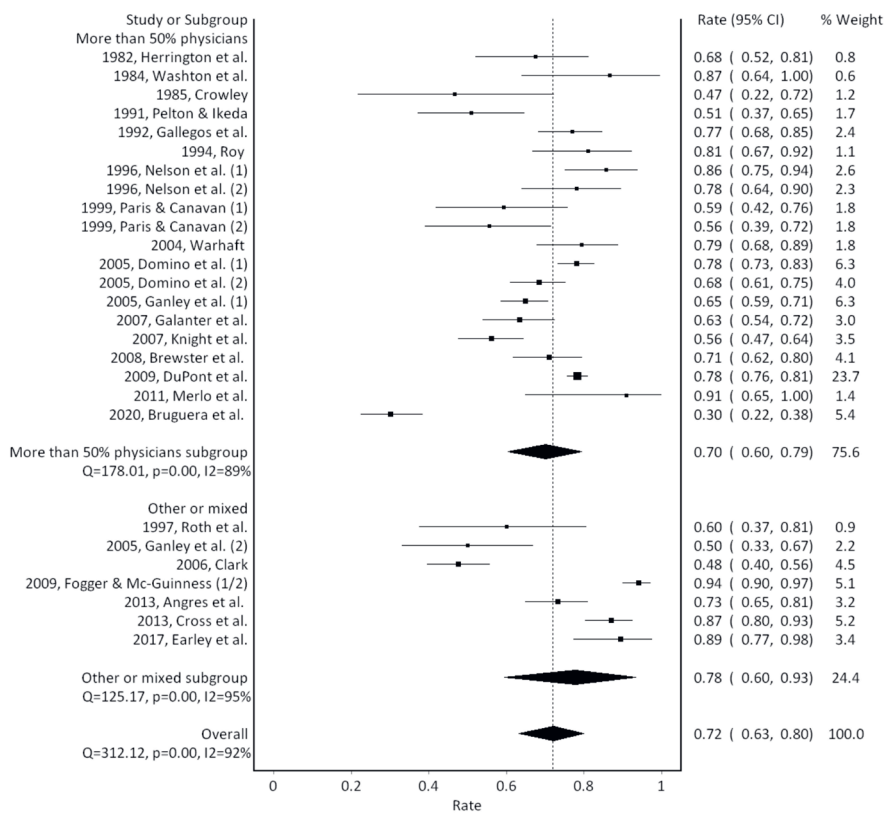


Figure S4. Forest plot of the pooled abstinence rate - subgroup analysis based on type of healthcare professional

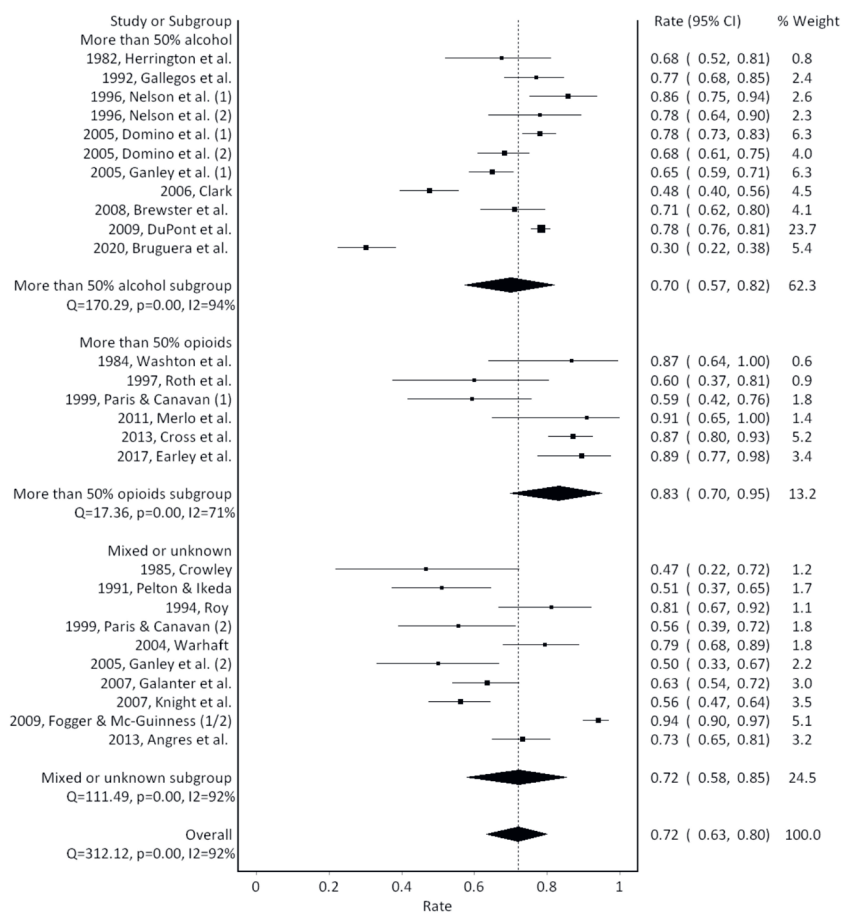


Figure S5. Forest plot of the pooled abstinence rate - subgroup analysis based on type of substance use

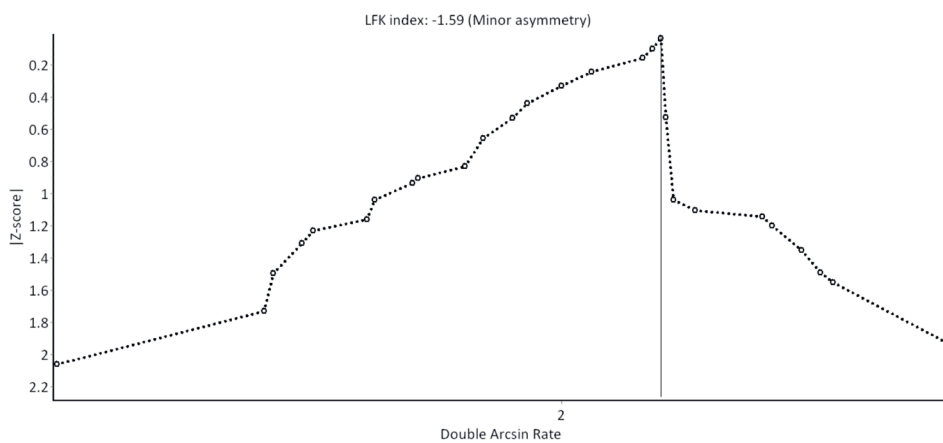


Figure S6. Doi plot analysis and LFK index of publication bias for the pooled abstinence rate

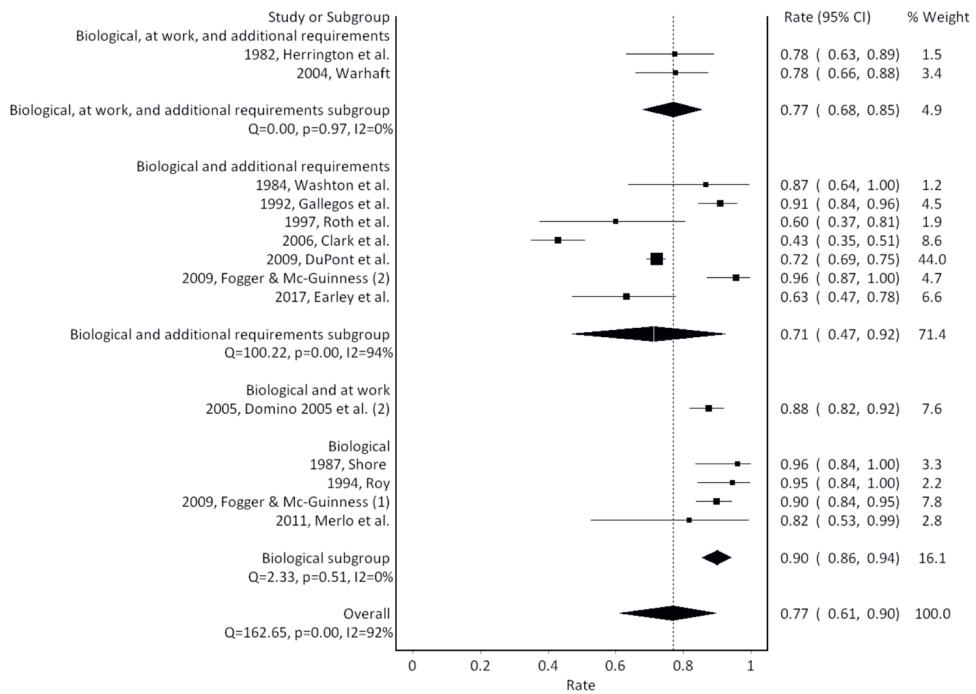


Figure S7. Forest plot of the pooled work retention rate - subgroup analysis based on type of monitoring

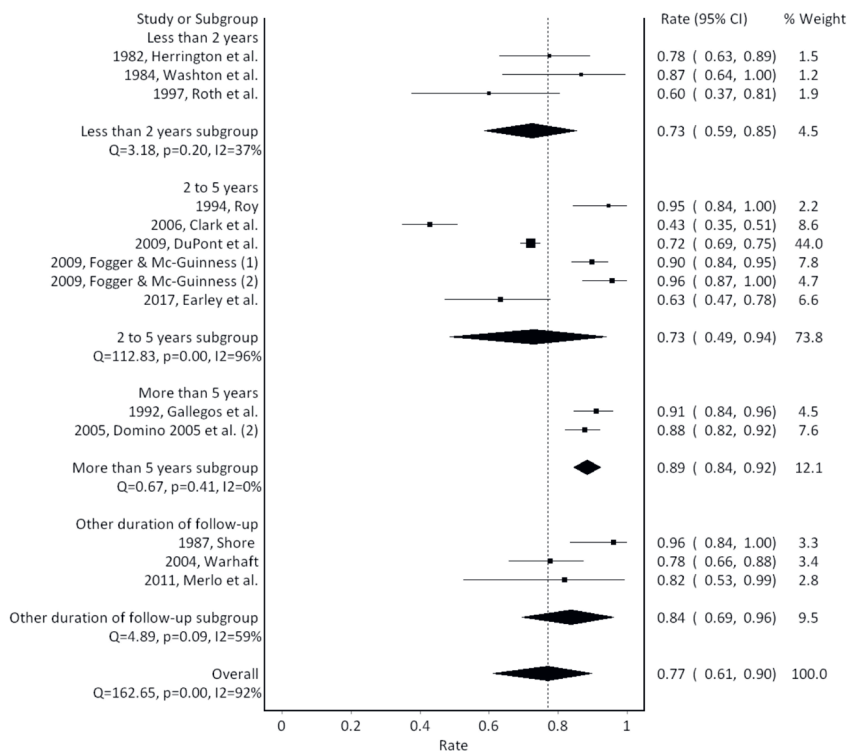


Figure S8. Forest plot of the pooled work retention rate - subgroup analysis based on duration of follow-up

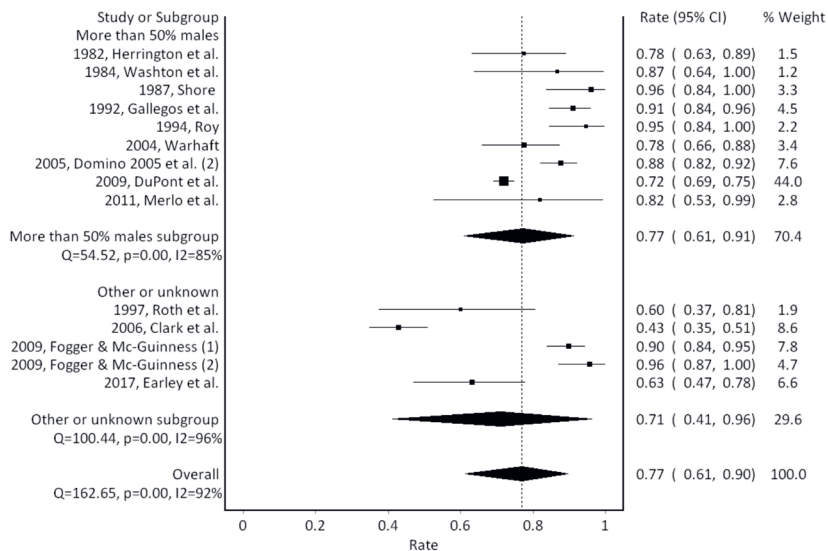


Figure S9. Forest plot of the pooled work retention rate - subgroup analysis based on gender

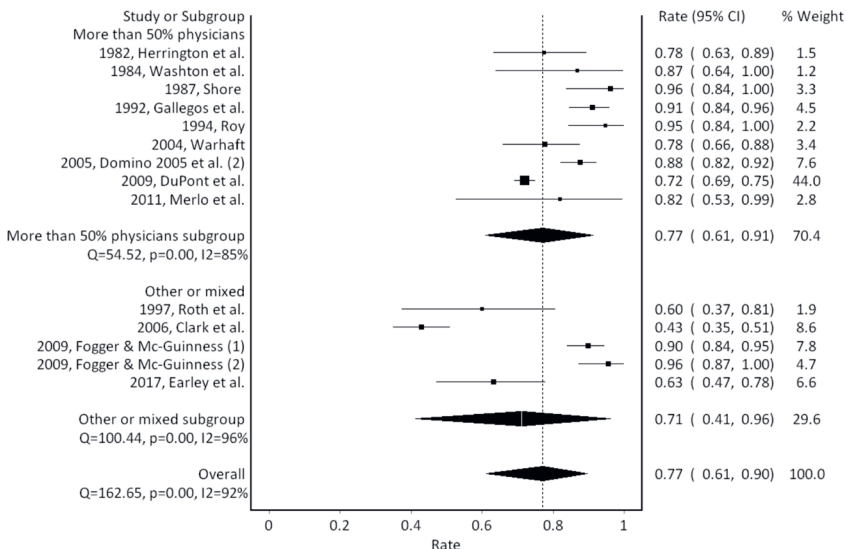


Figure S10. Forest plot of the pooled work retention rate - subgroup analysis based on type of healthcare professional

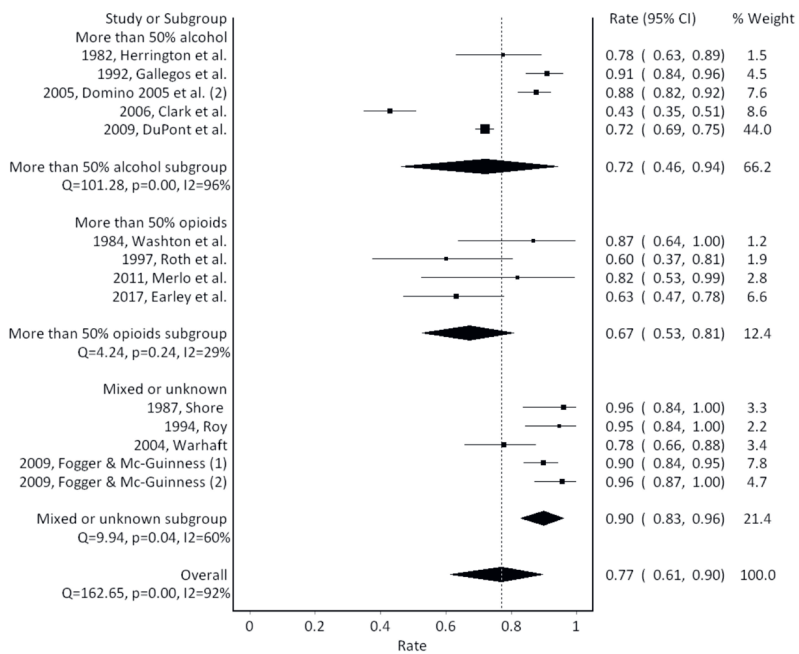


Figure S11. Forest plot of the pooled work retention rate - subgroup analysis based on type of substance use

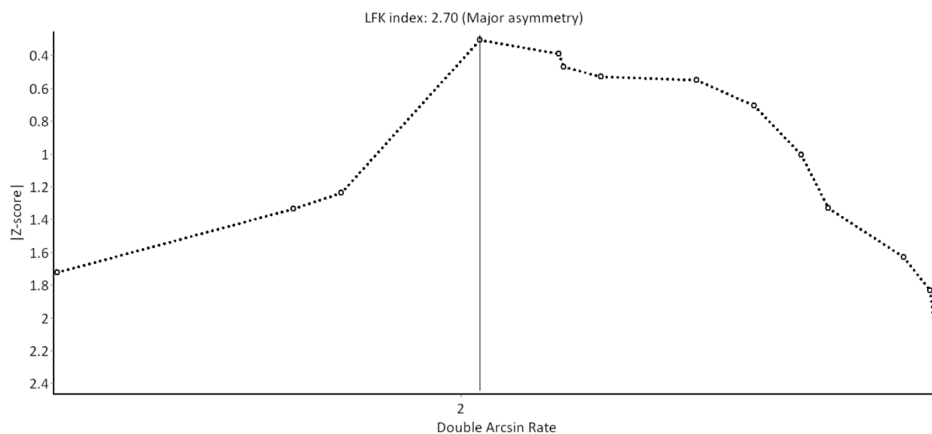


Figure S12. Doi plot analysis and LFK index of publication bias for the pooled work retention rate



**PART II: SEEKING AND OFFERING HELP
REGARDING PHYSICIANS WITH
SUBSTANCE USE DISORDER**



CHAPTER 4

Barriers and facilitators to seek help for substance use disorder among Dutch physicians: a qualitative study

Pauline M. Geuijen
Esther Pars
Joanneke M. Kuppens
Aart H. Schene †
Hein A. de Haan
Cornelis A.J. de Jong
Femke Atsma
Arnt F.A. Schellekens

European Addiction Research. 2022;28(1):23

ABSTRACT

Introduction

Substance use disorders among physicians affect their health, quality of life, but potentially also their quality of care. Despite availability of effective specific Physician Health Programs, physicians with substance use disorder often experience barriers when seeking professional help. Therefore, we studied barriers and facilitators when seeking help for substance use disorder among physicians from a multiple perspective approach.

Methods

A qualitative design was adopted for two sub-studies. First, answers of two open-ended questions (about anticipated barriers and facilitators) of an existing questionnaire were analyzed. This questionnaire was filled out by 1,685 general physicians. The answers of these open-ended questions were coded inductively. Second, 21 semi-structured interviews (about experienced barriers and facilitators) were performed with physicians with a (former) substance use disorder, significant others, and Physician Health Program employees. Themes identified in the first sub-study were used to deductively code the interview transcripts.

Results

Barriers were found at the level of the individual physician (negative feelings and lack of disease awareness), whereas facilitators were found at the level of social relationships (confrontation with substance use disorder and social support) and health services (supportive approach, good accessibility, and positive image of health services). The interviews emphasized the importance of non-judgmental confrontation by social relationships in the process of seeking help for substance use disorder.

Conclusions

Physicians face barriers when seeking help for substance use disorder mostly at the level of the individual physician. Health services and people around physicians with a substance use disorder could facilitate the help seeking process by offering confidential and non-punitive support. Future studies should explore whether the barriers and facilitators identified in this study also hold for other mental health issues.

INTRODUCTION

The prevalence of unhealthy alcohol use among physicians is, according to data from the United States, slightly higher (15%) than population prevalence rates (13%) (Oreskovich et al., 2015; Substance Abuse and Mental Health Services Administration, 2011). In Europe, hazardous alcohol and drug use among physicians were estimated at 18–23% and 3% respectively (Joos, Glazemakers, & Dom, 2013; Pfürringer, Mayer, Meisinger, Freuer, & Eyer, 2018; Rosta, 2008; Rosta & Aasland, 2005; Sørensen, Pedersen, Bruun, Christensen, & Vedsted, 2015; Sørensen, Pedersen, Vedsted, Bruun, & Christensen, 2016; Unrath, Zeeb, Letzel, Claus, & Escobar Pinzón, 2012). Data on the prevalence of substance use disorders (SUDs) among physicians are limited. However, SUDs often cause tremendous personal harm, and might also impair physicians' general functioning (Wallace, Lemaire, & Ghali, 2009). Consequently, SUD among physicians might affect quality of healthcare and patient safety, with studies suggesting mistakes in diagnoses and medical procedures, or problematic communication with patients as potential consequences in clinical practice (Oreskovich et al., 2012; Sendler, 2018).

In the 1970s, the American Medical Association initiated Physician Health Programs (PHPs) aimed at promoting early identification, evaluation, and confidential and adequate treatment for physicians with SUD (DuPont, McLellan, Carr, Gendel, & Skipper, 2009). Over the past decades, PHPs have been set up in various Western countries across the globe (e.g. United States, Canada, Australia, New Zealand, United Kingdom, Spain, Norway, Switzerland, and Ireland) (Braquehais, Tresidder, & DuPont, 2015; Brooks, Gerada, & Chalder, 2011). Our recent meta-analysis of PHP success rates showed an average abstinence rate of 72% and successful work resumption rate of 77% at follow-up (Geuijen et al., 2021). In contrast, studies showed that among SUD patients in general relapse rates are around 50% (Miller, Walters, & Bennett, 2001; National Institute on Drug Abuse, 2012; van Wamel, Croes, van Vugt, & van Rooijen, 2014).

Despite increasing availability of PHPs and their encouraging results, physicians hardly use health services when confronted with mental health problems, including SUD (Tyssen, 2007). Before physicians access regular mental healthcare, they may face barriers at the individual level, like embarrassment and fear of possible consequences, but also on the level of healthcare services, like worries about the quality of care and confidentiality (Kay, Mitchell, Clavarino, & Doust, 2008; Kay, Mitchell, Clavarino, & Frank, 2012). Moreover, a questionnaire study among Finnish physicians ($n=3,116$) found that almost two-thirds self-medicated their mental disorder (Töyry et al., 2000). Furthermore, a qualitative study among Australian general practitioners showed that informal

consultation at a colleague, without proper history-taking or physical examination, is also commonly practiced (Kay et al., 2012). Together, these factors impede access to regular (mental) healthcare by physicians with mental health problems.

In the case of SUD, denial or minimization of substance use problems is an additional barrier for seeking help (Motta-Ochoa et al., 2017). A systematic review of eight qualitative and twenty-three quantitative studies among healthcare professionals with SUD identified embarrassment and fear of possible consequences as major barriers and specific events, like drunk driving or a positive drug screen, and supportive relationships as major facilitators for seeking help (Kunyk, Inness, Reisdorfer, Morris, & Chambers, 2016). However, few European studies were included (more than two-third were from the United States), less than half of the included studies described a sample of physicians, and all included studies solely covered the viewpoint of healthcare professionals with SUD, but not of significant others (Kunyk et al., 2016).

In the current study, we applied a qualitative methodology in order to identify barriers and facilitators when seeking help for SUD among Dutch physicians. To ensure a multiple perspective approach, we focused upon both anticipated and experienced barriers and facilitators and included four different participant groups. More specifically, we 1) explored anticipated barriers and facilitators to seek help for SUD among physicians in general using two open-ended questions of an existing questionnaire, and 2) investigated experienced barriers and facilitators when actually seeking help for SUD among physician-patients, significant others, and PHP employees by means of semi-structured interviews.

