

Substance Misuse Education for Physicians: Why Older People are Important

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This perspective article focuses on the need for training and education for undergraduate medical students on substance-related disorders, and describes initiatives undertaken in the United Kingdom (UK), Netherlands, United States (US), and Norway to develop the skills, knowledge, and attitudes needed by future doctors to treat patients adequately. In addition, we stress that in postgraduate training, further steps should be taken to develop Addiction Medicine as a specialized and transverse medical domain. Alcohol use disorder is a growing public health problem in the geriatric population, and one that is likely to continue to increase as the baby boomer generation ages. Prescription drug misuse is a major concern, and nicotine misuse remains problematic in a substantial minority. Thus, Addiction Medicine training should address the problems for this specific population. In recent years, several countries have started an Addiction Medicine specialty. Although addiction psychiatry has been a subspecialty in the UK and US for more than 20 years, in most countries it has been a more recent development. Additional courses on addiction should be integrated into the curriculum at both undergraduate and postgraduate levels, as well as form part of the continuous training of other medical specialists. It is recommended that further research and mapping of what is currently taught in medical programs be undertaken, so as to enhance medical education in addiction and improve treatment services.

INTRODUCTION

For more than 25 years, concerns have been raised in Europe, the United Kingdom (UK), and North America about the need to improve medical students' education of substance misuse. Despite the efforts of many eminent psychiatrists, physicians, general practitioners, and other medical specialists to improve the teaching of substance

misuse, there is still much to be done at all levels of medical education [1]. Why is the need to improve this education important?

Addiction is defined by the American Society of Addiction Medicine as "a primary, chronic disease of brain reward, motivation, memory, and related circuitry. Dysfunction in these circuits leads to characteristic biological, psychological, social, and spiritual

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†Abbreviations: UK, United Kingdom; SUD, substance use disorders; DALY, Disability-Adjusted Life Year; AUD, alcohol use disorder; US, United States; NHS, National Health Service; MiAM, Dutch Master in Addiction Medicine; CPS, Characteristic Professional Situations; PEP, Personal Education Plan; IST, Interdisciplinary Specialized Treatment; PTSD, post-traumatic stress disorder; ADHD, attention deficit hyperactivity disorder; CASA, The National Center on Addiction and Substance Abuse at Columbia University

Keywords: medical education, substance-related disorders, Addiction Medicine, addiction psychiatry

manifestations. This is reflected in an individual pathologically pursuing reward and/or relief by substance use and other behaviors” [2].

Substance use disorders (SUD) are highly prevalent throughout the world and have a major affect on global health. A recent estimate for Europe showed a loss of 6.6 million Disability-Adjusted Life Years (DALYs) due to the effects of alcohol, drugs, and tobacco smoking [3]. SUD negatively influences the physical and mental well-being of patients from prenatal to old age [4]. Specifically, the prevalence of alcohol use disorders (AUD) has still been increasing in the last few decades [5], and there is growing awareness of, and concern about, alcohol addiction in the elderly [6,7]. Heavy alcohol consumption has negative effects on cognitive function, which is a particular concern in the elderly.

To the best of our knowledge, there is no special training in Addiction Medicine that focuses on substance use disorder in the elderly and the frequent comorbidities.

A journal-based continuing medical education activity from the Mayo Clinic College of Education on geriatric AUD was recently published specifically addressing the lack of knowledge in primary-care physicians [8]. Its goal is to explain the risk factors for the development of AUD in the United States’ (US) geriatric population, state two effective screening tools for detecting AUD in the geriatric population, and discuss medical stabilization, detoxification, and chemical dependency treatment for AUD in the geriatric population [8].

Given the devastating effect that drugs, tobacco smoking, and alcohol potentially have on almost every organ system, physicians in all medical fields frequently encounter patients with health problems related to substance use. Often, the underlying substance abuse causing these medical illnesses remains undetected and untreated, inducing a vicious circle of returning somatic problems, especially in the case of somatic and psychiatric comorbidity in the elderly. Consequently, all physicians need effective and relevant training during their undergraduate years, as well as in their continuing professional education.

Patients with substance-related health problems are either not treated or are sub-optimally treated for co-occurring medical disorders, often due to the attitudes and stigma these patients experience [9,10]. This is one of the main reasons for the dramatic reduction in life expectancies for these patients [11]. Good quality and appropriate training can bring a better understanding of these patients [12]. Reducing the stigma and experienced negativity ultimately changes attitudes for the better, which is a necessity when it comes to screening, detection, and treatment of patients with substance-induced medical disorders.

Although alcohol and tobacco sales are regulated, they remain easily available and regularly advertised. Today, drinking is seen as a normal activity, and although smoking prevalence has mostly declined, with the largest reductions in high-income Western countries, lower-in-

come countries have experienced only slight reductions and some have even seen an