METHODS

Data collection

Two qualitative methods were adopted to gather information about barriers and facilitators when seeking help for SUD among physicians: first, two open-ended questions about anticipated barriers and facilitators among general physicians were used from an existing online cross-sectional questionnaire (*study 1*) (Geuijen et al., 2020). Second, semi-structured interviews with physician SUD-patients, significant others, and PHP employees were performed (*study 2*). The open-ended questions (*study 1*) were used to explore anticipated barriers and facilitators among physicians in general. The interviews (*study 2*) were used to more in depth investigate distinct barriers and facilitators among physician-patients, significant others, and PHP employees based on their personal experiences with seeking help for SUD among physicians. The Consolidated criteria for Reporting Qualitative Research (COREQ) guidelines were used to report the findings of this study, see Table S1 (Tong, Sainsbury, & Craig, 2007).

Study 1: open ended questions from existing questionnaire

For a previous study (Geuijen et al., 2020) we used closed questions of an online cross-sectional questionnaire about “Addiction in physicians”. This questionnaire was administered to the physician panel of the Royal Dutch Medical Association (RDMA) in September 2016. All panelists received an e-mail with the invitation to participate and a link to the online questionnaire. They were informed about the nature of the questionnaire beforehand and they could decide to participate or not. Panelists had three weeks to complete the questionnaire. They received two reminders to respond to the questionnaire. Encrypted data were collected via the web-based questionnaire platform. The questionnaire data were synthesized with encrypted demographic information of the panelists.

For this study, two open-ended questions about anticipated barriers and facilitators of this questionnaire were used. Prior to these open questions, respondents were instructed to hypothesize that they suffered from SUD themselves and that they intended to contact the Dutch PHP. Subsequently, they were asked: “What barriers would you experience [when intending to contact the Dutch PHP for your own SUD]?” and “What would help you to overcome these barriers?”. The internal ethical review board of the RDMA reviewed and approved the questionnaire (Geuijen et al., 2020).

Study 2: semi-structured interviews

Semi-structured interviews concerning “Help seeking for SUD by physicians” were prepared by means of a topic list, which was pilot-tested among two students (medicine and social sciences). The topic list was based on the themes identified by the open questions and was used as a guideline during the interviews, see Box S1, Box S2, and Box S3. A female researcher with a background in health sciences and trained in conducting interviews performed the semi-structured interviews between February and November 2019. Interviewees knew the background of the interviewer and that the interview was about the help seeking process of physicians with SUD. Interviewees choose to conduct the interview by telephone or face-to-face (at their home or work, at the department of Psychiatry of Radboudumc, or at the Dutch PHP). All interviews were audio recorded and transcribed verbatim. Field notes were made during the interview and after each interview, the degree of saturation was discussed by the interviewer and her supervising senior researcher. All interviewees gave their written informed consent prior to the start of each interview and were given the possibility to reflect and comment on the accuracy and validity of the obtained information afterwards (“member checking”).

Physician-patients and significant others were approached via employees of the national Dutch PHP, via clinicians and therapists affiliated to our regional addiction

research consortium (Nijmegen Institute for Scientist-Practitioners in Addiction: NISPA), and via the Dutch self-help group Doctors Anonymous. By use of a recruitment text, we asked (former) physician-patients and significant others whether they wanted to participate in an interview about the help seeking process. The researcher approached the PHP employees via e-mail. There was no pre-existing relationship between the researcher and physician-patients/significant others. One significant other withdrew her informed consent for an unspecified reason. The local Medical Ethical Committee of the Radboudumc reviewed and approved the interview study (registration number: 2019-5160).

Sociodemographic characteristics

Gender and age were collected for all participants. Information on medical specialty, years in practice, and working situation was also available for physicians. Medical specialty was divided into four categories in line with literature (van Boekel, Brouwers, van Weeghel, & Garretsen, 2013): general practice, (psycho) social medicine, contemplative somatic medicine, and surgical and supportive medicine, as we did previously (Geuijen et al., 2020).

Data analysis

Descriptive statistics of participant characteristics were analyzed using the Statistical Package for Social Sciences software (SPSS version 22.0, IBM Corporation, Armonk, NY). The text from the open ended questions in the questionnaire and interview transcripts were coded using Atlas.ti software (version 8.3, Scientific Software Development GmbH). The first author coded the questionnaire answers inductively, the second author checked the analysis and discussed ambiguities with the first author, until consensus was reached. The themes identified by the questionnaire analysis were used to code the interview transcripts deductively. The first and second author independently coded eight randomly chosen interviews, thereafter discrepancies were discussed until consensus was reached. The first author coded the remaining transcripts. Next, the first author clustered codes into themes, before the first, second, and last author discussed the identified themes and adapted them if required.

RESULTS

Characteristics of participants

Study 1: The sample of panelists who responded to the questionnaire ($n=1,685$; response rate: 47%) consisted of general practitioners (34%), (psycho)social physicians (28%), contemplative somatic specialists (22%), and surgical and supportive specialists (15%), see Table 1.

Study 2: Twenty-one interviews were conducted with ten physician-patients (substances of abuse: 60% alcohol, 20% opioids, 10% ketamine, and 10% nicotine), four significant others (therapist, occupational physician, manager, and colleague), and seven PHP employees (team members, advisors, and manager). Interviews took on average 55 minutes (range: 23 to 102 minutes).

Table 1. Sociodemographic characteristics of participants

	Study 1: Questionnaire		Study 2: Interviews			
	Respondents ($n=1,685$)	Non-respondents ($n=1,920$)	Physician- patients ($n=10$)	Significant others ($n=4$)	PHP project members ($n=7$)	
Gender						
Male (%)	807 (48)	1,011 (53)	*	7 (70)	3 (75)	4 (57)
Female (%)	861 (51)	866 (45)		3 (30)	1 (25)	3 (43)
Age in years						
< 40 (%)	277 (16)	410 (21)		1 (10)	0 (0)	0 (0)
40 – 49 (%)	283 (17)	352 (18)	*	2 (20)	1 (25)	2 (29)
50 – 59 (%)	504 (30)	477 (25)		4 (40)	2 (50)	1 (14)
≥ 60 (%)	566 (34)	583 (30)		3 (30)	1 (25)	4 (57)
Specialty group						
General practice (%)	566 (34)	687 (36)		2 (20)		
(Psycho) social (%)	470 (28)	404 (21)	*	3 (30)	NA	NA
Contemplative somatic (%)	377 (22)	485 (25)		2 (20)		
Surgical and supportive (%)	263 (16)	328 (17)		3 (30)		
Years in practice						
< 10 (%)	321 (19)	443 (23)		1 (10)		
10 – 19 (%)	364 (22)	430 (22)	*	5 (50)	NA	NA
20 – 29 (%)	439 (26)	430 (22)		1 (10)		
≥ 30 (%)	471 (28)	479 (25)		3 (30)		
Working situation						
In training (%)	152 (9)	219 (11)		0 (0)		
Working part time (%)	293 (17)	296 (15)	*	4 (40)		
Working fulltime (%)	951 (56)	1089 (57)		4 (40)	NA	NA
Retired (%)	232 (14)	239 (12)		2 (20)		

n = number, NA = Not Applicable, PHP = Physician Health Program.

* = $p < .05$.

Table 2. Three levels of anticipated barriers and facilitators to seek help for SUD among physicians ($n=1,685$)

1. Individual physicians		2. Social relationships	
Themes	B (n)	F (n)	Themes
Negative feelings <i>embarrassment, fear and anxiety, insecurity, and feelings of guilt, failure, powerlessness, or weakness</i>	544	12	Social support <i>at work or at home</i>
Lack of disease awareness <i>denial of signs and symptoms or not being aware of SUD</i>	323	53	Confrontation with SUD <i>being confronted by others at work or at home</i>
Negative personal consequences <i>disclosure, suspension, dismissal, report to health inspectorate, financial, and private consequences</i>	199	71	External pressure <i>social pressure by work or home environment</i>
Low willingness to act <i>not open to recovery, difficulties with taking the initiative, self-treatment or -management</i>	115	42	Stigmatization <i>stigmatization and prejudice</i>
Distrust of privacy and anonymity <i>trust, need for anonymity</i>	108	21	Reputation damage <i>losing reputation or prestige</i>
Total	1,289	199	Total

B = barrier, F = facilitator, n = number of times an anticipated barrier or facilitator was mentioned among the online questionnaire respondents, SUD = Substance Use Disorder.

Barriers and facilitators

Anticipated barriers and facilitators mentioned by general physicians (questionnaire respondents) could be classified at the level of the individual physician (5 themes), the level of social relationships (5 themes), and the level of health services (5 themes), see Table 2. The majority of the general physicians anticipated one or more barriers ($n=1,153$; 68%) and one or more facilitators ($n=1,094$; 65%) for seeking help for SUD. The remaining respondents did not anticipate any barriers or facilitators to help seeking ($n=79$; 5% and $n=10$; 1%, respectively), did not know what barriers or facilitators to anticipate ($n=123$; 7% and $n=161$; 10%, respectively), or did not answer the question ($n=330$; 20% and $n=420$; 25%, respectively). Results are presented as descriptions of the identified themes per level, supplemented with in-depth information from the interviews.

Level 1: individual physician

General physicians (questionnaire respondents) anticipated four out of five barriers

3. Health services			Other				
B (n)	F (n)	Themes	B (n)	F (n)	Themes	B (n)	F (n)
18	309	<u>Supportive approach</u> <i>confidential, supportive, and non-punitive approach</i>	4	414	None	79	10
3	78	<u>Positive image of health services</u> <i>familiarity with and appearance of healthcare provider</i>	112	186	Don't know	123	161
4	39	<u>Good accessibility of health services</u> <i>location, opening hours, waiting list, information about process and methods, evidence-based results</i>	103	117	Missing answer	330	420
39	0	<u>Testimonials of personal experience</u> <i>experiences or advice from fellow sufferers (colleagues or other physicians), knowing you are not the only one</i>	0	47			
29	0	<u>Specific referral</u> <i>advice or referral from general practitioner or occupational physician</i>	3	10			
93	426	Total	222	774	Total	532	591

for seeking help for SUD at the level of the individual physician (Table 2). These barriers were associated with disease awareness, taking action, and consequences of disclosure. Respondents anticipated negative feelings like embarrassment, fear and anxiety, insecurity, and feelings of guilt, failure, powerlessness, or weakness. Questionnaire respondents mentioned these feelings often in combination with denial of signs and symptoms or not being aware of SUD. In addition, respondents expressed fear with regard to professional consequences like suspension or dismissal, report to the health inspectorate, and private problems. Over time, barriers can turn into facilitators. For example, awareness of possible consequences may ultimately result in seeking help for SUD. However, at the level of the individual patient barriers were much more often anticipated than facilitators.

Physician-patients, significant others, and PHP employees (interviewees) mentioned similar themes as compared to general physicians. All physician-patients mentioned lack of disease awareness, in combination with negative feelings according to two-thirds of the physician-patients, as main barrier(s) for seeking help.

Physician-patient #6:

“Substance use is associated with embarrassment. It would be hard going to my own GP, with whom I also work professionally ... It would be less hard to me if I was depressed or had back pain”.

PHP employees believed that professional consequences of disclosure prevent physician-patients from seeking help.

PHP employee #3:

“Many physicians don’t want to put their work down or get it [their SUD] disclosed or go on sick leave ... Their fear includes losing everything, [their] work and partner...”.

Additionally, the experiences of most physician-patients, significant others, and PHP employees showed that it takes time to seek help, because physicians with SUD have to overcome their procrastination and doubts regarding privacy and anonymity. Some PHP employees mentioned that physician-patients have difficulties with estimating the seriousness of the situation.

PHP employee #3:

“They think: I will be able to stop myself. That is most of the time true, they can stop themselves, but after a while they will get stuck”.

According to physician-patients and significant others, physicians should receive training about the risks of SUD, self-care, and self-treatment during the medical curriculum, at conferences, and by journal articles.

Physician-patient #7:

“Attention should be paid to SUD in the medical curriculum ... whatever specialty you are going to do, you will encounter patients with SUD and also colleagues”.

Level 2: social relationships

General physicians mentioned social relationships almost five times more often as a facilitator, than as a barrier for seeking help. They anticipated the social network to facilitate help seeking by providing support and by confronting the physician-patient with the SUD. Support or confrontation from the working environment (colleague, supervisor, or employer) was more often anticipated as facilitator compared to support or confrontation from the physician-patient’s home environment (partner, family member, or friend).

General physician #248:

"[I would need] a loved one or colleague who acknowledges my problem and who treats me with respect instead of judging me".

The interviews showed that discovery of the SUD by others (at work or at home) or by a specific event (positive urine screen at work, drunk driving) led to confrontation of the physician-patient with his or her problem. It was frustrating to some of the physician-patients that people in their environment had a presumption for some time, but they did not discuss it with the physician in question.

Physician-patient #1:

"Why did everyone shut up for three months?" To me, that is still a mystery ... There was no one who confronted me. Apparently, people do not dare to do that ...".

After non-judgmental confrontation and/or disclosure, social support is highly valued by physician-patients. Social relationships could help the physician-patient by a combination of attentive listening, offering comfort, and practical and/or informative help. One of the significant others experienced the consequences of not offering social support.

Significant other #4:

"The physician in question who drank himself to death in my hospital, one year earlier he had already indicated that he could not take it anymore... his colleagues did not support him... he plodded through, with this [his death] as a result... After that [there were] feelings of guilt in that department...".

Significant others and PHP employees mentioned the importance of a preconceived plan for offering help.

Significant other #4:

"I think it is important that there is already a good plan ... [then you can] discuss this [the presumption of SUD] with more obligation than just saying "I worry about you".

Several physician-patients mentioned the themes stigmatization (prejudice) and reputation damage as barriers to seek help for their SUD. Some physician-patients were afraid that the way social relationships see and value them would be impaired by disclosure of their SUD. Half of the interviewees stated that external pressure also facilitates help seeking, i.e. social relationships (family members, employer, or health inspectorate) expect or obligate the physician-patient to be treated for his or her SUD.

Level 3: health services

Finally, several general physicians mentioned anticipated barriers to seek help for SUD at the level of health services (healthcare providers or PHP), like no positive image of health services and poor accessibility of health services. A non-positive image included non-familiarity with and bad appearance of health services, whereas poor accessibility meant that the health service is difficult to approach. General physicians frequently anticipated facilitators at the level of the health services, such as a supportive approach, positive image and good accessibility of health services, and positive testimonials of personal experience.

All interviewees (physician-patients, significant others, and PHP employees) preferred that health services endorse a confidential, supportive, and non-punitive approach with a focus on recovery. It was disappointing to some physicians that there were long waiting lists (six to eight months) at healthcare providers, which delayed the process of treatment, recovery, and return to work.

Physician-patient #1:

"It is a shame that there are waiting lists of six to eight months everywhere ... I ended up sitting at home for almost a year ... I don't think it was good for me to stay at home for so long".

According to the majority of physician-patients and PHP employees the counseling service of the PHP was easily accessible, because there was no waiting list, no direct allocation to treatment (and thereby no registration at the health insurer), while anonymous guidance is optional. To most physician-patients it was important that health services share testimonials of recovered physician-patients. By sharing these experiences, physician-patients feel and/or realize that they are not the only one.

Physician-patient #6

"Use an ambassador as a role model, if he/she dares it ... preferably someone with stature: 'If it happens to him/her, then I am not so special'".

DISCUSSION

This study aimed to identify barriers and facilitators with regard to seeking help for SUD among physicians from a multiple perspective approach. Our questionnaire and interview data showed that physicians with SUD face barriers for seeking help mainly at the level of the individual physician, like embarrassment, anxiety, and denial. In

contrast, a supportive approach by health services and social relationships could facilitate help seeking. Furthermore, in the interviews participants emphasized the importance of non-judgmental confrontation by social relationships and sharing personal experiences of overcoming SUD in order to increase help seeking for SUD among physicians.

Behavioral change is a key element in overcoming SUD (Prochaska, DiClemente, & Norcross, 1992). According to the Transtheoretical model, behavioral change comes with five stages: precontemplation, contemplation, preparation, action, and maintenance (Prochaska et al., 1992). In line with existing SUD literature, several barriers for seeking help at the level of the individual physician as identified in our study suggest that being in the precontemplation phase, indeed hinders help seeking behavior (Motta-Ochoa et al., 2017; Prochaska et al., 1992). In more detail, participants reported lack of acknowledgment of the SUD and low willingness to act as barriers for seeking help, which could both be seen as indicators of precontemplation.

Other identified barriers and facilitators were linked to disclosure. More specifically, others finding out about a physician's SUD, and non-judgmental confrontation with SUD were mentioned as potential facilitators for seeking help, by providing both social support and external pressure from social relationships. As result of disclosure, physicians with SUD might on the one hand experience negative feelings, stigmatization, worries about their reputation, privacy, anonymity, and negative personal consequences at home and at work. On the other hand, non-judgmental confrontation may increase awareness and acknowledgment of the SUD, thus facilitating contemplation and potentially subsequent preparation for behavioral change (Prochaska et al., 1992). Such an approach is very much in line with the principles of Motivational Interviewing (non-judgmental and non-threatening approach). Since a large body of evidence supports effectiveness of Motivational Interviewing for facilitating behavioral change and seeking help for SUD (Miller & Rollnick, 2004), education on Motivational Interviewing as part of the medical curriculum could impact on both patient care, as well as interprofessional responsibility.

Though precontemplation, lack of SUD awareness, and disclosure are also encountered by non-physician SUD patients (Kay et al., 2008), an Australian qualitative study found that specifically physician-patients worry about formal report to the health inspectorate and loss of professional reputation or career development opportunities (Clough, March, Leane, & Ireland, 2019). As a result, it could be speculated that the precontemplation phase may last longer in physician SUD-patients compared to non-physician SUD-patients. Furthermore, their access to some substances of abuse (e.g. benzodiazepines, opioids), their usually comfortable financial situation, and intellectual abilities might further facilitate denial and the ability to disguise their SUD for a long time (Kunyk et al., 2016).

By combining hypothetical views from a large group of physicians with experiences of a small group of physicians and other relevant stakeholders, including significant others, with experience with seeking help for SUD, we comprehensively explored (potential) facilitators and barriers for seeking help in physicians with SUD. Interestingly, these anticipated and experienced barriers and facilitators largely overlapped. The current findings also suggest that barriers for seeking help may in some turn into facilitators for seeking help. For instance, some respondents mentioned negative feelings as a barrier, whereas others anticipated negative feelings as a facilitator for seeking help for their SUD. Though this finding might suggest that barriers and facilitators are very personal, it might also be that perceived barriers might become facilitators, depending on the stage of change and level of support from the environment. Indeed, a systematic review argued that physicians' healthcare access will benefit from cultural acceptance around physicians who seek help for mental health problems (Kay et al., 2008).

The majority of the facilitators identified in the current study was associated with (open) communication. More specifically, participants mentioned non-judgmental confrontation with SUD, social support, and external pressure as means to facilitate disclosure of SUD and guiding someone towards SUD treatment. We previously observed that although most physicians (97%) intend to act upon a substance use presumption in a colleague, only two-thirds (65%) actually took action in such case (Geuijen et al., 2020). Therefore, physicians should be trained to recognize signs and symptoms of SUD and learn how to take appropriate action in case of a substance use presumption in a colleague (Geuijen et al., 2020). Since confrontation from the physician's working environment was more often mentioned as facilitator than confrontation from the physician's home environment, workplace awareness campaigns might facilitate non-judgmental identification of physicians struggling with SUD. In the Netherlands, the Royal Dutch Medical Association recently launched such an awareness campaign, which offers policy, education, and ambassadorship tools for employers (Royal Dutch Medical Association, 2020).

Another important facilitator identified in the current study is sharing (positive) personal experiences by ambassadors, which was mentioned as a way to increase visibility of and familiarity with available SUD health services and to stimulate help seeking. Thereby, clear information of the healthcare provider or PHP about treatment facilities and treatment results could further lower the threshold for accessing healthcare and stimulate motivation for treatment. Clear information on available treatment options in combination with sharing testimonials of personal experiences by physicians who overcame their SUD will help physician-patients to become confident about the quality of care provided and the possibility to successfully overcome their

SUD. Therefore, it is recommended that health services commit former physician-patients as role models to their services. By sharing their testimonials these role models might contribute to reducing barriers for help seeking.

Once a physician with SUD takes the step for seeking help, it is important that employers or healthcare providers respond adequately by offering referral to confidential treatment where needed and ensuring proper follow-up and work resumption after treatment (Wallace et al., 2009). When physician-patients access regular healthcare, studies suggest that the treating healthcare professional should avoid assumptions about a physician-patient's knowledge or insight in the SUD (Fox et al., 2010). It is recommended to make reference to his or her medical status, but to also account for someone's unique hopes, fears, and expectations (Fox et al., 2010). Medical associations and employers should raise physicians' awareness about the risks of self- or informal treatment and emphasize the importance of professional support, which can further facilitate the recovery process (Fox et al., 2010). Ideally, this professional support follows a confidential and supportive approach. Although PHPs in the United States also value confidentiality, especially European PHPs (e.g., in Norway, Spain, the United Kingdom, and the Netherlands) encourage voluntary help seeking, which is associated with high rates of self-referrals (45-75%) (Braquehais et al., 2015; Bruguera et al., 2020).

Current literature about seeking help by healthcare professionals mainly focused on general health problems among physicians (Kay et al., 2008) and seeking help for SUD among healthcare professionals in general (Kunyk et al., 2016). We were specifically interested in help seeking for SUD among physicians. Furthermore, the existing literature mainly focused on barriers for seeking help from the single perspective of healthcare professionals themselves. Our study used a multiple perspective (hypothetical and experiences) and methods approach for the identification of both barriers as well as facilitators for help seeking for SUD, with relatively large sample sizes in the questionnaire study. However, this study should also be interpreted in the light of several limitations. Although the response rate of the questionnaire was acceptable, young physicians, females, and the surgical and supportive specialty group were underrepresented in our study when compared to the whole physician community in the Netherlands (CIBG, 2021). An American questionnaire study among a nationally representative sample of 5,829 physicians showed that younger and male physicians were more reluctant to seek help for mental health issues compared to older and female physicians (Dyrbye et al., 2017). The anticipated barriers identified in the current study may be specifically relevant for young and male physicians with SUD. However, future studies may explore differences in barriers and facilitators for seeking help for SUD among physicians of different age, gender, and specialty.

Another limitation is that sampling bias cannot be ruled out in the current study. Participants who chose to respond to the questionnaire invitation or took part in the interviews might have had personal reasons to do so, or might have had specific ideas concerning SUD among physicians compared to those who declined to participate. Furthermore, for the interviews we mainly recruited participants who contacted the Dutch PHP, and to a lesser extent through allied addiction care facilities. Those physicians with SUD who did not seek any form of help were therefore not reached. As often the case, patients who do not engage in the healthcare system are difficult to reach for both healthcare and scientific research. Especially concerning SUD, experienced shame and stigma might further hinder openness about SUD among physicians. Yet, by including interviewees with a variety of demographic characteristics, medical specialties, and working experience, we attempted to cover multiple perspectives, increasing the generalizability of this study. Since, we only focused on barriers and facilitators to help seeking for SUD, future research should investigate whether the barriers and facilitators found in this study, also hold for other mental health or physical problems among physicians, as SUD is often considered a highly stigmatized disorder.

Conclusions

To conclude, physicians with SUD perceive several barriers for seeking help for SUD mostly at the level of the individual physician, like negative feelings and denial of SUD. Health services and people around physicians with SUD could facilitate the help seeking process by offering a supportive approach (confidential and non-punitive), positive image and good accessibility of health services, and by non-judgmental confrontation of the physician-patient with his or her problem. Ambassadors sharing personal (positive) testimonials can further facilitate help seeking for SUD by physicians. In the end, effective identification and management of SUD among physicians not only improves the quality of life of the individual physician, but also contributes to the quality of patient care. Future studies should explore whether the perceived barriers and facilitators for seeking help for SUD also hold for other mental health issues, like mood disorders, anxiety disorders, and burnout.

Author contributions

Conceptualization, P.G., E.P., J.K., A.H.S, F.A., A.F.S.; methodology, P.G., E.P, F.A. and A.F.S.; analysis, P.G. and E.P.; writing - original draft preparation, P.G.; writing - review and editing, E.P., J.K., A.H.S., H.H., C.J., F.A. and A.F.S.; supervision, A.H.S., F.A., and A.F.S.; project administration, P.G. and A.F.S; funding acquisition, A.F.S, C.J., and H.H. All authors have read and agreed to the published version of the manuscript.

Ethics statement

All interviewees gave their written informed consent prior to the start of each interview. One significant other withdrew her informed consent for an unspecified reason. The local Medical Ethical Committee of the Radboudumc reviewed and approved the interview study (registration number: 2019-5160). The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees for human studies and with the World Medical Association Declaration of Helsinki.

Conflict of interest

Arnt F.A. Schellekens is an Editorial Board Member of the journal. Other than this the authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

Funding

This work was supported by a grant of the Dutch Ministry of Health, Welfare and Sport (grant number 328622) to the Royal Dutch Medical Association. The funder had no role in study design, collection, analysis or interpretation of the data, writing the manuscript, or the decision to submit the paper for publication.

REFERENCES

- Braquehais, M. D., Tresidder, A., & DuPont, R. L. (2015). Service provision to physicians with mental health and addiction problems. *Curr Opin Psychiatry*, *28*(4), 324-329. doi:10.1097/YCO.0000000000000166.
- Brooks, S. K., Gerada, C., & Chalder, T. (2011). Review of literature on the mental health of doctors: are specialist services needed? *J Ment Health*, *20*(2), 146-156. doi:10.3109/09638237.2010.541300.
- Bruguera, E., Heredia, M., Llavayol, E., Pujol, T., Nieva, G., Valero, S., . . . Braquehais, M. D. (2020). Integral Treatment Programme for Addicted Physicians: Results from The Galatea Care Programme for Sick Physicians. *Eur Addict Res*, *26*(3), 122-130. doi:10.1159/000505914
- CIBG. (2021). Over het BIG-register: cijfers. Retrieved from <https://www.bigregister.nl/over-het-big-register/cijfers>.
- Clough, B. A., March, S., Leane, S., & Ireland, M. J. (2019). What prevents doctors from seeking help for stress and burnout? A mixed-methods investigation among metropolitan and regional-based Australian doctors. *Journal of Clinical Psychology*, *75*(3), 418-432. doi:10.1002/jclp.22707.
- DuPont, R. L., McLellan, A. T., Carr, G., Gendel, M., & Skipper, G. E. (2009). How are addicted physicians treated? A national survey of Physician Health Programs. *J Subst Abuse Treat*, *37*(1), 1-7. doi:10.1016/j.jsat.2009.03.010.
- Dyrbye, L. N., West, C. P., Sinsky, C. A., Goeders, L. E., Satele, D. V., & Shanafelt, T. D. (2017). Medical Licensure Questions and Physician Reluctance to Seek Care for Mental Health Conditions. *Mayo Clin Proc*, *92*(10), 1486-1493. doi:10.1016/j.mayocp.2017.06.020.
- Fox, F. E., Taylor, G. J., Harris, M. F., Rodham, K. J., Sutton, J., Scott, J., & Robinson, B. (2010). "It's crucial they're treated as patients": ethical guidance and empirical evidence regarding treating doctor-patients. *J Med Ethics*, *36*(1), 7-11. doi:10.1136/jme.2008.029066.
- Geuijen, P., de Rond, M., Kuppens, J., Atsma, F., Schene, A., de Haan, H., . . . Schellekens, A. (2020). Physicians' norms and attitudes towards substance use in colleague physicians: A cross-sectional survey in the Netherlands. *PLoS One*, *15*(4), e0231084. doi:10.1371/journal.pone.0231084.
- Geuijen, P. M., van den Broek, S. J. M., Dijkstra, B. A. G., Kuppens, J. M., de Haan, H. A., de Jong, C. A. J., . . . Schellekens, A. F. A. (2021). Success Rates of Monitoring for Healthcare Professionals with a Substance Use Disorder: A Meta-Analysis. *J Clin Med*, *10*(2). doi:10.3390/jcm10020264.
- Joos, L., Glazemakers, I., & Dom, G. (2013). Alcohol use and hazardous drinking among medical specialists. *Eur Addict Res*, *19*(2), 89-97. doi:10.1159/000341993.
- Kay, M., Mitchell, G., Clavarino, A., & Doust, J. (2008). Doctors as patients: a systematic review of doctors' health access and the barriers they experience. *Br J Gen Pract*, *58*(552), 501-508. doi:10.3399/bjgp08X319486.
- Kay, M., Mitchell, G., Clavarino, A., & Frank, E. (2012). Developing a framework for understanding doctors' health access: a qualitative study of Australian GPs. *Australian Journal of Primary Health*, *18*(2), 158-165. doi:10.1071/PY11003.
- Kunyk, D., Inness, M., Reisdorfer, E., Morris, H., & Chambers, T. (2016). Help seeking by health professionals for addiction: A mixed studies review. *Int J Nurs Stud*, *60*, 200-215. doi:10.1016/j.ijnurstu.2016.05.001.
- Miller, W. R., & Rollnick, S. (2004). Talking Oneself Into Change: Motivational Interviewing, Stages of Change, and Therapeutic Process. *J Cogn Psychother*(4), 299-308. doi:10.1891/jcop.18.4.299.64003.
- Miller, W. R., Walters, S. T., & Bennett, M. E. (2001). How effective is alcoholism treatment in the United States? *J Stud Alcohol*, *62*(2), 211-220. doi:10.15288/jsa.2001.62.211.
- Motta-Ochoa, R., Bertrand, K., Flores-Aranda, J., Patenaude, C., Brunelle, N., Landry, M., & Brochu, S. (2017). A Qualitative Study of Addiction Help-Seeking in People with Different Co-occurring Mental Disorders and Substance Use Problems. *International Journal of Mental Health and Addiction*, *15*(4), 883-899. doi:10.1007/s11469-017-9762-y.
- National Institute on Drug Abuse. (2012). In. Bethesda, Maryland.
- Oreskovich, M. R., Kaups, K. L., Balch, C. M., Hanks, J. B., Satele, D., Sloan, J., . . . Shanafelt, T. D. (2012). Prevalence of alcohol use disorders among American surgeons. *Arch Surg*, *147*(2), 168-174. doi:10.1001/archsurg.2011.1481.
- Oreskovich, M. R., Shanafelt, T., Dyrbye, L. N., Tan, L., Sotile, W., Satele, D., . . . Boone, S. (2015). The prevalence of substance use disorders in American physicians. *Am J Addict*, *24*(1), 30-38. doi:10.1111/ajad.12173.

- Pförringer, D., Mayer, R., Meisinger, C., Freuer, D., & Eyer, F. (2018). Health, risk behaviour and consumption of addictive substances among physicians - results of an online survey. *J Occup Med Toxicol*, *13*, 27. doi:10.1186/s12995-018-0208-7.
- Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change. Applications to addictive behaviors. *Am Psychol*, *47*(9), 1102-1114. doi:10.1037//0003-066x.47.9.1102.
- Rosta, J. (2008). Hazardous alcohol use among hospital doctors in Germany. *Alcohol Alcohol*, *43*(2), 198-203. doi:10.1093/alcalc/agn180.
- Rosta, J., & Aasland, O. G. (2005). Female surgeons' alcohol use: a study of a national sample of norwegian doctors. *Alcohol Alcohol*, *40*(5), 436-440. doi:10.1093/alcalc/agh186.
- Royal Dutch Medical Association. (2020). ABS-artsen toolkit. Retrieved from <https://www.knmg.nl/advies-richtlijnen/abs-artsen-toolkit/abs-artsen-toolkit.htm>.
- Sendler, D. J. (2018). Physicians working under the influence of alcohol: An analysis of past disciplinary proceedings and their outcomes. *Forensic Sci Int*, *285*, 29-37. doi:10.1016/j.forsciint.2018.01.019.
- Substance Abuse and Mental Health Services Administration. (2011). Results from the 2010 National Survey on Drug Use and Health: Vol. I. Summary of national findings. In. Rockville, MD: SAMSHA.
- Sørensen, J. K., Pedersen, A. F., Bruun, N. H., Christensen, B., & Vedsted, P. (2015). Alcohol and drug use among Danish physicians. A nationwide cross-sectional study in 2014. *Dan Med J*, *62*(9).
- Sørensen, J. K., Pedersen, A. F., Vedsted, P., Bruun, N. H., & Christensen, B. (2016). Substance Use Disorders Among Danish Physicians: An Explorative Study of the Professional Socialization and Management of Colleagues With Substance Use Disorders. *J Addict Med*, *10*(4), 248-254. doi:10.1097/ADM.0000000000000228.
- Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care*, *19*(6), 349-357. doi:10.1093/intqhc/mzm042.
- Tyssen, R. (2007). Health problems and the use of health services among physicians: a review article with particular emphasis on Norwegian studies. *Ind Health*, *45*(5), 599-610.
- Töyry, S., Räsänen, K., Kujala, S., Aärimaa, M., Juntunen, J., Kalimo, R., . . . Husman, K. (2000). Self-reported health, illness, and self-care among finnish physicians: a national survey. *Arch Fam Med*, *9*(10), 1079-1085. doi:10.1001/archfami.9.10.1079.
- Unrath, M., Zeeb, H., Letzel, S., Claus, M., & Escobar Pinzón, L. C. (2012). Identification of possible risk factors for alcohol use disorders among general practitioners in Rhineland-Palatinate, Germany. *Swiss Med Wkly*, *142*, w13664. doi:10.4414/smw.2012.13664.
- van Boekel, L. C., Brouwers, E. P., van Weeghel, J., & Garretsen, H. F. (2013). Stigma among health professionals towards patients with substance use disorders and its consequences for healthcare delivery: systematic review. *Drug Alcohol Depend*, *131*(1-2), 23-35. doi:10.1016/j.drugalcdep.2013.02.018.
- van Wamel, A., Croes, E., van Vugt, M., & van Rooijen, S. (2014). *Prevalentie, zorgaanbod, effectiviteit en trends in de verslavingszorg. Achtergrondstudie in opdracht van het College van Zorgverzekeringen*. Retrieved from Trimbos Instituut.
- Wallace, J. E., Lemaire, J. B., & Ghali, W. A. (2009). Physician wellness: a missing quality indicator. *Lancet*, *374*(9702), 1714-1721. doi:10.1016/S0140-6736(09)61424-0.

Table S1. Consolidated criteria for reporting qualitative research (COREQ) checklist

No	Item	Guide questions/description	Page
Domain 1: Research team and reflexivity			
<i>Personal characteristics</i>			
1.	Interviewer/facilitator	Which author(s) conducted the interview?	5
2.	Credentials	What were the researcher's credentials?	5
3.	Occupation	What was their occupation at time of the study?	5
4.	Gender	Was the researcher male or female?	5
5.	Experience and training	What experience/training did the researcher have?	5
<i>Relationship with participants</i>			
6.	Relationship established	Was a relationship established prior to study commencement?	5
7.	Participant knowledge of the interviewer	What did the participants know about the researcher?	5
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator?	5
Domain 2: study design			
<i>Theoretical framework</i>			
9.	Methodological orientation and theory	What methodological orientation was stated to underpin the study?	NA
<i>Participant selection</i>			
10.	Sampling	How were participants selected?	5
11.	Method of approach	How were participants approached?	5
12.	Sample size	How many participants were in the study?	7
13.	Non-participation	How many people refused to participate or dropped out? Reason?	5
<i>Setting</i>			
14.	Setting of data collection	Where was the data collected?	5
15.	Presence of non-participants	Was anyone else present besides the participants and researchers?	No
16.	Description of sample	What are the important characteristics of the sample?	Table 1
<i>Data collection</i>			
17.	Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	5, Box S1, S2, S3
18.	Repeat interviews	Were repeat interviews carried out? If yes, how many?	No
19.	Audio/visual recording	Did the researchers use audio or visual recording to collect the data?	5
20.	Field notes	Were field notes made during and/or after the interview or focus group?	5
21.	Duration	What was the duration of the interviews or focus group?	7
22.	Data saturation	Was data saturation discussed?	5
23.	Transcripts returned	Were transcripts returned to participants for comment and/or correction?	5
Domain 3: analysis and findings			
<i>Data analysis</i>			
24.	Number of data coders	How many data coders coded the data?	6
25.	Description of coding tree	Did authors provide a description of the coding tree?	No
26.	Derivation of themes	Were themes identified in advance or derived from the data?	6
27.	Software	What software, if applicable, was used to manage the data?	6
28.	Participant checking	Did participants provide feedback on the findings?	No
<i>Reporting</i>			
29.	Quotations presented	Were participant quotations presented to illustrate the themes/ findings? Was each quotation identified?	8-11
30.	Data and findings consistent	Was there consistency between the data presented and the findings?	7-11
31.	Clarity of major themes	Were major themes clearly presented in the findings?	7-11
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	7-11

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357.

NA = Not Applicable

Box S1. Topic list interview with physician-patient

0. Personal characteristics
 - Age; gender; specialty; years in practice

1. Implementation Dutch PHP
 - Are you familiar with the Dutch PHP 'ABS-physicians'? If so, how did you hear about it? Did you contact the counseling service?
 - How do you think about the accessibility of counseling service? What is good? What could be improved?
 - How do you think about the image of the counseling service? What is good? What could be improved?
 - How can we raise the familiarity of the Dutch PHP among Dutch physicians?
 - Are you aware of other initiatives (not regular care) that focus on assisting physicians with SUD in the Netherlands?

2. Content of Dutch PHP
 - What did you expect from the counseling service? Have your expectations been met?
OR What would you expect from the counseling service? What should it offer?
 - Did contact with the counseling service assist you? In what way or why not?
OR If you would be familiar with the Dutch PHP, would you have contacted it?
 - What suggestions do you have for improving the counseling service?
 - Would you advise the counseling service to other physicians with SUD? Why or why not?

3. Future Dutch PHP
 - How do you think about extending the services of the Dutch PHP to psychological and/or psychiatric problems among physicians?
 - How do you think about extending the services of the Dutch PHP to all healthcare professionals with SUD?

4. Awareness
 - What can contribute to raising awareness of problematic substance use among physicians? How did you become aware of your SUD?
 - Which people around a physician can best discuss a presumption of problematic substance use? Did people around you discussed (their presumption of) problematic substance use with you?

5. Seeking help
 - What can help physicians with SUD to seek help or treatment earlier? What did help you to seek help or treatment?
 - What can people around a physician with SUD do to assist a physician with seeking help for SUD?

PHP = Physician Health Program, SUD = Substance Use Disorder.

Box S2. Topic list interview with significant other

0. Personal characteristics
 - Age; gender; profession; years in practice
1. Implementation Dutch PHP
 - Are you familiar with the Dutch PHP 'ABS-physicians'? If so, how did you hear about it? Did you contact the counseling service?
 - How do you think about the accessibility of counseling service? What is good? What could be improved?
 - How do you think about the image of the counseling service? What is good? What could be improved?
 - How can we raise the familiarity of the Dutch PHP among Dutch physicians?
 - Are you aware of other initiatives (not regular care) that focus on assisting physicians with SUD in the Netherlands?
2. Content of Dutch PHP
 - What did you expect from the counseling service? Have your expectations been met?
OR What would you expect from the counseling service? What should it offer?
 - Did contact with the counseling service assist you? In what way or why not?
OR If you would be familiar with the Dutch PHP, would you have contacted it?
 - What suggestions do you have for improving the counseling service?
 - Would you advise the counseling service to other physicians with SUD? Why or why not?
3. Future Dutch PHP
 - How do you think about extending the services of the Dutch PHP to psychological and/or psychiatric problems among physicians?
 - How do you think about extending the services of the Dutch PHP to all healthcare professionals with SUD?
4. Awareness
 - What can contribute to raising awareness of problematic substance use among physicians? How did you become aware of your SUD?
 - Which people around a physician can best discuss a presumption of problematic substance use? Did you discuss (the presumption of) problematic substance use with the physician in question? Why or why not?
5. Seeking help
 - What can help physicians with SUD to seek help or treatment earlier?
 - What can people around a physician with SUD do to assist a physician with seeking help for SUD?

PHP = Physician Health Program, SUD = Substance Use Disorder.

Box 53. Topic list interview with PHP employee

0. Personal characteristics
 - Age; gender; profession; years in practice

1. Implementation Dutch PHP
 - How did you become familiar with the Dutch PHP 'ABS-physicians'? What do you do for the Dutch PHP?
 - How do you think about the accessibility of counseling service? What is good? What could be improved?
 - How do you think about the image of the counseling service? What is good? What could be improved?
 - How can we raise the familiarity of the Dutch PHP among Dutch physicians?
 - Are you aware of other initiatives (not regular care) that focus on assisting physicians with SUD in the Netherlands?

2. Content of Dutch PHP
 - What are your experiences with the counseling service? What is good? What could be improved?
 - How are physician-patients and significant others involved in further development of the counseling service?

3. Future Dutch PHP
 - How do you think about extending the services of the Dutch PHP to psychological and/or psychiatric problems among physicians?
 - How do you think about extending the services of the Dutch PHP to all healthcare professionals with SUD?

4. Awareness
 - What can contribute to raising awareness of problematic substance use among physicians?
 - Which people around a physician can best discuss a presumption of problematic substance use?

5. Seeking help
 - What can help physicians with SUD to seek help or treatment earlier?
 - What can people around a physician with SUD do to assist a physician with seeking help for SUD?

PHP = Physician Health Program, SUD = Substance Use Disorder.

CHAPTER 5

Physicians' norms and attitudes towards substance use in colleague physicians: a cross-sectional survey

Pauline M. Geuijen
Marlies E.J. de Rond
Joanneke M. Kuppens
Femke Atsma
Aart H. Schene †
Hein A.de Haan
Cornelis A.J. de Jong
Arnt F.A. Schellekens

PLoS One. 2020;15(4):e0231084

ABSTRACT

Introduction

Substance use disorders in physicians often remain concealed for a long time. Peer monitoring and open discussions with colleagues are essential for identifying a substance use disorder. However, physicians often feel uncomfortable discussing substance use with a colleague. We explored physicians' attitudes and norms about substance use (disorders) and their (intended) approach upon a presumption of substance use in a colleague.

Methods

An online cross-sectional survey concerning "Addiction in physicians" was administered by the Royal Dutch Medical Association physician panel. Overall, 1,685 physicians (47%) responded. Data were analyzed by logistic regression to explore factors associated with taking action upon a substance use presumption.

Results

Most physicians agreed that substance use disorder can happen to anyone (67%), is not a sign of weakness (78%) and that it is a disease that can be treated (83%). Substance use in a working context was perceived as unacceptable (alcohol at work: 99%, alcohol during a standby duty: 91%, alcohol in the eight hours before work: 77%, and illicit drugs in the eight hours before work: 97%). Almost all respondents (97%) intend to act upon a substance use presumption in a colleague. Of the 29% who ever had this presumption, 65% took actual action. Actual action was associated with male gender and older age (OR=1.81; 95% CI=1.20-2.74 and OR=1.03; 95% CI = 1.01-1.05, respectively).

Conclusions

About one-third of physicians reported experience with a presumption of substance use in a colleague. Whilst most physicians intend to take action upon such a presumption, two-thirds actually do act upon a presumption. To bridge this intention-behavior gap continued medical education on signs and symptoms of substance use disorder and instructions on how to enter a supportive dialogue with a colleague about personal issues, may enhance physicians' knowledge, confidence, and ethical responsibility to act upon a presumption of substance use or other concerns in a colleague.

INTRODUCTION

Physical illness, mental problems and substance use disorders (SUDs) hit physicians as any other individual. SUD is associated with personal harm, but may also contribute to physician impairment; thus influencing quality of healthcare (New South Wales, 1992; Wallace, Lemaire, & Ghali, 2009). Substance use or SUD has been shown to contribute to impairment in 20-40% of these cases (Nash et al., 2007; Warhaft, 2004; Weenink, Westert, Schoonhoven, Wollersheim, & Kool, 2015), with consequences as mistakes in diagnoses and medical procedures, or problematic communication skills (Oreskovich et al., 2012; Sendler, 2018). Several studies provide additional evidence for self-reported work-related effects of substance use or SUD (French, Maclean, Sindelar, & Fang, 2011; Lambrechts, Vandersmissen, & Godderis, 2019). It has however been suggested that other variables, like male gender, better predict malpractice and that physicians with mental health problems report medical errors more often due to negative self-appraisal resulting from cognitive bias (Lawson, 2018). Physicians well-being is not only relevant for the individual physician, but also increasingly seen as an important indicator for quality of patient care (Wallace et al., 2009). However, the impact of substance use among physicians is an understudied area.

The lifetime prevalence of SUD in physicians is, according to American numbers, slightly higher (15.4%) than in the general population (12.6%) (Oreskovich et al., 2015; Substance Abuse and Mental Health Services Administration, 2011). In Europe, hazardous alcohol and drug use among physicians are estimated at 18-23% and 3% respectively (Joos, Glazemakers, & Dom, 2013; Pfürringer, Mayer, Meisinger, Freuer, & Eyer, 2018; Rosta, 2008; Rosta & Aasland, 2005; Sørensen, Pedersen, Bruun, Christensen, & Vedsted, 2015; Sørensen, Pedersen, Vedsted, Bruun, & Christensen, 2016; Unrath, Zeeb, Letzel, Claus, & Escobar Pinzón, 2012). Compared to the general population, physicians more often use alcohol and prescription medicines, including sedatives and opioids (Hughes et al., 1992; Merlo & Gold, 2008). Predisposing factors for SUD in physicians include stress and high expectations at work, disrupted lifestyle due to inconsistent working hours, and easy access to prescription drugs (Carinci & Christo, 2009; Shaw, McGovern, Angres, & Rawal, 2004; Unrath et al., 2012).

Normally, society sees physicians as healthy individuals treating patients, not as individuals who might be patients in need of help themselves (Baldisseri, 2007; Kay, Mitchell, Clavarino, & Doust, 2008; Wilson et al., 2009). A qualitative study in New Zealand suggested that this paradox deters physicians to access healthcare for their own health problems (Stanton & Randal, 2011). Besides a tendency of minimization and denial of early symptoms (Stanton & Randal, 2011), impaired physicians indicated that they feel ashamed and that they fear accessing mental healthcare (Baldisseri,

2007; Kay et al., 2008). Their fear includes being stigmatized as a 'patient' or 'addict' and losing their professional confidentiality and career perspective (Baldisseri, 2007; Kay et al., 2008; Sørensen, 2019; Wilson et al., 2009). Minimization and denial of early symptoms and the authority to prescribe drugs subsequently impede identification of SUD in physicians (Lefebvre & Kaufmann, 2017).

Seeking help for SUD by physicians often occurs after a pivotal event, such as being caught using substances at work (Kunyk, Inness, Reisdorfer, Morris, & Chambers, 2016). Some typical signs for SUD in healthcare professionals have been described, including frequent absences, inaccessibility to patients and staff, decreased performance, large quantities of drugs ordered, multiple prescriptions for family members, and vague letters of reference (Baldisseri, 2007; Carinci & Christo, 2009). Since colleagues and other healthcare professionals may notice these signs earlier than formal agencies, peer support and peer report are important mechanisms for identifying substance use problems in physicians (DesRoches et al., 2010; Kunyk et al., 2016).

Although physicians say they feel the ethical duty to report substance use in colleagues (Rice, 1999), several reasons withhold them of reporting a colleague to a Physician Health Program (PHP) (Farber et al., 2005). Frequently cited reasons for not reporting impaired colleagues include fear of retribution and excessive punishment of the impaired physician, the assumption that someone else is taking care of the problem, believing it is not your responsibility, believing nothing would happen as result of the report, and not knowing how to report (DesRoches et al., 2010; Sanfey et al., 2015; Weenink et al., 2015). It is known that attitudes and norms play an important role in intention and actual behavior (Ajzen, 2011). However, we do not know in what way attitudes towards SUD and norms about substance use contribute to a physician's intention and behavior to act upon a substance use presumption in a colleague (Sørensen et al., 2015).

A Dutch survey on impairment and incompetence in healthcare professionals ($n=1,238$; physicians represented 38% of the respondents) revealed that 8.5% of the respondents experienced impairment in a colleague due to substance use during the last year (Weenink et al., 2015). This Dutch survey and a comparable American survey in physicians revealed that almost three quarters of the respondents (64-72%) think that they know how to deal with impairment or incompetence if present (DesRoches et al., 2010; Weenink et al., 2015). A similar proportion of the healthcare professionals (66-69%) say they acted upon an actual impairment or incompetence presumption (DesRoches et al., 2010; Weenink et al., 2015), including talking with the colleague, reporting the colleague to the board of the organization or other relevant authority, or discussing the experience with colleagues. These studies did not investigate factors associated with taking actual action upon a presumption of impairment or incompetence (Sørensen et al., 2016).

Altogether, substance use among physicians is a highly relevant, but understudied area. Colleagues seem to be aware of substance use and SUD among colleagues, but it is unclear how many actually take action upon a substance use presumption in a colleague. To identify factors that are associated with taking action, we investigated a) physician's attitudes towards SUD, b) their norms about work-related substance use, and c) their intended and actual actions upon a presumption of substance use in a colleague. We also explored whether physicians' attitudes, norms and characteristics predicted their actual action upon a substance use presumption.

METHODS

Design and participants

An online survey concerning "Addiction in physicians" was composed and released by the Royal Dutch Medical Association (RDMA) in September 2016. The survey was administered to an existing physician panel of the RDMA. Through this panel the RDMA aims to efficiently collect information concerning physicians' opinions regarding specific topics. The panel distributes maximally 8 survey invitations per year and physicians decide to participate per survey. In total, the physician panel of the RDMA consists of 3,605 Dutch physicians .

Panelists received an e-mail with the invitation to participate in and the link to the online survey. Panelists had three weeks to complete the survey. They received two reminders to respond to the survey. Encrypted data were collected via the web-based survey platform. This survey data was synthesized with encrypted demographic information of the respondents.

The study was reviewed and approved by the internal ethical review board of the Royal Dutch Medical Association. Participants of the RDMA physician panel were informed about the nature of the survey beforehand and they could decide to participate or not. Data were analyzed anonymously.

Measures

The survey consisted of 26 closed and 10 open questions on four main themes: attitudes towards SUD, norms about work-related substance use, presumptions of substance use in a colleague at work, and the Dutch PHP ABS-physicians. For this study, we selected 10 questions that were related to the aim of our study, see Box 1.

SUD attitude response categories were "agree", "don't know" or "disagree". Questions regarding physicians' norms about work-related substance use were assessed by the response categories "yes", "don't know", or "no". Physicians were asked

to indicate what they would do and, if applicable, what they did when presuming a colleague of using alcohol or medicines of the Controlled Substances Act. Response categories included “I would do nothing”/“I wondered how to act, but eventually did nothing”, “I enter(ed) the dialogue with the colleague in question”, “I discuss(ed) it with another colleague”, “I discuss(ed) it with the manager”, “I consult(ed) the Dutch PHP and followed their procedures”, “other, namely ...”, and “don’t know”.

Available demographical information included gender, age, medical specialty, years in practice, and working situation. Medical specialty was divided into four categories based on differences in SUD attitudes per discipline (van Boekel, Brouwers, van Weeghel, & Garretsen, 2013) and convenience with regard to group size: general practice, (psycho) social medicine, contemplative somatic medicine, and surgical and supportive medicine, see Table S1.

Box 1. Theses and questions selected of the RDMA survey

<i>Attitudes</i>	SUD can happen to anyone
	SUD is not a sign of weakness
	SUD is a disease that can be treated
<i>Norms</i>	Do you think you can drink alcohol at work?
	Do you think you can drink alcohol during a standby duty?
	Do you think you can drink alcohol in the eight hours before work?
	Do you think you can use illicit drugs in the eight hours before work?
<i>Presumptions</i>	How would you react when you presume a colleague of using alcohol or medicines of the Controlled Substances Act at work?
	Did you ever presume a colleague of using alcohol or medicines of the Controlled Substances Act at work?
	If yes: What did you do?

RDMA = Royal Dutch Medical Association, SUD = Substance Use Disorder.

Statistical analysis

Dichotomous variables were created for the three SUD attitudes theses (“agree” response versus responses “don’t know” + “disagree”), since we were interested in the extent to which physicians reported empathetic attitudes towards SUD. In order to formulate all three SUD attitude theses positively, one of the theses on SUD attitudes was reversed (from “SUD is a sign of weakness” to “SUD is not a sign of weakness”). Dichotomous variables were also created for the four substance use norm questions (“no” response versus responses “don’t know” + “yes”), since our interest was the extent to which physicians saw work-related substance use as unacceptable. Intended and actual approaches to a presumption of substance use in a colleague at work were

combined into three categories, in order to reflect the nature of action. These categories were direct action (“I enter(ed) the dialogue with the colleague in question”), indirect action (“I discuss(ed) it with another colleague”, “I discuss(ed) it with the manager”, and “I consult(ed) the Dutch PHP and followed their procedures”), and no action (“I would do nothing”, “I wondered how to act, but eventually did nothing” and “don’t know”).

Chi-square tests and Analysis of Variance (ANOVA) tests were used to compare the characteristics of the respondents with the non-respondents. In order to test whether physicians’ attitudes towards SUD and norms about work-related substance use were associated with physician characteristics, Chi-square tests or independent sample t-tests were used when appropriate. Chi-square tests and ANOVA were used to test whether intended and actual approaches upon a substance use presumption in a colleague were associated with physician characteristics. Post hoc Bonferroni tests were conducted to compare attitudes, norms, and approaches by physician characteristics. Binary logistic regression with backward elimination (likelihood ratio test, $\alpha=0.05$) was used in order to explore factors among physician characteristics, attitudes, norms that predicted actual action. The characteristics ‘years in practice’ and ‘working situation’ were not included in the regression analysis due to their strong correlation with age. Multicollinearity of data was checked by determining the tolerance and variance inflation factor (VIF). Sensitivity analyses, excluding the retired physicians, were performed in order to verify timeliness of our findings. All statistical analyses were performed using the Statistical Package for Social Sciences (SPSS), version 22.0 for Windows (IBM Corporation, Armonk, NY).

RESULTS

Of the 3,605 participating Dutch physicians, 1,685 (47%) completed the survey. Respondents were more often female, older, and had more years in practice than non-respondents, see Table 1. Over half of the (psycho) social medicine group responded upon the survey. The other specialty groups had more non-respondents than respondents. The respondent sample consisted of general practitioners (34%), (psycho)social physicians (28%), contemplative somatic specialists (22%), and supportive and surgical specialists (15%), see Table 1 for a more detailed description of the sample.

Attitudes towards SUD

The majority of the respondents agreed with the statement that SUD can happen to anyone (67%), that SUD is not a sign of weakness (78%), and that SUD is a disease that

Table 1. Characteristics of respondents and non-respondents (n=3,605)

	All panel participants	Respondents	Non-respondents	
Total (n (%))	3,605	1,685 (47)	1,920 (53)	
Gender (n (%))				
Male	1,818	807 (44)	1,011 (56)	*
Female	1,727	861 (50)	866 (50)	
Age in years				
(Mean (SD))	52 (13)	53 (13)	52 (13)	*
Specialty group (n (%))				
General practice	1,253	566 (45)	687 (55)	*
(Psycho) social	874	470 (54)	404 (46)	
Contemplative somatic	862	377 (44)	485 (56)	
Surgical and supportive	591	263 (45)	328 (55)	
Years in practice				
(Mean (SD))	21 (13)	22 (12)	21 (13)	*
Working situation (n (%))				
In training	371	152 (41)	219 (59)	*
Working part time	589	293 (50)	296 (50)	
Working fulltime	2,040	951 (47)	1,089 (53)	
Retired	471	232 (49)	239 (51)	

n = number, SD = standard deviation, * = p<.05.

can be treated (83%) (Table 2). Agreement to the thesis “SUD can happen to anyone” was significantly associated with a younger age (52 versus 55 years), less years in practice (21 versus 23 years), and the working situation in training (+13 to +18 percentage points compared to working fulltime and retired). Agreement to the thesis “SUD is not a sign of weakness” was associated with female gender (+8 percentage points compared to male gender), a younger age (52 versus to 56 years), the specialty group (psycho)social medicine, general practice, or contemplative somatic medicine (+11 to +14 percentage points compared to surgical and supportive medicine), less years in practice (21 versus 25 years), and the working situations in training and working full time (+11 to +17 percentage points compared to retired). Agreement to the thesis “SUD is a disease that can be treated” was associated with the specialty group (psycho) social medicine (+8 percentage points compared to surgical and supportive medicine) and the working situation in training (+13 percentage points compared to retired).

Norms about work-related substance use

A vast majority of the respondents considered alcohol at work (99%), alcohol during a standby duty (91%), alcohol or illicit drugs in the eight hours before work unacceptable (77% and 97% respectively), see Table 2. Agreement to the norm that using alcohol at

work is unacceptable was associated with female gender (+1 percentage point compared to male gender) and the specialty group general practice (+3 percentage points compared to surgical and supportive medicine). Unacceptability of using alcohol during a standby duty was associated with the specialty group general practice or (psycho)social medicine (+10 to +14 percentage points compared to contemplative somatic and surgical and supportive medicine). Unacceptability of using alcohol or illicit drugs in the eight hours before work was associated with female gender (+2 to +4 percentage points compared to male gender).

Intended and actual action upon a presumption of substance use in a colleague

Almost all physicians (95%) indicated that they would take action upon a substance use presumption in a colleague, either through direct (86%) or indirect (9%) action (Table 3). Approximately three out of ten physicians ($n=487$; 29%) answered “yes” to the question “Did you ever presume a colleague of using alcohol or medicines of the Controlled Substances Act at work?” Almost half of them (49%) took direct action (i.e. entered the dialogue with the colleague in question), 17% took indirect action (i.e. discussed the presumption with others), while 34% of the physicians took no action (Table 3). Taking action was more often reported in the hypothetical situation of a substance use presumption in a colleague than as a result of an actual presumption (97% versus 65%) (Figure 1). Male physicians were more likely to enter the dialogue with the colleague in question, whereas female physicians were more likely to do nothing. Being older (+4 to +5 years) and working more years in practice (+3 to +4 years) were associated with higher likeliness of entering the dialogue with the colleague in question or discussing the presumption with others. Retired physicians showed highest rates of taking direct and indirect action.

The full logistic regression model revealed male gender (Odds Ratio (OR)=2.07; 95%-Confidence Interval (CI)=1.34-3.21), increasing age (OR=1.03; 95%-CI=1.01-1.05), and disagreement with the attitude “SUD can happen to anyone” (OR=.62; 95%-CI=.40-.96) as predictors for taking actual (direct or indirect) action (Table 4). After correction with backward selection, the final logistic regression model revealed male gender (OR=1.81; 95%-CI=1.20-2.74) and increasing age (OR=1.03; 95%-CI=1.01-1.05) as independent predictors for taking actual action compared to no action (Table 4).

In the final logistic regression analysis, physicians’ attitudes and norms did not predict physicians actual approach upon a substance use presumption in a colleague. The models had a moderate discriminative power, with an Area Under the receiver operating characteristics Curve (AUC) of 0.68. There was no indication for multicollinearity (tolerance > 0.8 and VIF < 1.3). The sensitivity analyses excluding the retired physicians did not substantially alter our results (Table S2).

Table 2. Descriptive statistics of substance use disorder attitudes and norms regarding work-related substance use (n=1,685)

	Agreement with the thesis that ...			Unacceptability of ...			
	SUD can happen to anyone ^a	SUD is not a sign of weakness ^b	SUD is a disease that can be treated ^c	drinking alcohol at work ^d	drinking alcohol during a standby duty ^e	drinking alcohol in eight hours before work ^f	using illicit drugs in eight hours before work ^g
Total (n (%))	1,131 (67)	1,313 (78)	1,394 (83)	1,663 (99)	1,529 (91)	1,293 (77)	1,639 (97)
Gender (n (%))							
Male ¹	540 (67)	598 (74)* ²	657 (81)	791 (98)* ²	722 (90)	602 (75)* ²	778 (96)* ²
Female ²	581 (68)	703 (82)* ¹	724 (84)	856 (99)* ¹	792 (92)	680 (79)* ¹	845 (98)* ¹
Age in years (Mean (SD))	52 (13)*	52 (12)*	53 (13)	53 (13)	53 (13)	53 (12)	53 (13)
Specialty group (n (%))							
General practice ³	384 (68)	446 (79)* ⁶	462 (82)	563 (100)* ⁶	542 (96)* ^{5,6}	438 (77)	552 (98)
(Psycho) social ⁴	321 (68)	386 (82)* ⁶	410 (87)* ⁶	466 (99)	446 (95)* ^{5,6}	365 (78)	455 (97)
Contemplative somatic ⁵	252 (67)	296 (79)* ⁶	306 (81)	372 (99)	318 (85)* ^{3,4}	293 (78)	369 (98)
Surgical and supportive ⁶	168 (64)	178 (68)* ^{3,4,5}	208 (79)* ⁴	253 (97)* ³	215 (82)* ^{3,4}	193 (74)	255 (97)
Years in practice (Mean (SD))	21 (12)*	21 (12)*	23 (13)	22 (12)	22 (12)	22 (12)	22 (12)
Working situation (n (%))							
In training ⁷	120 (79)* ¹⁰	129 (85)* ¹⁰	135 (89)* ¹⁰	148 (97)	138 (91)	111 (73)	146 (96)
Working part time ⁸	198 (68)	229 (78)	245 (84)	289 (99)	270 (92)	218 (74)	286 (98)
Working fulltime ⁹	631 (66)* ⁷	753 (79)* ¹⁰	785 (83)	941 (99)	855 (90)	751 (79)	929 (98)
Retired ¹⁰	142 (61)* ⁷	158 (68)* ⁷	176 (76)* ⁷	228 (98)	215 (93)	168 (72)	223 (96)

n = number, SD = Standard Deviation, SUD = Substance Use Disorder, * = p < .05.

¹⁻¹⁰ Significantly different percentages are printed with corresponding number of the different characteristic.

^a Reference: mean age in years = 55 (SD = 12), mean years in practice = 23 (SD = 12).

^b Reference: mean age in years = 56 (SD = 13), mean years in practice = 25 (SD = 13).

^c Reference: mean age in years = 54 (SD = 12), mean years in practice = 23 (SD = 13).

^d Reference: mean age in years = 50 (SD = 14), mean years in practice = 20 (SD = 14).

^e Reference: mean age in years = 52 (SD = 12), mean years in practice = 21 (SD = 12).

^f Reference: mean age in years = 54 (SD = 13), mean years in practice = 23 (SD = 13).

^g Reference: mean age in years = 57 (SD = 11), mean years in practice = 26 (SD = 12).

Table 3. Descriptive statistics of intended approach, experience, and actual approach upon a presumption of substance use in a colleague

	All respondents	Intended approach (n=7685) ^a		Ever presumed colleague of substance use ^a	Actual approach (n=487)	
		Direct action	Indirect action		Direct action	Indirect action
Total (n (%))	1,685	1,455 (86)	155 (9)	487 (29)	237 (49)	81 (17)
Gender (n (%))						
Male ¹	807	708 (88)	70 (9)	270 (33) ^{*2}	156 (58)	42 (16)
Female ²	861	733 (85)	84 (10)	212 (25) ^{*1}	80 (38)	38 (18)
Age in years						
(Mean (SD))	53 (13)	53 (12)	53 (13)	56 (11) [*]	58 (11)	57 (11)
Specialty group (n (%))						
General practice ³	566	481 (85)	57 (10)	191 (34) ^{*5}	95 (50)	34 (18)
(Psycho) social ⁴	470	414 (88)	34 (7)	143 (30) ^{*5}	73 (51)	21 (15)
Contemplative somatic ⁵	377	328 (87)	37 (10)	78 (21) ^{*3,4}	33 (42)	17 (22)
Surgical and supportive ⁶	263	225 (86)	26 (10)	74 (28)	36 (49)	9 (12)
Years in practice						
(Mean (SD))	22 (12)	22 (12)	22 (13)	25 (12) [*]	26 (11)	25 (12)
Working situation (n (%))						
In training ⁷	152	134 (88)	13 (9)	21 (14) ^{*9,10}	8 (38)	4 (19)
Working part time ⁸	293	249 (85)	26 (9)	66 (23)	19 (29)	11 (17)
Working fulltime ⁹	951	832 (87)	87 (9)	288 (30) ^{*7,10}	142 (49)	51 (18)
Retired ¹⁰	232	193 (83)	23 (10)	98 (42) ^{*7,9}	59 (60)	14 (14)

n = number, SD = standard deviation, * = p<.05.

¹ There were 19 missings on the intended approach.

¹⁻¹⁰ Significantly different percentages are printed with corresponding number of the different characteristic.

^a Reference: mean age in years = 52 (SD = 13), mean years in practice = 21 (SD = 12).

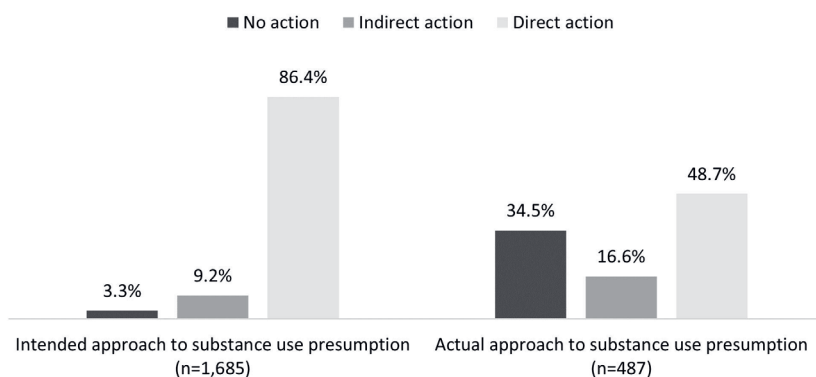


Figure 1. Intended and actual approach upon a presumption of substance use in a colleague

Table 4. Logistic regression of actual action upon a presumption of substance use in a colleague

	Actual action ^a (n=473)				
		Full logistic regression model ^a		Final logistic regression model after backward selection ^b	
Gender (OR (95% CI))					
Male		2.07	1.34-3.21*	1.81	1.20-2.74*
Female		ref		ref	
Age in years (OR (95% CI))					
		1.03	1.01-1.05*	1.03	1.01-1.05*
Specialty group (OR (95% CI))					
General practice		1.57	0.85-2.90	-	
(Psycho) social		1.48	0.78-2.82	-	
Contemplative somatic		1.57	0.76-3.24	-	
Surgical and supportive		ref		ref	
Attitudes					
Agreement with the thesis that ... (OR (95% CI))					
SUD can happen to anyone		0.62	0.40-0.96*	-	
SUD is not a sign of weakness		1.37	0.82-2.30	-	
SUD is a disease that can be treated		1.07	0.64-1.79	-	
Norms					
Unacceptability of ... (OR (95% CI))					
Drinking alcohol at work		0.63	0.13-3.09	-	
Drinking alcohol during a standby duty		1.44	0.70-2.93	-	
Drinking alcohol in eight hours before work		1.48	0.89-2.44	-	
Using illicit drugs in eight hours before work		1.49	0.54-4.10	-	
Model performance (AUC)		0.68		0.68	

AUC = Area Under the receiver operating characteristics Curve, CI = Confidence Interval, n = number, OR = Odds Ratio, ref = reference category, SUD = Substance Use Disorder.

* = p < .05.

^a Actual action: direct and indirect action, reference category: no action.

^b Constant: beta = -2.215, ^b Constant: beta = -1.287.

DISCUSSION

This study aimed to investigate attitudes towards SUD and norms about work-related substance use among physicians, and explored their role in taking action upon a presumption of substance use in a colleague. Overall, physicians showed empathic attitudes towards SUD and their norms regarding work-related substance use were high. Almost one-third of the physicians reported ever having presumed substance use in a colleague at work. Almost two-thirds of these physicians took action after such presumption. Male and older physicians were most likely to take action upon a substance use presumption. Attitudes towards SUD and norms about work-related substance use did not predict action upon a substance use presumption in a colleague.

Our study shows that a substantial proportion of physicians ever presumed substance use in a colleague. A survey in 1,248 Dutch healthcare professionals reported an experience rate of 2.6% in the past year regarding substance use in a colleague (Weenink et al., 2015). With an annual rate of nearly 3% it is rather likely that physicians will be confronted with such a presumption at some point of their career (Frone, 2012). Though our observation of about two-thirds of physicians taking action upon such presumption is in line with previous studies among healthcare professionals (DesRoches et al., 2010; Weenink et al., 2015), definitions of taking action vary among studies. In our, and some European studies (Sørensen et al., 2015; Weenink et al., 2015), taking action mainly concerned peer support or informal action (i.e. informal expression of empathic concerns regarding substance use to the colleague in question or discussing how to act upon the presumption with others), whereas American studies commonly describe peer report or formal action (i.e. delating the colleague in question to relevant authorities) (DesRoches et al., 2010; Dyrbye et al., 2015). Physicians seem to prefer taking peer support over peer report (Raniga, Hider, Spriggs, & Ardagh, 2005), yet around 40% of physicians and medical students in the United Kingdom, United States and New Zealand indicated that they feel it is not their responsibility to address their colleagues' mistakes (Campbell et al., 2007; DesRoches et al., 2010; Dyrbye et al., 2015; Goldie, Schwartz, McConnachie, & Morrison, 2003; Raniga et al., 2005).

About one-third of the physicians in cross-sectional studies reported that they did not act upon impairment or incompetence in a colleague (DesRoches et al., 2010; Weenink et al., 2015). A frequently cited reason for taking no action was the expectation that someone else would take care of the problem (bystander effect) (DesRoches et al., 2010; Sanfey et al., 2015; Weenink et al., 2015). Such bystander effect has repeatedly been observed in dangerous and non-dangerous emergencies in different contexts (Fischer et al., 2011), including for instance when witnessing cardiac arrest (Lamote, Calle, Lyphout, & Van de Voorde, 2019), bullying (Jenkins & Nickerson, 2017), sexual violence (Coker et al., 2017), or drug overdose (Tobin, Davey, & Latkin, 2005). The

decision to take action is explained by the five steps of the bystander or social intervention model (Latané & Darley, 1970). At first, a potential intervener should notice the event, subsequently take it seriously and feel responsibility to intervene, and lastly should know what to do and decide to take action (Buckley, Chapman, & Lewis, 2016). Besides the bystander effect, a dependency position relative to the colleague in question might affect a physician's willingness to act (Perez et al., 2014). A cohort study in medical students showed that only 13% of the first-year physician-students considers reporting a senior colleague's mistake, whereas by the end of their medical training, less than 5% is inclined to do so (Goldie et al., 2003).

Most physicians reported empathic attitudes towards SUD and high norms regarding work-related substance use. Female gender, younger age, being in training, and the specialty group psycho-social medicine were associated with slightly more empathic attitudes. Previous studies showed that more contact and familiarity with SUD may contribute to reducing the stigma towards SUD, and development of more empathic attitudes (Corrigan, Kuwabara, & O'Shaughnessy, 2009; van Boekel, Brouwers, van Weeghel, & Garretsen, 2015). This can be reached by training in addiction medicine (by for example former substance use impaired healthcare professionals), which showed to be effective in increasing physicians' knowledge, attitudes, and skills concerning SUD at various academic levels (student, resident, specialist) (Ayu, Schellekens, Iskandar, Pinxten, & De Jong, 2015). Thereby, workplace policy and supervision are suggested to further improve attitudes towards SUD and work-related substance use norms (Baldisseri, 2007).

With regard to work-related substance use norms, male physicians were somewhat more tolerant than female physicians. These results are in line with an American study showing that more than 95% of workers disapproved substance use by a colleague at work (Frone, 2012). They also showed that disapproval of substance use at work was significantly higher in female workers, compared to male workers. In another American study someone's disapproval of substance use at work was associated with lower own frequency of substance use before and at work (Frone & Brown, 2010). While female physicians showed higher norms towards work-related substance use, the logistic regression showed that male physicians were more than twice as likely to act in case of a substance use presumption in a colleague. Previous studies have suggested gender differences in empathic ability and moral decision making (Friesdorf, Conway, & Gawronski, 2015; Fumagalli et al., 2010), with females being more resistant to decisions to inflicting physical or moral pain to others (Eisenberg, 2005; Fumagalli et al., 2010; Jaffee & Hyde, 2000). It is tempting to speculate that this might also play a role in delating a colleague in case of a substance use presumption.

Recently, the RDMA published an explicit zero-tolerance policy for substance use by physicians at work (Royal Dutch Medical Association, 2018). Indeed, an Australian

study showed an association between the presence of substance use workplace policies and reduced levels of risky drinking and drug use in workers (Pidd, Kostadinov, & Roche, 2016). Besides policy making, watching your own and your colleagues' health is essential for optimal patient care. Education programs can raise awareness in physicians about their own health and develop skills to deal with being a patient themselves or when a colleague becomes a patient and requires help (Cadiz, O'Neill, Butell, Epeneter, & Basin, 2012; Pfürringer et al., 2018; Wallace et al., 2009). Especially when it comes to SUD, which is often associated with denial (Lefebvre & Kaufmann, 2017), peer identification and support by colleagues are important for physicians in order to receive appropriate care at for example mental health facilities or specialized addiction care (Kunyk et al., 2016). A recent Danish study indeed showed that among physicians with unhealthy alcohol use ($n=346$), the majority (78%) reported that help seeking is not relevant to them, indicating a low degree of problem recognition (Sørensen et al., 2015). For physicians it is therefore important to know how to identify substance use in a colleague, and how to enter the dialogue when presuming substance use in a colleague (DesRoches et al., 2010; Marshall, 2008).

This study should be interpreted in the light of several limitations. Although the response rate for the survey was acceptable, young physicians are underrepresented in our study (less than 16,5% was younger than 40 years). Secondly, response bias cannot be ruled out, which might have led to social desirable answers including an overestimation of empathic attitudes towards SUD, work-related substance use norms, and willingness to take action upon a substance use presumption (Babor, Brown, & del Boca, 1990) and/or a selection of respondents with specific attitudes or prior experiences with substance use among colleagues. Thirdly, no validated questionnaires and measures (for example a Likert scale) were used and specialties were grouped partly based on convenience. Due to the broad sample of specialties with small numbers per specialty we were unable to perform analyses at the level of individual specialties.

Conclusions

About one-third of physicians reported experience with a presumption of substance use or SUD in a colleague. Whilst most physicians intend to take action upon such a presumption, two-thirds actually do act upon a presumption. To bridge this intention-behavior gap continued medical education on signs and symptoms of SUD and instructions on how to express empathic concerns to a colleague about personal issues, may enhance physicians' knowledge, confidence, and ethical responsibility to act upon a presumption of substance use or other concerns in a colleague. This will ultimately benefit physicians' health as well as quality of patient care.

Author contributions

Conceptualization, P.G., M.R., F.A., C.J. and A.F.S.; methodology, P.G., F.A. and A.F.S.; formal analysis, P.G.; writing - original draft preparation, P.G.; writing - review and editing, M.R., J.K., F.A., A.H.S., H.H., C.J. and A.F.S.; supervision, A.F.S.; funding acquisition, M.R..

Ethics statement

The study was reviewed by the internal ethical review board of the Royal Dutch Medical Association. Participants of the RDMA physician panel were informed about the nature of the survey beforehand and they could decide to participate or not. Data were analyzed anonymously.

Data availability

The data of the current survey study are hosted by the Royal Dutch Medical Association. Their policy is not to make the current data publicly available, for two reasons. First, participants did not provide informed consent for data-sharing. Second, the Royal Dutch Medical Association considers data on substance use (disorders) among physicians as sensitive information, that cannot be shared. However, the data used for the current study are available for researchers who meet the criteria for access to confidential data, after approval from the internal ethical review board of the Royal Dutch Medical Association (m.de.rond@fed.knmg.nl).

Conflict of interest

The authors have declared that no competing interests exist.

Funding

This study was supported by the Dutch Ministry of Health, Welfare and Sport (grant number 328622) to the Royal Dutch Medical Association. The funder had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

REFERENCES

- Ajzen, I. (2011). The theory of planned behaviour: reactions and reflections. *Psychol Health, 26*(9), 1113-1127. doi:10.1080/08870446.2011.613995.
- Ayu, A. P., Schellekens, A. F., Iskandar, S., Pinxten, L., & De Jong, C. A. (2015). Effectiveness and Organization of Addiction Medicine Training Across the Globe. *Eur Addict Res, 21*(5), 223-239. doi:10.1159/000381671.
- Babor, T. F., Brown, J., & del Boca, F. K. (1990). Validity of self-reports in applied research on addictive behaviors: Fact or fiction? *Behavioral Assessment, 12*(1), 5-31.
- Baldisseri, M. R. (2007). Impaired healthcare professional. *Crit Care Med, 35*(2 Suppl), S106-116. doi:10.1097/01.CCM.0000252918.87746.96.
- Buckley, L., Chapman, R. L., & Lewis, I. (2016). A Systematic Review of Intervening to Prevent Driving While Intoxicated: The Problem of Driving While Intoxicated (DWI). *Subst Use Misuse, 51*(1), 9.
- Cadiz, D. M., O'Neill, C., Butell, S. S., Epeneter, B. J., & Basin, B. (2012). Quasi-experimental evaluation of a substance use awareness educational intervention for nursing students. *J Nurs Educ., 51*(7), 5.
- Campbell, E. G., Regan, S., Gruen, R. L., Ferris, T. G., Rao, S. R., Cleary, P. D., & Blumenthal, D. (2007). Professionalism in medicine: results of a national survey of physicians. *Ann Intern Med, 147*(11), 795-802.
- Carinci, A. J., & Christo, P. J. (2009). Physician impairment: Is recovery feasible? *Pain Physician, 12*(3), 487-491.
- Coker, A. L., Bush, H. M., Cook-Craig, P. G., DeGue, S. A., Clear, E. R., Brancato, C. J., . . . Recktenwald, E. A. (2017). RCT Testing Bystander Effectiveness to Reduce Violence. *Am J Prev Med, 52*(5), 566-578. doi:10.1016/j.amepre.2017.01.020.
- Corrigan, P. W., Kuwabara, S. A., & O'Shaughnessy. (2009). The public stigma of mental illness and drug addiction. *Journal of Social Work, 9*(2), 139-147.
- DesRoches, C. M., Rao, S. R., Fromson, J. A., Birnbaum, R. J., Iezzoni, L., Vogeli, C., & Campbell, E. G. (2010). Physicians' perceptions, preparedness for reporting, and experiences related to impaired and incompetent colleagues. *JAMA, 304*(2), 187-193. doi:10.1001/jama.2010.921.
- Dyrbye, L. N., West, C. P., Satele, D., Boone, S., Sloan, J., & Shanafelt, T. D. (2015). A national study of medical students' attitudes toward self-prescribing and responsibility to report impaired colleagues. *Acad Med, 90*(4), 485-493. doi:10.1097/ACM.0000000000000604.
- Eisenberg, N. (2005). The development of empathy-related responding. *Nebr Symp Motiv, 51*, 73-117.
- Farber, N. J., Gilibert, S. G., Aboff, B. M., Collier, V. U., Weiner, J., & Boyer, E. G. (2005). Physicians' willingness to report impaired colleagues. *Soc Sci Med, 61*(8), 1772-1775. doi:10.1016/j.socscimed.2005.03.029.
- Fischer, P., Krueger, J. I., Greitemeyer, T., Vogrinic, C., Kastenmüller, A., Frey, D., . . . Kainbacher, M. (2011). The bystander-effect: a meta-analytic review on bystander intervention in dangerous and non-dangerous emergencies. *Psychol Bull, 137*(4), 517-537. doi:10.1037/a0023304.
- French, M. T., Maclean, J. C., Sindelar, J. L., & Fang, H. (2011). The morning after: alcohol misuse and employment problems. *Appl Econ, 43*(21), 2705-2720. doi:10.1080/00036840903357421.
- Friesdorf, R., Conway, P., & Gawronski, B. (2015). Gender differences in responses to moral dilemmas: a process dissociation analysis. *Pers Soc Psychol Bull, 41*(5), 696-713. doi:10.1177/0146167215575731.
- Frone, M. R. (2012). Workplace Substance Use Climate: Prevalence and Distribution in the U.S. Workforce. *J Subst Use, 71*(1), 72-83. doi:10.3109/14659891.2010.531630.
- Frone, M. R., & Brown, A. L. (2010). Workplace substance-use norms as predictors of employee substance use and impairment: a survey of U.S. workers. *J Stud Alcohol Drugs, 71*(4), 526-534.
- Fumagalli, M., Ferrucci, R., Mameli, F., Marcegaglia, S., Mrakic-Spota, S., Zago, S., . . . Priori, A. (2010). Gender-related differences in moral judgments. *Cogn Process, 11*(3), 219-226. doi:10.1007/s10339-009-0335-2.
- Goldie, J., Schwartz, L., McConnachie, A., & Morrison, J. (2003). Students' attitudes and potential behaviour with regard to whistle blowing as they pass through a modern medical curriculum. *Med Educ, 37*(4), 368-375.
- Hughes, P. H., Storr, C., Baldwin, D. C., Williams, K. M., Conard, S., & Sheehan, D. (1992). Patterns of substance use in the medical profession. *Md Med J, 41*(4), 311-314.
- Jaffee, S., & Hyde, J. S. (2000). Gender differences in moral orientation: a meta-analysis. *Psychol Bull, 126*(5), 703-726.
- Jenkins, L. N., & Nickerson, A. B. (2017). Bullying participant roles and gender as predictors of bystander intervention. *Aggress Behav, 43*(3), 281-290. doi:10.1002/ab.21688.

- Joos, L., Glazemakers, I., & Dom, G. (2013). Alcohol use and hazardous drinking among medical specialists. *Eur Addict Res*, 19(2), 89-97. doi:10.1159/000341993.
- Kay, M., Mitchell, G., Clavirino, A., & Doust, J. (2008). Doctors as patients: a systematic review of doctors' health access and the barriers they experience. *Br J Gen Pract*, 58(552), 501-508. doi:10.3399/bjgp08X319486.
- Kunyk, D., Inness, M., Reisdorfer, E., Morris, H., & Chambers, T. (2016). Help seeking by health professionals for addiction: A mixed studies review. *Int J Nurs Stud*, 60, 200-215. doi:10.1016/j.ijnurstu.2016.05.001.
- Lambrechts, M. C., Vandersmissen, L., & Godderis, L. (2019). Alcohol and other drug use among Belgian workers and job-related consequences. *Occup Environ Med*, 76(9), 652-659. doi:10.1136/oemed-2019-105690.
- Lamote, I., Calle, P., Lyphout, C., & Van de Voorde, P. (2019). Adequacy of bystander actions in unconscious patients: an audit study in the Ghent region (Belgium). *Eur J Emerg Med*. doi:10.1097/MEJ.0000000000000595.
- Latané, B., & Darley, J. M. (1970). *The Unresponsive Bystander: Why Doesn't He Help?* (Vol. 1).
- Lawson, N. D. (2018). Burnout is Not Associated With Increased Medical Errors. *Mayo Clin Proc*, 93(11), 1683. doi:10.1016/j.mayocp.2018.08.015.
- Lefebvre, L. G., & Kaufmann, I. M. (2017). The identification and management of substance use disorders in anesthesiologists. *Can J Anaesth*, 64(2), 211-218. doi:10.1007/s12630-016-0775-y.
- Marshall, E. J. (2008). Doctors' health and fitness to practise: treating addicted doctors. *Occup Med (Lond)*, 58(5), 334-340. doi:10.1093/occmed/kqn081.
- Merlo, L. J., & Gold, M. S. (2008). Prescription opioid abuse and dependence among physicians: hypotheses and treatment. *Harv Rev Psychiatry*, 16(3), 181-194. doi:10.1080/10673220802160316.
- Nash, L., Daly, M., Johnson, M., Walter, G., Walton, M., Willcock, S., . . . Tennant, C. (2007). Psychological morbidity in Australian doctors who have and have not experienced a medico-legal matter: cross-sectional survey. *Aust N Z J Psychiatry*, 41(11), 917-925. doi:10.1080/00048670701634960.
- Medical Practice Act. (1992).
- Oreskovich, M. R., Kaups, K. L., Balch, C. M., Hanks, J. B., Satele, D., Sloan, J., . . . Shanafelt, T. D. (2012). Prevalence of alcohol use disorders among American surgeons. *Arch Surg*, 147(2), 168-174. doi:10.1001/archsurg.2011.1481.
- Oreskovich, M. R., Shanafelt, T., Dyrbye, L. N., Tan, L., Sotile, W., Satele, D., . . . Boone, S. (2015). The prevalence of substance use disorders in American physicians. *Am J Addict*, 24(1), 30-38. doi:10.1111/ajad.12173.
- Perez, B., Knych, S. A., Weaver, S. J., Liberman, A., Abel, E. M., Oetjen, D., & Wan, T. T. (2014). Understanding the barriers to physician error reporting and disclosure: a systemic approach to a systemic problem. *J Patient Saf*, 10(1), 45-51. doi:10.1097/PTS.0b013e31829e4b68.
- Pförringer, D., Mayer, R., Meisinger, C., Freuer, D., & Eyer, F. (2018). Health, risk behaviour and consumption of addictive substances among physicians - results of an online survey. *J Occup Med Toxicol*, 13, 27. doi:10.1186/s12995-018-0208-7.
- Pidd, K., Kostadinov, V., & Roche, A. (2016). Do workplace policies work? An examination of the relationship between alcohol and other drug policies and workers' substance use. *Int J Drug Policy*, 28, 48-54. doi:10.1016/j.drugpo.2015.08.017.
- Raniga, S., Hider, P., Spriggs, D., & Ardagh, M. (2005). Attitudes of hospital medical practitioners to the mandatory reporting of professional misconduct. *N Z Med J*, 118(1227), U1781.
- Rice, B. (1999). Doctor policing: too tough? Too easy? Impaired physicians: giving rehab programs a new look. *Med Econ*, 76(9), 173-174, 179-180, 185.
- Rosta, J. (2008). Hazardous alcohol use among hospital doctors in Germany. *Alcohol Alcohol*, 43(2), 198-203. doi:10.1093/alcald/agh180.
- Rosta, J., & Aasland, O. G. (2005). Female surgeons' alcohol use: a study of a national sample of norwegian doctors. *Alcohol Alcohol*, 40(5), 436-440. doi:10.1093/alcald/agh186.
- Royal Dutch Medical Association. (2018). KNMG-gedragsregel Nul is de Norm.
- Sanfey, H., Fromson, J. A., Mellinger, J., Rakinic, J., Williams, M., & Williams, B. (2015). Residents in distress: an exploration of assistance-seeking and reporting behaviors. *Am J Surg*, 210(4), 678-684. doi:10.1016/j.amjsurg.2015.05.011.
- Sendler, D. J. (2018). Physicians working under the influence of alcohol: An analysis of past disciplinary proceedings and their outcomes. *Forensic Sci Int*, 285, 29-37. doi:10.1016/j.forsciint.2018.01.019.
- Shaw, M. F., McGovern, M. P., Angres, D. H., & Rawal, P. (2004). Physicians and nurses with substance use disorders. *J Adv Nurs*, 47(5), 561-571. doi:10.1111/j.1365-2648.2004.03133.x.

- Stanton, J., & Randal, P. (2011). Doctors accessing mental-health services: an exploratory study. *BMJ Open*, 1(1), e000017. doi:10.1136/bmjopen-2010-000017.
- Substance Abuse and Mental Health Services Administration. (2011). Results from the 2010 National Survey on Drug Use and Health: Vol. I. Summary of national findings. In. Rockville, MD: SAMSHA.
- Sørensen, J. K. (2019). How physicians professional socialisation and social technologies may affect colleagues in substance use disorders. *Addiction Research & Theory*, 27(2), 104-113. doi:10.1080/16066359.2018.1457654.
- Sørensen, J. K., Pedersen, A. F., Bruun, N. H., Christensen, B., & Vedsted, P. (2015). Alcohol and drug use among Danish physicians. A nationwide cross-sectional study in 2014. *Dan Med J*, 62(9).
- Sørensen, J. K., Pedersen, A. F., Vedsted, P., Bruun, N. H., & Christensen, B. (2016). Substance Use Disorders Among Danish Physicians: An Explorative Study of the Professional Socialization and Management of Colleagues With Substance Use Disorders. *J Addict Med*, 10(4), 248-254. doi:10.1097/ADM.0000000000000228.
- Tobin, K. E., Davey, M. A., & Latkin, C. A. (2005). Calling emergency medical services during drug overdose: an examination of individual, social and setting correlates. *Addiction*, 100(3), 397-404. doi:10.1111/j.1360-0443.2005.00975.x.
- Unrath, M., Zeeb, H., Letzel, S., Claus, M., & Escobar Pinzón, L. C. (2012). Identification of possible risk factors for alcohol use disorders among general practitioners in Rhineland-Palatinate, Germany. *Swiss Med Wkly*, 142, w13664. doi:10.4414/smw.2012.13664.
- van Boekel, L. C., Brouwers, E. P., van Weeghel, J., & Garretsen, H. F. (2013). Stigma among health professionals towards patients with substance use disorders and its consequences for healthcare delivery: systematic review. *Drug Alcohol Depend*, 131(1-2), 23-35. doi:10.1016/j.drugalcdep.2013.02.018.
- van Boekel, L. C., Brouwers, E. P., van Weeghel, J., & Garretsen, H. F. (2015). Comparing stigmatising attitudes towards people with substance use disorders between the general public, GPs, mental health and addiction specialists and clients. *Int J Soc Psychiatry*, 61(6), 539-549. doi:10.1177/0020764014562051.
- Wallace, J. E., Lemaire, J. B., & Ghali, W. A. (2009). Physician wellness: a missing quality indicator. *Lancet*, 374(9702), 1714-1721. doi:10.1016/S0140-6736(09)61424-0.
- Warhaft, N. J. (2004). The Victorian Doctors Health Program: the first 3 years. *Med J Aust*, 181(7), 376-379.
- Weenink, J. W., Westert, G. P., Schoonhoven, L., Wollersheim, H., & Kool, R. B. (2015). Am I my brother's keeper? A survey of 10 healthcare professions in the Netherlands about experiences with impaired and incompetent colleagues. *BMJ Qual Saf*, 24(1), 56-64. doi:10.1136/bmjqs-2014-003068.
- Wilson, A., Rosen, A., Randal, P., Pethebridge, A., Codyre, D., Barton, D., . . . Rose, L. (2009). Psychiatrically impaired medical practitioners: an overview with special reference to impaired psychiatrists. *Australas Psychiatry*, 17(1), 6-10. doi:10.1080/10398560802579351.

Table S1. Distribution of various medical specialties (*n*=1,676)

Specialty group			
General practice (<i>n</i> =566)	(Psycho) social (<i>n</i> =470)	Contemplative somatic (<i>n</i> =377)	Supportive and surgical (<i>n</i> =263)
- general practice (<i>n</i> =566)	- addiction medicine (<i>n</i> =4)	- allergology (<i>n</i> =1)	- anesthesiology (<i>n</i> =51)
	- forensic medicine (<i>n</i> =7)	- cardiology (<i>n</i> =16)	- cardiothoracic surgery (<i>n</i> =2)
	- infectious disease control (<i>n</i> =2)	- dermatology and venereology (<i>n</i> =9)	- clinical chemistry (<i>n</i> =2)
	- insurance medicine (<i>n</i> =61)	- internal medicine (<i>n</i> =74)	- clinical genetics (<i>n</i> =3)
	- mental disability (<i>n</i> =17)	- gastroenterology (<i>n</i> =10)	- general surgery (<i>n</i> =40)
	- occupational medicine (<i>n</i> =125)	- geriatrics (<i>n</i> =144)	- medical microbiology (<i>n</i> =9)
	- policy and advice (<i>n</i> =10)	- neurology (<i>n</i> =24)	- neurosurgery (<i>n</i> =3)
	- psychiatry (<i>n</i> =124)	- pediatrics (<i>n</i> =48)	- nuclear medicine (<i>n</i> =5)
	- public health (<i>n</i> =68)	- pneumology (<i>n</i> =14)	- obstetrics and gynecology (<i>n</i> =40)
	- social medical assessment and counseling (<i>n</i> =4)	- rehabilitation medicine (<i>n</i> =25)	- ophthalmology (<i>n</i> =17)
	- tuberculosis control (<i>n</i> =1)	- rheumatology (<i>n</i> =11)	- orthopedics (<i>n</i> =17)
	- youth healthcare (<i>n</i> =47)	- sports medicine (<i>n</i> =1)	- otolaryngology (<i>n</i> =9)
			- pathology (<i>n</i> =10)
			- plastic surgery (<i>n</i> =6)
			- emergency medicine (<i>n</i> =10)
			- radiology (<i>n</i> =19)
			- radiotherapy (<i>n</i> =9)
			- urology (<i>n</i> =11)

n = number.

Table S2. Sensitivity analyses: logistic regression of actual action upon a presumption of substance use in a colleague; sample without retired physicians

	Actual action ^a (n=375)			
		Full logistic regression model ^a		Final logistic regression model after backward selection ^b
Gender (OR (95% CI))				
Male	2.04	1.27-3.29*	1.79	1.14-2.81*
Female	ref		ref	
Age in years (OR (95% CI))	1.04	1.01-1.06*	1.04	1.01-1.06*
Specialty group (OR (95% CI))				
General practice	1.21	0.59-2.50	-	
(Psycho) social	1.23	0.58-2.59	-	
Contemplative somatic	1.34	0.59-3.07	-	
Surgical and supportive	ref		ref	
Attitudes				
Agreement with the thesis that ... (OR (95% CI))				
SUD can happen to anyone	0.64	0.39-1.05	-	
SUD is not a sign of weakness	1.49	0.82-2.73	-	
SUD is a disease that can be treated	0.85	0.47-1.56	-	
Norms				
Unacceptability of ... (OR (95% CI))				
Drinking alcohol at work	0.98	0.17-5.75	-	
Drinking alcohol during a standby duty	1.72	0.80-3.72	-	
Drinking alcohol in eight hours before work	1.32	0.75-2.32	-	
Using illicit drugs in eight hours before work	1.55	0.53-4.56	-	
Model performance (AUC)	0.66		0.66	

AUC = Area Under the receiver operating characteristics Curve, CI = Confidence Interval, n = number, OR = Odds Ratio, ref = reference category, SUD = Substance Use Disorder.

* = p<.05.

^a Actual action: direct and indirect action, reference category: no action.

^b Constant: beta = -2.771, ^b Constant: beta = -1.603.



DISCUSSION AND SUMMARY



CHAPTER 6

General discussion

This thesis aimed to provide insight into the understudied area of substance use disorders (SUDs) among physicians. The presented studies investigated the epidemiology of SUD among physicians, the success rates of monitoring among healthcare professionals with SUD, barriers and facilitators for seeking help among physicians with SUD, and experience with a substance use presumption in a colleague physician. Main findings of these studies were:

- The prevalence rates of clinical SUD diagnoses and drinking patterns were fairly comparable or slightly lower for physicians, as compared to a highly educated reference population. Looking in further detail showed that physician SUD patients had a higher proportion of sedative use disorder compared to SUD patients in the reference population.
- About three-quarters of the healthcare professionals with SUD in monitoring programs were abstinent during follow-up and working at the end of the follow-up period. The heterogeneity in success rates was partly explained by the starting moment of monitoring. Participants who started with monitoring after successful initial treatment had better outcomes compared to those who started monitoring simultaneously with treatment.
- Physicians with SUD face barriers when seeking help for SUD mostly at the level of the individual, like negative feelings and lack of disease awareness. In contrast, individuals around physicians with SUD and health services could facilitate the help seeking process by offering confidential and non-punitive support. Ambassadors who share personal (positive) testimonials can further facilitate help seeking for SUD by physicians.
- About one-third of physicians reported experience with a substance use presumption in a colleague. Whilst most physicians intend to take action upon this, two-thirds of the physicians who experienced such a presumption did actually act upon it. Male and older physicians were most likely to take action upon a substance use presumption.

DISCUSSION OF FINDINGS

In this section, the findings of this thesis will be discussed, with a particular focus on the epidemiology of substance use and SUD among physicians and the relevance of this problem. Subsequently, the role of stigma surrounding SUD among physicians is addressed. Finally, research considerations will be discussed and recommendations will be made for practice, policy, and research regarding SUD among physicians.

Is SUD a problem among physicians?

This thesis showed that the number of physicians in treatment for SUD is rather low (0.3%) and similar to the number in the general population with a comparable educational level (0.5%) (*Chapter 2*). However, the number of individuals in treatment for SUD is only a fraction of the population that meets the criteria for a SUD diagnosis in the general population (worldwide prevalence rate alcohol use disorder: 5.1%; drug use disorder: 0.7%) (United Nations Office on Drugs and Crime, 2021; World Health Organization, 2018). This so-called treatment gap is defined as the “absolute difference between the true prevalence of a disorder and the treated proportion of individuals affected by the disorder” (Kohn, Saxena, Levav, & Saraceno, 2004). A worldwide review about treatment gaps showed that among mental disorders, alcohol use disorders (AUD) had the widest treatment gap, being about 90% in Europe (Bijl & Ravelli, 2000; Bijl, Ravelli, & van Zessen, 1998; Kohn et al., 2004).

Despite this huge treatment gap, a Dutch study suggested that the treatment gap for SUD might be less problematic than it seems (Tuithof, Ten Have, van den Brink, Vollebergh, & de Graaf, 2016). By means of three-year follow-up data of NEMESIS-2 (Netherlands Mental Health Survey and Incidence Study-2) the study showed that individuals with moderate to severe AUD were most likely to seek specialized AUD treatment, and that individuals who sought general or no treatment were most likely to experience mild AUD symptoms with a favorable natural course (Tuithof et al., 2016). About a quarter of individuals who sought general or no treatment had moderate to severe AUD and this group might benefit from specialized AUD treatment (Tuithof et al., 2016). These findings suggest a much smaller treatment gap for severe AUD (25%) than previously reported for SUD in general (90%). However, it still implies that there might be a considerable group of individuals, including physicians, with substance use problems who might benefit from specialized addiction treatment. It remains to be studied whether the treatment gap for severe SUD is comparable to the one for severe AUD and whether the treatment gap for SUD among physicians is comparable to that for individuals with SUD in general.

In our qualitative study, PHP employees mentioned that physician SUD patients show difficulties with estimating the seriousness of their SUD (*Chapter 4*). For some of the physicians with SUD, this could result in self-treatment and self-medication, as literature shows that these practices are, despite clear professional guidelines, strongly embedded within the culture of medicine (Montgomery, Bradley, Rochfort, & Panagopoulou, 2011; Morishita, Iida, & Nishigori, 2020). Additionally, informal consultations with a colleague have been reported, often without formal history-taking, as an alternative for regular care (Gold, Andrew, Goldman, & Schwenk, 2016; Kay, Mitchell, Clavarino, & Frank, 2012). Although the extent of self-treatment and informal

consultation among physicians with SUD is unknown, these factors may apply to those physicians with SUD who do not seek help at a treatment facility.

The use of sedatives by physicians deserves attention, given the relatively higher proportion of sedative use disorder among physicians (16.8%) compared to the highly educated reference group (6.8%) (*Chapter 2*). High proportions of prescription drug use disorders (26%-42%) were also observed by American studies, showing especially increased proportions of (prescription) opioid use disorder (Angres, McGovern, Shaw, & Rawal, 2003; Cottler et al., 2013; Shaw, McGovern, Angres, & Rawal, 2004). In general, the level of (prescription) opioid use in the United States is much higher than in Europe, which has been associated with the marketing of opioids directly to patients as this is allowed in the United States and prohibited in Europe (Kalkman et al., 2022). A plausible explanation for an enhanced prevalence of prescription drug use disorder among physicians is that they have the authority to prescribe drugs, which makes them more familiar with and gives them easier access to prescription drugs compared to the general population (Hartnett, Drakeford, Dunne, McLoughlin, & Kennedy, 2020).

As in other individuals with SUD, SUD among physicians has major impact on well-being and functioning. Generally, physician well-being is associated with their functioning, e.g. patient satisfaction, adherence to treatment, and quality of patient care (Scheepers, Boerebach, Arah, Heineman, & Lombarts, 2015). The other way round, sub-optimal quality of care, reduced patient adherence and satisfaction, and increased risk of medical errors were suggested as negative medical consequences of physician impairment (Wallace, Lemaire, & Ghali, 2009). Consequently, physician wellness has been proposed as a missing quality indicator (Wallace et al., 2009).

Substance use was recently identified as a risk factor for complaints and impaired performance among physicians (Austin et al., 2021). A Polish study on disciplinary proceedings of 17 physicians accused of providing medical care under the influence of alcohol showed that complaints about poor communication were most common, filed for 65% of the accused physicians (Sendler, 2018). About 6% of the potentially affected patients ($n=157$) treated by these physicians were actually affected by malpractice due to omissions in care, failure to administer appropriate medication, post-operative complications, and misdiagnosis (Sendler, 2018). Taken together, physician impairment due to substance use can have tremendous consequences for individuals dependent on the quality of their work for their safety. Therefore, physician well-being should be seen as an important indicator for the quality of a physician's work since all physical and psychological complaints or disorders may impact physician functioning (Wallace et al., 2009).

Taken together, the risk for SUD is comparable between physicians and the general population. Due to a significant treatment gap, the prevalence of physicians and

individuals with a clinical SUD diagnosis is a gross underestimation of the prevalence of physicians and individuals who meet the criteria for a SUD diagnosis. Moreover, vigilance on SUD among physicians is recommended because of an occupational risk associated with using addictive substances and their professional responsibility for patient lives.

What is the role of stigmatization?

Looking at stigmatization towards individuals with mental illness, negative attitudes can be experienced from four different perspectives (Subu et al., 2021). From a societal perspective, these attitudes are known as public or social stigma and embedding these attitudes in policies or culture is known as institutional stigma (Ahmedani, 2011; Corrigan, Powell, & Rüscher, 2012; Subu et al., 2021; Yanos, Lucksted, Drapalski, Roe, & Lysaker, 2015). From a patient perspective, self-stigma includes relating negative attitudes to oneself or one's own mental illness (Ahmedani, 2011; Corrigan et al., 2012; Subu et al., 2021). Lastly, in the case of professional stigma, these negative attitudes are held by a treating professional (Ahmedani, 2011; Subu et al., 2021).

Despite good treatment options for SUD in general and availability of specific PHPs with a favorable prognosis for physicians with SUD (*Chapter 3*), a large proportion of physicians who meet the criteria for SUD diagnosis does not seek specialized addiction treatment (*Chapter 2*) and/or does not receive adequate treatment (Kay et al., 2012; Morishita et al., 2020). During our studies, we encountered several factors related to stigma that contribute to this treatment gap, including 1) the taboos on SUD in society and on illness in general among physicians, 2) the individual barriers to seeking help among physicians with SUD, and 3) a sub-optimal treatment relationship between physician patients and their treating physicians (*Chapter 4*). Below, we explore whether the four types of mental health-related stigmatization also play a role in seeking and offering help regarding physicians with SUD.

1) The taboos on SUD in society and illness in general among physicians

The public or social stigma surrounding SUD has been described to result in negative attitudes and reactions of the society towards individuals with SUD, like stereotyping, emotional reactions, and status loss and discrimination (Yang, Wong, Grivel, & Hasin, 2017). First, stereotyping includes linking individuals with SUD to public conceptions about negative characteristics, like dangerousness, unpredictability, and reduced decision-making ability (Wallace, 2012; Yang et al., 2017). Subsequently, these negative characteristics linked to individuals with SUD may lead to emotional reactions (fear, anger, and pity) from society (Wallace, 2012; Yang et al., 2017). Finally, status loss and discrimination occur as a result of stereotyping and emotional reactions, so that

individuals with SUD are avoided and help is not offered (Wallace, 2012; Yang et al., 2017).

Avoidance and not offering help are very undesirable responses regarding physicians with SUD, since colleagues and other healthcare professionals are important mechanisms for identifying SUD in physicians (DesRoches et al., 2010; Kunyk, Inness, Reisdorfer, Morris, & Chambers, 2016). In this thesis, we found that whilst most physicians are willing to act upon a substance use presumption in a colleague, two-thirds actually took action (*Chapter 5*). Although physicians feel the ethical duty to act upon substance use in colleagues (Rice, 1999), discrimination of both the physician in question and the reporting colleague(s) seem to prevent them from reporting a physician to a PHP (Farber et al., 2005). Other frequently cited reasons that prevent colleagues from reporting are the assumption that someone else is taking care of the problem (bystander effect), the belief that nothing will happen as result of the report, and lack of knowledge on what steps to take and which support options are available (DesRoches et al., 2010; Marshall, 2008; Perez et al., 2014; Sanfey et al., 2015; Weenink, Westert, Schoonhoven, Wollersheim, & Kool, 2015).

Moreover, the institutional stigma surrounding SUD among physicians is associated with the so-called conspiracy of silence in the culture of medicine, which includes the reluctance of recognizing and talking openly about occupational stressors or health concerns among physicians (Arnetz, 2001; Wallace, 2012; Wallace et al., 2009). For a long time, the institutional approach of impaired physicians mainly focused on protecting patient safety, perpetuating a culture of punishment regarding impaired physicians rather than offering confidential and non-punitive support (Taub et al., 2006). This causes tolerance for both mental and physical illnesses to be limited among physicians, probably because most physicians did not learn how to adequately apply self-care in medical school (Wallace, 2012). Out of respect and loyalty, colleagues offer impaired physicians the opportunity to work it out on their own, as a result the impaired physician will not receive adequate social support or help (McCall, 2001; Wallace, 2012; Wallace et al., 2009).

2) *The individual barriers to seeking help among physicians with SUD*

Self-stigma surrounding SUD and illness in general among physicians may underlie individual barriers for seeking help among physicians with SUD. In this thesis, we found the following individual barriers: negative feelings, lack of disease awareness, negative personal consequences, low willingness to act, and distrust of privacy and anonymity (*Chapter 4*). These individual barriers are not unique for physicians with SUD, as they are also described for SUD patients in the general population (Mojtabai, Chen, Kaufmann, & Crum, 2014; Motta-Ochoa et al., 2017). However, it has been indicated that physician-patients specifically worry about loss of professional reputation or career

development opportunities and formal report to the health inspectorate (Clough, March, Leane, & Ireland, 2019). Furthermore, it could be speculated that physicians may be able to disguise their SUD for a long time, due to their intellectual abilities, easy access to addictive prescription medicines, and their usually comfortable financial situation, thus hindering and delaying seeking help (Kunyk et al., 2016).

3) *A sub-optimal treatment relationship between physician-patient and treating professional*
Lastly, the professional stigma surrounding SUD among physicians might be associated with physician-patients' reluctance to seek help and adopt the patient role (Klitzman, 2008; Wallace, 2012). A Dutch cross-sectional study that compared stigmatizing attitudes towards individuals with SUD between clients, society, general practitioners, and mental health and addiction professionals, found that although more prevalent among the public and general practitioners, stigmatizing attitudes were also prevalent among treating professionals (van Boekel, Brouwers, van Weeghel, & Garretsen, 2015). Thereby, it has been described that especially handing over control to the treating colleague is hard for physicians, often resulting in unspoken discomfort which might impair effective treatment (Fox et al., 2010; Jaye & Wilson, 2003). Due to the medical knowledge of physician-patients, the treating professional often fails to treat the physician-patient as a regular patient or does not recognize the physician-patients' specific needs (Fox et al., 2010). Taken together, these issues may result in a sub-optimal treatment relationship between the physician-patient and his or her treating professional, which can lead to premature termination of treatment in some cases (Wallace, 2012).

Taken together, the four types of stigma that play a role in mental health-related stigmatization also seem to apply to the taboo on SUD among physicians, the individual barriers for seeking help among physicians with SUD, and a sub-optimal treatment relationship between physician-patients and their treating professionals. Reducing public/social, institutional, and self-stigma, might increase willingness to act upon a substance use presumption in a colleague and might also increase awareness among physicians with SUD that they can benefit from professional help and reduce barriers for seeking help. Reducing professional stigma may also lead to a more optimal treatment relationship between physician-patients and their treating professionals.

HOW TO PROCEED?

Ideally, an open and supportive culture that encourages seeking and offering help regarding physicians with SUD breaks the taboo on SUD among physicians and

eliminates stigmatization of physicians with SUD. When looking at reducing mental health related stigmatization in the medical profession, three key strategies have been described, being 1) education about and raising awareness regarding mental illness among physicians; 2) implementing identification and assessment procedures of mental health concerns for physicians; and 3) providing safe and confidential support to help physicians in need (Wallace, 2012). Since SUD is classified as mental illness, we explore whether these three key strategies can also be used to reduce stigma on SUD among physicians, ultimately leading to as many physicians with SUD as possible receiving effective SUD treatment. Due to their expertise and experience related to physicians with SUD, PHPs can play an important role in eliminating stigmatization by adopting these key strategies widely.

1) Education about and raising awareness regarding SUD among physicians

In this thesis (*Chapter 4*), we identified that the majority of the facilitators for seeking help was associated with (open) communication, like non-judgmental confrontation with SUD, social support, and external pressure as means to facilitate disclosure of SUD. Thereby we observed (*Chapter 5*) that almost all physicians intend to offer help when presuming problematic substance use in a colleague, but only two-thirds actually did offer help. So, it is essential that the conspiracy of silence culture in the medical profession changes into a culture of open communication about personal health concerns. Literature showed that education and awareness interventions should target multiple levels (individuals, structures, and organizations) in order to be effective (Heijnders & Van Der Meij, 2006; Link & Phelan, 2001; Wallace, 2012). In the Netherlands, the Royal Dutch Medical Association (RDMA) launched an education and awareness campaign in 2020, which offers tools for education, policy making and encourages ambassadorship for employers (Royal Dutch Medical Association, 2020). The campaign is freely available and promoted by the RDMA at healthcare umbrella organizations and individual health services (www.knmg.nl/advies-richtlijnen/abs-artsen-toolkit/abs-artsen-toolkit.htm).

2) Implementing SUD identification and assessment procedures among physicians

Physician well-being has been proposed as an indicator for quality of care and patient safety (Wallace et al., 2009). In order to treat physician well-being as a quality indicator, it should be measurable. One suggested approach is to deploy medical monitoring for physicians throughout their career (Vayr, Herin, Jullian, Soulat, & Franchitto, 2019), including the monitoring of addictive behavior. Preferably medical monitoring is performed by occupational health physicians, since they are specialized in primary, secondary, and tertiary prevention among employees (Vayr et al., 2019). Another

approach is the administration of anonymous self-evaluation screening questionnaires that assess mental health issues, including SUD symptoms, among physicians (Wallace, 2012). In this way, physicians would be allowed to monitor their wellness and identify the early signs of mental illness or SUD (Wallace, 2012).

3) *Providing safe and confidential support to help physicians with SUD*

Like any other patient, physicians with SUD have the right to benefit from fair treatment (Wilson et al., 2009). For instance, physicians with SUD should not enter an improvement trajectory due to dysfunction (often aimed at dismissal), but they should be able to take sick leave, receive support from an occupational physician, and should be offered a work resumption trajectory after treatment, just like colleagues with other psychiatric and/or somatic disorders. In this way, physicians with SUD will be supported in their recovery, instead of being fired. Ideally, physicians in recovery participate in a monitoring program during return to work, because of the high success rates with regard to long-term abstinence and work retention (*Chapter 3*).

Additionally, it might be helpful when treatment facilities specialized in offering treatment to physicians offer treatment for a wide range of disorders, including SUD and other mental health issues. In the Netherlands, the PHP supports physicians with SUD, but they do not offer support to colleagues with other psychiatric or somatic disorders. Other PHPs (in the United States (Bohigian, Bondurant, & Croughan, 2005), Australia (Wile, Frei, & Jenkins, 2011), and the United Kingdom (Brooks, Gerada, & Chalder, 2013)) and profession-specific programs (American Lawyer Assistance Programs (COLAP, 2022) and the German Antiskid program for pilots (AntiSkid, 2022)) also offer support for physicians and professionals with other psychiatric disorders (for example depression, personality disorder, and bipolar mood disorder). By offering support for SUD and other psychiatric (or sometimes even somatic) disorders within PHPs and other profession-specific programs, SUD is seen as part of a wide range of disorders. This might facilitate the help seeking process and reduce stigma related to SUD.

Lastly, it is recommended that treatment facilities share personal experiences of role models, since this could increase the visibility and familiarity with available treatment facilities and stimulate help seeking (*Chapter 4*). Clear information on available treatment options in combination with sharing testimonials of personal experiences by physicians who recovered from SUD will help physician SUD patients to become confident about the quality of care provided and the possibility to successfully overcome their SUD. By sharing their testimonials, these role models might contribute to reducing barriers for help seeking.

RESEARCH CONSIDERATIONS

This thesis presents findings in the broad context of SUD among physicians, ranging from epidemiology to monitoring programs and from seeking help to offering help. In addition, our studies included samples with diversity in age and specialty, which increases generalizability of findings. Furthermore, a diversity in research methods was applied, including cross-sectional surveys, analysis of mental healthcare claims data, semi-structured interviews, and a meta-analysis. Almost all data in this thesis, except for the semi-structured interviews, were secondary data that were reused from various parties (i.e. Community Health Services, Statistics Netherlands, the National Institute for Public Health and the Environment, and the RDMA). Strengths of these data sources include the large sample sizes and nationwide coverage.

One of the main limitations of this thesis relates to the risk of several forms of selection and information bias in our data. First, selection bias might have occurred due to the treatment gap in the mental healthcare claims study (*Chapter 2*) and as non-response/volunteer bias in the survey and interview studies. Although our response rates were acceptable, physicians younger than 40 years were underrepresented in our samples (*Chapter 4 - 5*). Physicians who chose to respond to the survey invitation or took part in the interviews might have had personal reasons to do so, or might have had specific ideas concerning SUD among physicians and help seeking compared to those who did not accept the invitation. Indeed, the younger physicians included in our sample showed more empathic attitudes towards SUD and due to their underrepresentation, this might have resulted in an underestimation of empathic attitudes towards SUD among physicians in general. Furthermore, it has been shown that younger physicians were more reluctant to seek help for mental health conditions, including SUD, because of its potential effect on physicians' license to practice (Dyrbye et al., 2017). Therefore, barriers for seeking help for SUD might be specifically relevant for young physicians.

Second, information bias might have occurred in the form of reporting and/or recall bias in the survey and interview studies (*Chapter 2, 4 - 5*). Due to social desirable answers, prevalence rates of heavy and/or excessive drinking might be underestimated and empathic attitudes towards SUD, work-related substance use norms, and willingness to take action upon a substance use presumption might be overestimated. It remains to be studied whether physicians are inclined to report social desirable answers to the same extent as the general population. Furthermore, due to the retrospective design, past experiences might be underestimated, affecting the accuracy and completeness of our results on barriers and facilitators for seeking help and experience with a substance use presumption in a colleague. In the meta-analysis,

information bias might have occurred as reporting and publication bias. Some of the included studies did not take into account participants who were lost to follow-up in calculating the overall success rate of monitoring. It is unclear how this may have influenced the outcomes. Participants may have become lost to follow-up either because they are doing well and feel they no longer need monitoring or, on the other hand, because they have relapsed and cannot be located or do not want to reveal their condition (Blodgett, Maisel, Fuh, Wilbourne, & Finney, 2014). Furthermore, our meta-analysis showed asymmetry for success rates of monitoring, suggesting overpublication of positive results and thereby an overestimation of the success rates we found. In order to reduce reporting and publication bias, we strongly encourage monitoring programs to systematically assess and publish success rates of monitoring.

As suggested above, it has been proposed to educate and raise awareness regarding SUD among physicians (Wallace, 2012), in order to reduce the taboo surrounding SUD among physicians. Recently, the RDMA launched an awareness campaign on problematic substance use and SUD in order to initiate cultural change in the medical sector. Ideally, a campaign like this is evaluated scientifically on its effects, for instance by using a controlled implementation strategy with predetermined outcome measures (like norms, attitudes, and intentions), assessed before and after implementing the awareness campaign. This might be supplemented by using control workplaces, i.e., workplaces where the campaign is not implemented.

In order to evaluate the effectiveness of SUD identification and assessment procedures among physicians, it would be recommended to first perform pilot studies on both the implementation of medical monitoring as well as the implementation of anonymous self-evaluation screening questionnaires. If these procedures turn out to be adopted in hospitals and among physicians, the effectiveness of these procedures can be investigated. This investigation preferably follows the design of a randomized clinical trial with four conditions: medical monitoring only, self-evaluation screening questionnaires only, both medical monitoring and self-evaluation screening questionnaires and a control condition.

The extent to which safe and confidential support is provided to physicians with SUD can be explored using cross-sectional surveys in workplace and treatment settings. First, by making an inventory of policies regarding employees with SUD among management or human research staff in workplace settings. If recommended or desired, tools for policy making can be offered to better ensure safe and confidential support to physicians with SUD in specific workplace settings. Second, by making an inventory of the number of physician SUD-patients among treatment facilities. This number can be related to offering treatment for a wide range of disorders (including SUD) and the use of role models. If it turns out that physician SUD patients are more

likely to be treated at treatment facilities that offer treatment for a wide range of disorders and that use role models, this would argue in favor of large-scale implementation of these interventions.

GENERAL CONCLUSIONS

The aim of this thesis was twofold: I) to investigate the epidemiology and monitoring of SUD among physicians; and II) to study the process of seeking and offering help regarding physicians with SUD. Based on our findings and insights from other studies, the following conclusions and recommendations are made:

- I.I) Nationwide analysis of mental healthcare claims data and public health surveys showed that physicians may not be at an increased risk for SUD, compared to the general population. We observed a relatively low number of physicians in treatment for SUD in our nationwide sample. It is likely that physicians with SUD who receive treatment are, just like other individuals with SUD, only a fraction of the total population of physicians who meet the criteria for SUD, given the SUD treatment gap described in literature. Due to an occupational risk associated with using addictive substances in physicians and their professional responsibility for patient lives and safety, vigilance is recommended.
- I.II) Our meta-analysis showed high success rates for monitoring among healthcare professionals with SUD. About three-quarters of monitoring participants in the included studies were abstinent during follow-up and working at the end of the follow-up period. The heterogeneity in success rates was partly explained by the starting moment of monitoring. Participants who started with monitoring after successful initial treatment had better outcomes compared to those who started monitoring simultaneously with treatment. Due to selection and publication bias we may have encountered, no firm conclusions could be drawn about the effectiveness of monitoring for healthcare professionals with SUD. However, half of the general SUD patients relapses within the first year after treatment initiation. If the effectiveness of monitoring turns out to be comparable to the success rates we observed, this is highly promising.
- II.I) Qualitative methods showed that physicians with SUD face barriers when seeking help for SUD mostly at the level of the individual, like negative feelings and lack of disease awareness. In contrast, individuals around physicians with SUD and health services could facilitate the help-seeking process by offering confidential and non-punitive support. Ambassadors who share personal (positive) testimonials can further facilitate help seeking for SUD by physicians.

II.II) Analysis of a physician panel survey showed that a broad sample of physicians endorsed empathic attitudes towards SUD, with high norms regarding substance use. About one-third of these physicians reported experience with a substance use presumption in a colleague. Whilst most physicians intend to take action upon such a presumption, two-thirds of the physicians who experienced such a presumption did actually act upon it. Male and older physicians were most likely to take action upon a substance use presumption in a colleague. To narrow the intention-behavior gap and enhance taking action upon such a presumption, continued medical education on signs and symptoms of SUD and instructions on how to express empathic concerns to a colleague about personal issues are recommended.

Taken together, our findings align with literature on stigma about SUD in society and illness in general among physicians. Four types of stigma towards physicians with SUD (public or social, institutional, self, and professional stigma) hinder seeking and offering help regarding SUD among physicians. Based on literature about mental health related stigma in the medical profession, we recommend three key strategies to reduce stigma towards physicians with SUD: 1) education about and raising awareness regarding SUD among physicians (i.e. SUD workplace awareness campaigns); 2) implementing identification and assessment procedures of mental health concerns, including problematic substance use and SUD, among physicians (i.e. medical monitoring and/or self-evaluation screening questionnaires); and 3) providing safe and confidential support to help physicians with SUD (i.e. offering treatment for a wide range of disorders). Due to their expertise and experience regarding physicians with SUD, PHPs and role models (i.e. physicians in recovery) can play a major role in reducing stigma towards physicians with SUD.

REFERENCES

- Ahmedani, B. K. (2011). Mental Health Stigma: Society, Individuals, and the Profession. *J Soc Work Values Ethics*, 8(2), 41-416.
- Angres, D. H., McGovern, M. P., Shaw, M. F., & Rawal, P. (2003). Psychiatric comorbidity and physicians with substance use disorders: a comparison between the 1980s and 1990s. *J Addict Dis*, 22(3), 79-87. doi:10.1300/J069v22n03_07.
- AntiSkid (2022). Retrieved from <https://www.antiskid.info/en>.
- Arnetz, B. B. (2001). Psychosocial challenges facing physicians of today. *Soc Sci Med*, 52(2), 203-213. doi:10.1016/S0277-9536(00)00220-3.
- Austin, E. E., Do, V., Nullwala, R., Fajardo Pulido, D., Hibbert, P. D., Braithwaite, J., . . . Clay-Williams, R. (2021). Systematic review of the factors and the key indicators that identify doctors at risk of complaints, malpractice claims or impaired performance. *BMJ Open*, 11(8), e050377. doi:10.1136/bmjopen-2021-050377.
- Bijl, R. V., & Ravelli, A. (2000). Psychiatric morbidity, service use, and need for care in the general population: results of The Netherlands Mental Health Survey and Incidence Study. *Am J Public Health*, 90(4), 602-607. doi:10.2105/ajph.90.4.602.
- Bijl, R. V., Ravelli, A., & van Zessen, G. (1998). Prevalence of psychiatric disorder in the general population: results of The Netherlands Mental Health Survey and Incidence Study (NEMESIS). *Soc Psychiatry Psychiatr Epidemiol*, 33(12), 587-595. doi:10.1007/s001270050098.
- Blodgett, J. C., Maisel, N. C., Fuh, I. L., Wilbourne, P. L., & Finney, J. W. (2014). How effective is continuing care for substance use disorders? A meta-analytic review. *J Subst Abuse Treat*, 46(2), 87-97. doi:10.1016/j.jsat.2013.08.022.
- Bohigian, G. M., Bondurant, R., & Croughan, J. (2005). The Impaired and Disruptive Physician. *Journal of Addictive Diseases*, 24(1), 13-23. doi:10.1300/J069v24n01_02.
- Brooks, S. K., Gerada, C., & Chalder, T. (2013). Doctors and dentists with mental ill health and addictions: outcomes of treatment from the Practitioner Health Programme. *J Ment Health*, 22(3), 237-245. doi:10.3109/09638237.2012.734647.
- Clough, B. A., March, S., Leane, S., & Ireland, M. J. (2019). What prevents doctors from seeking help for stress and burnout? A mixed-methods investigation among metropolitan and regional-based Australian doctors. *Journal of Clinical Psychology*, 75(3), 418-432. doi:10.1002/jclp.22707.
- COLAP (2022). Retrieved from <http://coloradolap.org/home/home-2/>.
- Corrigan, P. W., Powell, K. J., & Rüschi, N. (2012). How does stigma affect work in people with serious mental illnesses? *Psychiatr Rehabil J*, 35(5), 381-384. doi:10.1037/h0094497.
- Cottler, L. B., Ajinkya, S., Merlo, L. J., Nixon, S. J., Ben Abdallah, A., & Gold, M. S. (2013). Lifetime psychiatric and substance use disorders among impaired physicians in a physicians health program: comparison to a general treatment population: psychopathology of impaired physicians. *J Addict Med*, 7(2), 108-112. doi:10.1097/ADM.0b013e31827fad9.
- DesRoches, C. M., Rao, S. R., Fromson, J. A., Birnbaum, R. J., Iezzoni, L., Vogeli, C., & Campbell, E. G. (2010). Physicians' perceptions, preparedness for reporting, and experiences related to impaired and incompetent colleagues. *JAMA*, 304(2), 187-193. doi:10.1001/jama.2010.921.
- Dyrbye, L. N., West, C. P., Sinsky, C. A., Goeders, L. E., Satele, D. V., & Shanafelt, T. D. (2017). Medical Licensure Questions and Physician Reluctance to Seek Care for Mental Health Conditions. *Mayo Clin Proc*, 92(10), 1486-1493. doi:10.1016/j.mayocp.2017.06.020.
- Farber, N. J., Gilbert, S. G., Aboff, B. M., Collier, V. U., Weiner, J., & Boyer, E. G. (2005). Physicians' willingness to report impaired colleagues. *Soc Sci Med*, 61(8), 1772-1775. doi:10.1016/j.socscimed.2005.03.029.
- Fox, F. E., Taylor, G. J., Harris, M. F., Rodham, K. J., Sutton, J., Scott, J., & Robinson, B. (2010). "It's crucial they're treated as patients": ethical guidance and empirical evidence regarding treating doctor-patients. *J Med Ethics*, 36(1), 7-11. doi:10.1136/jme.2008.029066.
- Gold, K. J., Andrew, L. B., Goldman, E. B., & Schwenk, T. L. (2016). "I would never want to have a mental health diagnosis on my record": A survey of female physicians on mental health diagnosis, treatment, and reporting. *Gen Hosp Psychiatry*, 43, 51-57. doi:10.1016/j.genhosppsych.2016.09.004.
- Hartnett, Y., Drakeford, C., Dunne, L., McLoughlin, D. M., & Kennedy, N. (2020). Physician, heal thyself: a cross-sectional survey of doctors' personal prescribing habits. *J Med Ethics*, 46(4), 231-235. doi:10.1136/medethics-2018-105064.

- Heijnders, M., & Van Der Meij, S. (2006). The fight against stigma: an overview of stigma-reduction strategies and interventions. *Psychol Health Med*, *11*(3), 353-363. doi:10.1080/13548500600595327.
- Jaye, C., & Wilson, H. (2003). When General Practitioners Become Patients. *Health*, *7*(2), 201-225. doi:10.1177/1363459303007002875.
- Kalkman, G. A., van den Brink, W., Pierce, M., Atsma, F., Vissers, K. C. P., Schers, . . . Schellekens, A. F. A. (2022). Monitoring opioids in Europe: The need for shared definitions and measuring drivers of opioid use and related harms. *Eur Addict Res*, *28*(3):231-240. doi:10.1159/000521996.
- Kay, M., Mitchell, G., Clavarino, A., & Frank, E. (2012). Developing a framework for understanding doctors' health access: a qualitative study of Australian GPs. *Australian Journal of Primary Health*, *18*(2), 158-165. doi:10.1071/PY11003.
- Klitzman, R. (2008). *When doctors become patients*: Oxford University Press.
- Kohn, R., Saxena, S., Levav, I., & Saraceno, B. (2004). The treatment gap in mental health care. *Bull World Health Organ*, *82*(11), 858-866. doi:/S0042-96862004001100011.
- Kunyk, D., Inness, M., Reisdorfer, E., Morris, H., & Chambers, T. (2016). Help seeking by health professionals for addiction: A mixed studies review. *Int J Nurs Stud*, *60*, 200-215. doi:10.1016/j.ijnurstu.2016.05.001.
- Link, B. G., & Phelan, J. C. (2001). Conceptualizing Stigma. *Annual Review of Sociology*, *27*(1), 363-385. doi:10.1146/annurev.soc.27.1.363.
- Marshall, E. J. (2008). Doctors' health and fitness to practise: treating addicted doctors. *Occup Med (Lond)*, *58*(5), 334-340. doi:10.1093/occmed/kqn081.
- McCall, S. V. (2001). Chemically dependent health professionals. *West J Med*, *174*(1), 50-54. doi:10.1136/ewjm.174.1.50.
- Mojtabai, R., Chen, L. Y., Kaufmann, C. N., & Crum, R. M. (2014). Comparing barriers to mental health treatment and substance use disorder treatment among individuals with comorbid major depression and substance use disorders. *J Subst Abuse Treat*, *46*(2), 268-273. doi:10.1016/j.jsat.2013.07.012.
- Montgomery, A. J., Bradley, C., Rochfort, A., & Panagopoulou, E. (2011). A review of self-medication in physicians and medical students. *Occup Med (Lond)*, *61*(7), 490-497. doi:10.1093/occmed/kqr098.
- Morishita, M., Iida, J., & Nishigori, H. (2020). Doctors' experience of becoming patients and its influence on their medical practice: A literature review. *Explore (NY)*, *16*(3), 145-151. doi:10.1016/j.explore.2019.10.007.
- Motta-Ochoa, R., Bertrand, K., Flores-Aranda, J., Patenaude, C., Brunelle, N., Landry, M., & Brochu, S. (2017). A Qualitative Study of Addiction Help-Seeking in People with Different Co-occurring Mental Disorders and Substance Use Problems. *International Journal of Mental Health and Addiction*, *15*(4), 883-899. doi:10.1007/s11469-017-9762-y.
- Perez, B., Knych, S. A., Weaver, S. J., Liberman, A., Abel, E. M., Oetjen, D., & Wan, T. T. (2014). Understanding the barriers to physician error reporting and disclosure: a systemic approach to a systemic problem. *J Patient Saf*, *10*(1), 45-51. doi:10.1097/PTS.0b013e31829e4b68.
- Rice, B. (1999). Doctor policing: too tough? Too easy? Impaired physicians: giving rehab programs a new look. *Med Econ*, *76*(9), 173-174, 179-180, 185.
- Royal Dutch Medical Association. (2020). ABS-artsen toolkit. Retrieved from <https://www.knmg.nl/advies-richtlijnen/abs-artsen-toolkit/abs-artsen-toolkit.htm>.
- Sanfey, H., Fromson, J. A., Mellinger, J., Rakinic, J., Williams, M., & Williams, B. (2015). Residents in distress: an exploration of assistance-seeking and reporting behaviors. *Am J Surg*, *210*(4), 678-684. doi:10.1016/j.amjsurg.2015.05.011.
- Scheepers, R. A., Boerebach, B. C., Arah, O. A., Heineman, M. J., & Lombarts, K. M. (2015). A Systematic Review of the Impact of Physicians' Occupational Well-Being on the Quality of Patient Care. *Int J Behav Med*, *22*(6), 683-698. doi:10.1007/s12529-015-9473-3.
- Sendler, D. J. (2018). Physicians working under the influence of alcohol: An analysis of past disciplinary proceedings and their outcomes. *Forensic Sci Int*, *285*, 29-37. doi:10.1016/j.forsciint.2018.01.019.
- Shaw, M. F., McGovern, M. P., Angres, D. H., & Rawal, P. (2004). Physicians and nurses with substance use disorders. *J Adv Nurs*, *47*(5), 561-571. doi:10.1111/j.1365-2648.2004.03133.x.
- Subu, M. A., Wati, D. F., Netrida, N., Priscilla, V., Dias, J. M., Abraham, M. S., . . . Al-Yateem, N. (2021). Types of stigma experienced by patients with mental illness and mental health nurses in Indonesia: a qualitative content analysis. *Int J Ment Health Syst*, *15*(1), 77. doi:10.1186/s13033-021-00502-x.
- Taub, S., Morin, K., Goldrich, M. S., Ray, P., Benjamin, R., & Association, C. o. e. a. J. a. o. t. A. M. (2006). Physician health and wellness. *Occup Med (Lond)*, *56*(2), 77-82. doi:10.1093/occmed/kqj025.

- Tuithof, M., Ten Have, M., van den Brink, W., Vollebergh, W., & de Graaf, R. (2016). Treatment Seeking for Alcohol Use Disorders: Treatment Gap or Adequate Self-Selection? *Eur Addict Res*, 22(5), 277-285. doi:10.1159/000446822.
- United Nations Office on Drugs and Crime. (2021). World drug report 2021. Retrieved from <https://www.unodc.org/unodc/en/data-and-analysis/wdr2021.html>.
- van Boekel, L. C., Brouwers, E. P., van Weeghel, J., & Garretsen, H. F. (2015). Comparing stigmatising attitudes towards people with substance use disorders between the general public, GPs, mental health and addiction specialists and clients. *Int J Soc Psychiatry*, 61(6), 539-549. doi:10.1177/0020764014562051.
- Vayr, F., Herin, F., Jullian, B., Soulat, J. M., & Franchitto, N. (2019). Barriers to seeking help for physicians with substance use disorder: A review. *Drug Alcohol Depend*, 199, 116-121. doi:10.1016/j.drugalcdep.2019.04.004.
- Wallace, J. E. (2012). Mental health and stigma in the medical profession. *Health (London)*, 16(1), 3-18. doi:10.1177/1363459310371080.
- Wallace, J. E., Lemaire, J. B., & Ghali, W. A. (2009). Physician wellness: a missing quality indicator. *Lancet*, 374(9702), 1714-1721. doi:10.1016/S0140-6736(09)61424-0.
- Weenink, J. W., Westert, G. P., Schoonhoven, L., Wollersheim, H., & Kool, R. B. (2015). Am I my brother's keeper? A survey of 10 healthcare professions in the Netherlands about experiences with impaired and incompetent colleagues. *BMJ Qual Saf*, 24(1), 56-64. doi:10.1136/bmjqs-2014-003068.
- Wile, C., Frei, M., & Jenkins, K. (2011). Doctors and Medical Students Case Managed by an Australian Doctors Health Program: Characteristics and Outcomes. *Australasian Psychiatry*, 19(3), 202-205. doi:10.3109/10398562.2011.561846.
- Wilson, A., Rosen, A., Randal, P., Pethebridge, A., Codyre, D., Barton, D., . . . Rose, L. (2009). Psychiatrically impaired medical practitioners: an overview with special reference to impaired psychiatrists. *Australas Psychiatry*, 17(1), 6-10. doi:10.1080/10398560802579351.
- World Health Organization. (2018). Global status report on alcohol and health 2018. Retrieved from <https://www.who.int/publications/i/item/9789241565639>.
- Yang, L. H., Wong, L. Y., Grivel, M. M., & Hasin, D. S. (2017). Stigma and substance use disorders: an international phenomenon. *Curr Opin Psychiatry*, 30(5), 378-388. doi:10.1097/YCO.0000000000000351.
- Yanos, P. T., Lucksted, A., Drapalski, A. L., Roe, D., & Lysaker, P. (2015). Interventions targeting mental health self-stigma: A review and comparison. *Psychiatr Rehabil J*, 38(2), 171-178. doi:10.1037/prj0000100.

Substance use disorder (SUD) is a “complex condition in which there is uncontrolled use of substances despite harmful consequences”. Due to work-related risk factors (an extensive workload, irregular working hours, and access to prescription medicines) physicians might be more at risk for developing SUD. On the other hand, physicians might be at lower risk for SUD because of protective factors related to their socioeconomic status (high level of education, high income, and favorable position on the labor market). SUD among physicians might include adverse effects on the quality and safety of care. In this thesis, we examined the magnitude of SUD among physicians, the effectiveness of Physician Health Programs (PHPs), and the process of seeking and offering help regarding physicians with SUD.

In *Chapter 2*, a nationwide registry-based study showed that the prevalence of clinical SUD diagnoses and drinking patterns were comparable between physicians and a reference group of highly educated Dutch citizens. Due to the occupational risk associated with using addictive substances in physicians and their professional responsibility for patient lives and safety, vigilance is recommended.

In the 1970s, the first PHPs were initiated in order to facilitate early identification and adequate treatment of psychiatric disorders, including SUD, among physicians. In *Chapter 3*, a meta-analysis of PHP success rates showed that about three-quarters of the participating healthcare providers with SUD remained abstinent during follow-up and was working at the end of the follow-up period.

Despite encouraging success rates of PHPs, physicians hardly use health services when confronted with mental health problems, including SUD. In *Chapter 4*, a qualitative study showed that negative feelings (like embarrassment and fear) and a lack of disease awareness hinder the help seeking process of physicians with SUD, while confidential and non-judgmental support from bystanders and healthcare organizations can facilitate the process.

Bystanders, such as colleagues, often seem to be aware of problematic substance use and/or SUD among physicians. In *Chapter 5*, an online questionnaire showed that about one-third of physicians ever presumed (problematic) substance use by a colleague and that two-thirds of them took action upon this presumption by providing direct or indirect support.

Based on the findings of this thesis and the consulted literature, three strategies are recommended in *Chapter 6* to discuss SUD among physicians: 1) create awareness within medical education and during continuing education regarding SUD among physicians; 2) implement identification and assessment procedures of mental health concerns, including substance use and SUD, among physicians; and 3) provide safe and confidential support to physicians with SUD. Due to their expertise and experience regarding physicians with SUD, PHPs and physicians in recovery can play a major role in reducing stigma towards physicians with SUD.

Verslaving is een “complexe aandoening waarbij middelen ongecontroleerd worden gebruikt ondanks schadelijke gevolgen”. Door werk-gerelateerde risicofactoren (hoge werkdruk, onregelmatige werktijden en toegang tot geneesmiddelen op recept) lopen artsen mogelijk meer risico op het ontwikkelen van een verslaving. Verslaving en/of (problematisch) middelengebruik bij artsen kan nadelige effecten hebben op de kwaliteit en veiligheid van zorg. In dit proefschrift onderzochten we de omvang van verslaving onder artsen, de effectiviteit van ‘Physician Health Programs’ (PHPs) en het proces van hulp zoeken en bieden bij artsen met verslaving.

In *Hoofdstuk 2* vonden we middels een landelijke database studie dat de prevalenties van klinische verslavingsdiagnoses en drinkpatronen vergelijkbaar waren tussen artsen en een referentiegroep van hoogopgeleiden. Aandacht voor verslaving onder artsen blijft geboden vanwege persoonlijk lijden en in het bijzonder de werk-gerelateerde risicofactoren en mogelijke nadelige effecten op de kwaliteit en veiligheid van zorg.

In de jaren ‘70 werden de eerste PHPs opgericht om psychiatrische stoornissen, waaronder verslaving, bij artsen vroegtijdig te herkennen en adequaat te behandelen. In *Hoofdstuk 3* vonden we middels een meta-analyse van PHP-slagingspercentages dat driekwart van de deelnemende zorgverleners met een verslavingsdiagnose abstinente bleef en werkzaam was aan het einde van de gevolgde periode.

Ondanks de bemoedigende PHP-slagingspercentages maken artsen nauwelijks gebruik van PHPs. In *Hoofdstuk 4* vonden we middels een kwalitatieve studie dat negatieve gevoelens (zoals schaamte en angst) en een gebrek aan ziektebesef het hulpzoekproces van artsen met verslaving belemmeren, terwijl vertrouwelijke en niet-veroordelende ondersteuning door omstanders en zorgorganisaties het proces kunnen bevorderen.

Omstanders, zoals collega’s, lijken vaak op de hoogte te zijn van verslaving en/of (problematisch) middelengebruik bij een arts. In *Hoofdstuk 5* vonden we middels een online vragenlijst dat bijna een derde van de artsen ooit een vermoeden had van (problematisch) middelengebruik bij een collega-arts en dat twee-derde van hen hierop actie ondernam door directe of indirecte ondersteuning te bieden.

In *Hoofdstuk 6* worden, op basis van de bevindingen van dit proefschrift en de geraadpleegde literatuur over mentale gezondheid in de medische beroepsgroep, drie strategieën aangeraden om verslaving onder artsen bespreekbaar te maken: 1) creëer bewustwording binnen het geneeskundeonderwijs en tijdens bij- en nascholing; 2) implementeer identificatie- en evaluatieprocedures voor mentale gezondheidsproblemen onder artsen in het kader van kwaliteitscycli en 3) biedt veilige en vertrouwelijke ondersteuning aan artsen met verslaving. PHPs en artsen in herstel kunnen een belangrijke rol spelen bij de uitrol van deze strategieën, gezien hun expertise en ervaring rondom artsen met verslaving.



APPENDIX



Begin 2017 startte ik in deeltijd met het promotieonderzoek over verslaving onder artsen. Nu, eind 2022, ben ik heel blij dat mijn promotietraject is afgerond. Dit was niet gelukt zonder de vele mensen die op de een of andere manier betrokken waren bij dit traject! Allereerst wil ik graag alle deelnemers bedanken voor hun bijdrage aan de hoofdstukken in dit proefschrift. Een speciaal woord van dank hierbij aan de artsen en omstanders die hun verhalen met mij deelden.

Tijdens mijn promotieonderzoek werd ik begeleid door prof. dr. Arnt Schellekens, prof. dr. Aart Schene † en dr. Femke Atsma. Arnt, bedankt voor je enthousiasme en het delen van je kennis ten aanzien van verslaving, psychiatrie en de wetenschap! Fijn dat je steeds weer nieuwe mogelijkheden zag als er weer eens hobbels op de weg waren tijdens mijn promotietraject. Aart †, bedankt voor jouw betrokkenheid en inbreng tot het laatste moment! Femke, bedankt voor de fijne begeleiding, ik ben blij dat je mijn team bent komen versterken met je methodologische kennis! Verder wil ik graag Cor, Hein, Marlies, Joanneke, Esther, Sophie en Boukje bedanken voor hun bijdrage als coauteur aan de hoofdstukken in dit proefschrift. En hartelijk dank aan prof. dr. Gert Jan Scheffer, prof. dr. Kees Kramers en prof. dr. Dike van de Mheen voor het lezen en beoordelen van mijn proefschrift.

Verder dank ik de collega's van de afdeling Psychiatrie van het Radboudumc en het Nijmegen Institute for Scientist-Practitioners in Addiction (NISPA) voor het sparren, de kritische vragen en hulp die ik van jullie mocht ontvangen! Marlies, Joanneke, Michelle, Hans, Frieda, Nannet, Sonja, Daphne, Natasja en Frank, collega's bij het steunpunt ABS-artsen van artsenfederatie KNMG, de woensdagen met jullie in de Domus Medica waren steeds weer een fijn uitstapje. Bedankt voor jullie steun, het delen van jullie ervaringen en het meedenken tijdens mijn promotietraject! Jacqueline, bedankt dat je mij 'adopteerde' bij de onderzoeksgroep Substance use, Addiction & Food van de Radboud Universiteit. Ik heb een hele fijne tijd gehad op jullie afdeling en op kantoor met Joëlle, Nina, Levie en Carina! Ook wil ik graag alle (oud-)collega's van Karakter Kinder- en Jeugdpsychiatrie, Tilburg University en het RIVM bedanken voor de interesse en motiverende woorden die ik mocht ontvangen tijdens mijn promotieonderzoek.

Lieve (oud-)teamgenoten en liefste vriendinnen, bedankt voor de fijne afleiding van mijn promotieonderzoek buiten werktijd! Esmée, ik vind het heel fijn dat je mijn paranimf bent! Als laatste veel dank aan mijn (schoon)familie voor jullie steun tijdens mijn promotieonderzoek. Lieve pap en mam, wat ben ik blij dat jullie altijd voor mij klaarstaan en dat ik met al mijn verhalen en vragen bij jullie terecht kan! Dank voor jullie interesse in mijn promotieonderzoek en het kritisch meelesen van de Nederlandse stukken. Lieve Marthe, wat ben ik blij dat wij een sterke band hebben. Ik ben trots op jou en vind het heel fijn dat je mijn paranimf bent!

Lieve Tim, ervaringsdeskundige qua promoveren en 'collega' tijdens het thuiswerken, dank voor het kritisch meedenken tijdens mijn promotietraject. Maar meer nog bedankt voor je steun en liefde in de afgelopen jaren! Ik ben blij met alle momenten die we al samen mochten beleven en ik kijk uit naar onze toekomst samen ♥



Pauline Maureen Geuijen werd geboren op 27 oktober 1992 te Deventer en groeide op in Haarle (gemeente Hellendoorn). In 2011 behaalde zij haar VWO-diploma aan het Carmel College Salland te Raalte. In datzelfde jaar verhuisde zij naar Nijmegen, waar zij startte met de bacheloropleiding Biomedische Wetenschappen aan de Radboud Universiteit. In het voorjaar van 2014 deed Pauline haar bachelorstage epidemiologie bij de afdeling Health Evidence van het Radboudumc. Onder begeleiding van dr. Marleen van Gelder onderzocht zij op basis van data

uit de 'PRegnancy and Infant DEvelopment' (PRIDE) studie de relatie tussen depressieve symptomen en het hormoon cortisol bij zwangere vrouwen.

Na het behalen van haar bachelordiploma in het najaar van 2014, vervolgde zij haar studie met de masteropleiding 'Biomedical Sciences' aan de Radboud Universiteit. Tijdens haar Master verdiepte Pauline zich verder in de epidemiologie en wetenschapscommunicatie. Daarnaast volgde zij keuzevakken op het gebied van psychische gezondheid aan de Radboud Universiteit en op het gebied van gezondheidsvoorlichting aan Maastricht University. In het najaar van 2015 deed zij haar masterstage wetenschapscommunicatie bij de afdeling Leefomgeving van de GGD Hart voor Brabant, gericht op de digitale Persoonlijke Gezondheidscheck voor een gezonder Brabant. Tevens was zij in deze periode werkzaam als student-assistent, waarbij zij statistisch onderwijs verzorgde voor de masteropleiding 'Biomedical Sciences'. In het voorjaar van 2016 deed Pauline haar masterstage epidemiologie bij Karakter Academie van Karakter kinder- en jeugdpsychiatrie. Onder begeleiding van dr. Nanda Lambregts-Rommelse onderzocht zij op basis van Nederlandse data van de 'International Multicenter ADHD Genetics' (IMAGE) studie de relatie tussen ADHD en overgewicht in de familiale context. Daarnaast werkte zij mee aan de dataverzameling voor de 'Treatment of ADHD with Care as usual versus an Elimination diet' (TRACE) studie. Aan het einde van haar masterstage startte Pauline in deeltijd als onderzoeker bij Karakter Academie van Karakter kinder- en jeugdpsychiatrie. Hier was zij, in opdracht van elf gemeenten, verantwoordelijk voor de monitoring van pilots waarbij specialistische ondersteuning bij huisartsen werd ingezet op het gebied van jeugd geestelijke gezondheidszorg (SOH-JGGZ).

Na het behalen van haar masterdiploma in het voorjaar van 2017, begon zij in deeltijd als promovenda bij de afdeling Psychiatrie van het Radboudumc. Onder begeleiding van prof. dr. Arnt Schellekens, prof. dr. Aart Schene † en dr. Femke Atsma werkte zij aan haar promotieonderzoek over verslaving onder artsen. Gedurende deze periode was Pauline verbonden aan het Nijmegen Institute for Scientist-Practitioners

in Addiction (NISPA), het steunpunt ABS-artsen van artsenfederatie KNMG en de onderzoeksgroep Substance use, Addiction & Food (SAF) van de Radboud Universiteit. Na afronding van haar werkzaamheden bij Karakter kinder- en jeugdpsychiatrie, in de zomer van 2019, werkte Pauline enkele maanden voltijds aan haar promotieonderzoek. Vervolgens startte zij in het voorjaar van 2020 in deeltijd als onderzoeker bij het departement Tranzo van Tilburg University. Hier evalueerde zij, in opdracht van Zorgverzekeraars Nederland, de inzet van een Bondgenoot voor naasten in gezinnen met multiproblematiek en indicatie(s) voor langdurige zorg.

Momenteel werkt Pauline als wetenschappelijk medewerker bij de afdeling Kwaliteit van Zorg & Gezondheidseconomie van het Rijksinstituut voor Volksgezondheid en Milieu (RIVM). Hier is zij betrokken bij de Gezondheidsmonitors (grootschalig landelijk vragenlijstonderzoek naar gezondheid, leefstijl en welzijn op landelijk, regionaal en lokaal niveau) en de Leefstijlmonitor (landelijk vragenlijstonderzoek op het gebied van leefstijl-gerelateerde thema's, zoals roken, alcohol- en drugsgebruik, bewegen en voeding). Met het afronden van haar promotietraject is Pauline geregistreerd als Epidemioloog B.

Engelstalige publicaties

Hiemstra, M., **Geuijen, P.**, Hupkens, C., van Dorsselaer, S., Wendel-Vos, W., Kemler, E., de Graaf, H., Stafleu, A., Hosper, K., Tak, N., van Rossum, C., Vermey, K., & de Hollander, E. (in preparation). The Lifestyle monitor: Public health surveillance of lifestyle and health in the Netherlands.

Geuijen, P., Atsma, F., Schene, A., & Schellekens, A. (submitted). Diagnoses of substance use disorder and drinking patterns among physicians: a nationwide registry-based study.

Geuijen, P., Pars, E., Kuppens, J., Schene, A., de Haan, H., de Jong, C., Atsma, F., & Schellekens, A. (2022). Barriers and facilitators to seek help for substance use disorder among Dutch physicians: a qualitative study. *European Addiction Research*, 28(1):23.

Geuijen, P., Vromans, L., & Embregts, P. (2021). A qualitative investigation of support workers' experiences of the impact of the COVID-19 pandemic on Dutch migrant families who have children with intellectual disabilities. *Journal of Intellectual & Developmental Disability*, 46(4), 300-305.

Vlenterie, R., **Geuijen, P.**, van Gelder, M., & Roeleveld, N. (2021). Questionnaires and biomarkers to measure stress and depression in mid-pregnancy. *PLoS One*, 16(4):e0250459.

Geuijen, P., van den Broek, S., Dijkstra, B., de Rond, M., Kuppens, J., Schene, A., Atsma, F., & Schellekens, A. (2021). Success rates of monitoring for healthcare professionals

with a substance use disorder: a meta-analysis. *Journal of Clinical Medicine*, 10(2):264.

Geuijen, P., de Rond, M., Kuppens, J., Atsma, F., Schene, A., de Haan, H., de Jong, C., & Schellekens, A. (2020). Physicians' norms and attitudes towards substance use in colleague physicians: a cross-sectional survey in the Netherlands. *PLoS One*, 15(4):e0231084.

Geuijen, P., Buitelaar, J., Fliers, E., Maras, A., Schewen, L., Oosterlaan, J., Hoekstra, P., Franke, B., Hartman, C., & Rommelse, N. (2019). Overweight in family members of probands with ADHD. *European Child & Adolescent Psychiatry*, 28:1659-1669.

van Gelder, M., **Geuijen, P.**, de Vries, J., & Roeleveld, N. (2017). Effects of estimated completion time and unconditional gift certificates on questionnaire response. *Journal of Epidemiology and Community Health*, 71(5):520.

Nederlandstalige blogs

Geuijen, P. (2021). Van 'gezellig' gebruik naar thuis trippen? *RAD Blog*: rad-blog.com.

Geuijen, P. (2020). Sci-fly: Wat doen sociaal isolement en eenzaamheid met onze leefstijl? *RAD Blog*: rad-blog.com.

Geuijen, P. (2019). Dronken in de derde helft. *RAD Blog*: rad-blog.com.

Geuijen, P. (2019). Sci-fly: Rookgedrag bij zwangere vrouwen. *RAD Blog*: rad-blog.com.

Geuijen, P. (2018). Pistepils in winterwonderland. *RAD Blog*: rad-blog.com.

Nederlandstalige publicaties

Bruggink, J., Hiemstra, M., **Geuijen, P.**, & van Dorsseleer, S. (2022). Dataverzamelingsproces Gezondheidsenquête/Leefstijlmonitor 2014-2021. *Centraal Bureau voor de Statistiek*: cbs.nl.

Zwaanswijk, M., **Geuijen, P.**, Boelhouwer, M., Spijk-de Jonge, M., & Serra, M. (2020). Jeugdigen met psychische problemen: verwijspatronen door praktijkondersteuners jeugd in de huisartsenpraktijk. *Huisarts en Wetenschap*, 63:14-18.

Otten, E., **Geuijen, P.**, Zwaanswijk, M., & Koopman, I. (2018). Jeugdwet en Specialistische Ondersteuner Huisarts Jeugd GGZ. *Bijblijven*, 34(8):596-615.

Nederlandstalige rapporten

Hupkens, C., **Geuijen, P.**, & Hiemstra, M. (2022). Aanvullende module Leefstijlmonitor Bewegen en ongevallen 2021. Vergelijking met de Gezondheidsenquête. *Heerlen*: Centraal Bureau voor de Statistiek.

Geuijen, P., & Hiemstra, M. (2022). Evaluatieverslag Leefstijlmonitor 2019-2022. *Bilthoven*: Rijksinstituut voor Volksgezondheid en Milieu.

Boeke, R., **Geuijen, P.**, & Hiemstra, M. (2022). Opbouw en instructie totaalbestand Corona Gezondheidsmonitor Jeugd 2021. *Bilthoven*: Rijksinstituut voor Volksgezondheid en Milieu.

- Geuijen, P.**, Boekee, R., Hiemstra, M., Tak, N., & Meerdink, A. (2022). Handboek Corona Gezondheidsmonitor Jeugd 2021 - naslagwerk voor GGD'en. *Bilthoven*: Rijksinstituut voor Volksgezondheid en Milieu.
- Hupkens, C., **Geuijen, P.**, & Hiemstra, M. (2021). Aanvullende module Leefstijlmonitor Middelen 2020. Vergelijking met de Gezondheidsenquête. *Heerlen*: Centraal Bureau voor de Statistiek.
- Geuijen, P.**, Westerman-den Boer, M., Frielink, N., ten Brug, A., Piekema, L., Poppes, P., van der Putten, A., & Embregts, P. (2021). Rapportage Onderzoek naar de inzet van een Bondgenoot van naasten (Pilot 5). *Tilburg*: Tilburg University.
- Geuijen, P.**, Schellekens, A., & Atsma, F. (2020). Evaluatierapportage Hulpprogramma ABS-artsen. *Nijmegen*: Radboudumc.
- Spijk-de Jonge, M., Boelhouwer, M., **Geuijen, P.**, Zwaanswijk, M., & Serra, M. (2019). Jeugdhulp bij de huisarts. Onderzoek naar inzet en effect van de Praktijkondersteuner Jeugd. *Assen*: Accare Child Study Center.

Nederlandstalige vakbladbijdragen

- Het palet van de POH-jeugd. *Tijdschrift voor praktijkondersteuners en praktijkverpleegkundigen*, 2021(5).
- Met een beetje hulp de verslaving echt achter je laten. *Medisch Contact*, 2021(25).
- Jongens vaker naar de specialistische ggz. *Tijdschrift voor praktijkondersteuners en praktijkverpleegkundigen*, 2020(4).
- Ook onderzoek wijst uit: verslaving bespreekbaar maken is moeilijker dan je denkt. *Medisch Contact*, 2020(20).
- Praktijkondersteuner jeugd bij de huisarts: betere zorg én geld besparen! *Tijdschrift voor Orthopedagogiek*, 2020(2).

Graduate school Donders Graduate School for Cognitive Neuroscience (DGCN)
Project duration March 2017 until June 2021

Courses, workshops, and lectures	Year
PIE: finishing up your PhD, Donders Graduate School for Cognitive Neuroscience	2021
Webinars COVID-19, Vereniging voor Epidemiologie	2021
Webinar Studentenwelzijn, Trimbos-instituut	2021
Inspiratiecollege gedragsverandering, Behavior change academy	2021
Webinar Mental Health & Well-being (during COVID-19), Radboudumc	2021
Mental Health First Aid, Pro Persona	2021
Junior refereren Aparte onderzoeksdesigns, Radboudumc	2021
Design and Illustration, Radboud University	2020
Mindfulness voor promovendi, Radboud University	2020
Introductie data-analyse met R, Tridata	2020
Projectmanagement voor promovendi, Radboud University	2020
Loopbaanmanagement voor promovendi, Radboud University	2020
Science Journalism and Communication, Radboud University	2019
Junior refereren Systematic Reviews in Healthcare, Radboudumc	2019
Scientific Integrity, Donders Graduate school for Cognitive Neuroscience	2019
Junior refereren Measurement in Medicine, Radboudumc	2018
Summer school Qualitative methods 2: analysis, Radboud University	2018
Summer school Qualitative methods 1: data collection, Radboud University	2018
Junior refereren Randomized Clinical Trials, Radboudumc	2018
Discussion & Drinks: Forensic epidemiology, Radboudumc	2017
Training MediSoft Dossier Manager, artsenfederatie KNMG	2017
Training Measurements in the Addictions for Triage and Evaluation (MATE), Radboudumc	2017
Basiscursus Regelgeving en Organisatie voor Klinisch onderzoekers (BROK), Radboudumc	2017

Conferences and discussion forums	Year
Donders Graduate School day, online	2020
Invitational conference ABS-artsen, Nieuwegein	2020
NISPA dag Op inhoud verbinden (presentatie), Nijmegen	2019
Writing retreat SAF, Neerkant	2019
Donders Graduate School day, Nijmegen	2019
Writing retreat NISPA, Huissen	2019
NVvH Najaarsdag Heel de Mens (presentatie), Ede	2018
NISPA dag De nieuwe standaarden (workshop), Nijmegen	2018
Donders Graduate School introduction day, Nijmegen	2018

NISPA dag Samen beter, Nijmegen	2017
Work visit of Michael Kaufman, Utrecht	2017
ENMESH conference The context of mental healthcare, Groningen	2017
Bimonthly SAF meetings (multiple presentations), Nijmegen	2017-2020
Monthly NISPA forums (multiple presentations), Nijmegen	2017-2021
Weekly department of Psychiatry Grand Rounds, Nijmegen	2017

Supervision internships	Year
Bachelor student Medicine - The process of help seeking among Dutch physicians with SUD	2019
Master student Medicine - Psychometric properties of the CBCL in Tanzanian children with HIV and antiretroviral therapy	2018
Bachelor student Biomedical Sciences - From childhood trauma to addiction: the role of the HPA axis	2018

Donders Graduate School for Cognitive Neuroscience

For a successful research Institute, it is vital to train the next generation of young scientists. To achieve this goal, the Donders Institute for Brain, Cognition and Behaviour established the Donders Graduate School for Cognitive Neuroscience (DGCN), which was officially recognised as a national graduate school in 2009. The Graduate School covers training at both Master's and PhD level and provides an excellent educational context fully aligned with the research programme of the Donders Institute.

The school successfully attracts highly talented national and international students in biology, physics, psycholinguistics, psychology, behavioral science, medicine and related disciplines. Selective admission and assessment centers guarantee the enrolment of the best and most motivated students.

The DGCN tracks the career of PhD graduates carefully. More than 50% of PhD alumni show a continuation in academia with postdoc positions at top institutes worldwide, e.g. Stanford University, University of Oxford, University of Cambridge, UCL London, MPI Leipzig, Hanyang University in South Korea, NTNU Norway, University of Illinois, North Western University, Northeastern University in Boston, ETH Zürich, University of Vienna etc.. Positions outside academia spread among the following sectors: specialists in a medical environment, mainly in genetics, geriatrics, psychiatry and neurology. Specialists in a psychological environment, e.g. as specialist in neuropsychology, psychological diagnostics or therapy. Positions in higher education as coordinators or lecturers. A smaller percentage enters business as research consultants, analysts or head of research and development. Fewer graduates stay in a research environment as lab coordinators, technical support or policy advisors. Upcoming possibilities are positions in the IT sector and management position in pharmaceutical industry. In general, the PhDs graduates almost invariably continue with high-quality positions that play an important role in our knowledge economy.

For more information on the DGCN as well as past and upcoming defenses please visit: www.ru.nl/donders/graduate-school/phd.

This thesis used semi-structured interviews, mental healthcare claims data, cross-sectional surveys, and literature as data sources. The included studies were not subject to the Medical Research Involving Human Subject Act, because participants were not subjected to actions or interventions. For the primary data (*Chapter 4*), the local Medical Ethical Committee of the Radboudumc reviewed and had no objections regarding the study protocol of the interview study (registration number: 2019-5160). All interviewees gave their written informed consent which was scanned and the paper version was destroyed. With regard to anonymous analysis of secondary data (mental healthcare claims data and cross-sectional surveys), the owners had their own data management procedures. For the analysis of mental healthcare claims data and cross-sectional (public) health surveys (*Chapter 2*), pseudonymized data was available via the Remote Access facility of Statistics Netherlands (<https://www.cbs.nl/en-gb/onzе-diensten/customised-services-microdata/microdata-conducting-your-own-research>). The protocol for this study was reviewed and no objection was considered by Statistics Netherlands and the Public Health Monitor registration committee. For the analysis of the cross-sectional physician panel data (*Chapter 5*), anonymous data was shared by the Royal Dutch Medical Association (<https://www.knmg.nl/over-knmg/artsenpanel/word-lid/privacy.htm>). This study was reviewed and no objection was considered by the internal ethical review board of the Royal Dutch Medical Association.

The secondary data that were used in *Chapter 2* were available from Statistics Netherlands via their Remote Access facility. Therefore, restrictions apply to the availability of these data, which were used under license for the study in *Chapter 2* and are not publicly available. The data of *Chapter 2* will be saved at the Remote Access facility of Statistics Netherlands for 5 years after termination of the study. The primary and secondary data used in *Chapter 3, 4, and 5* is stored at the server of the Department of Psychiatry of Radboudumc (in the secured folder H:\Research\ABS-artsen). The data of *Chapter 3, 4, and 5* will be saved at Radboudumc for 15 years after termination of the studies and are available upon reasonable request.

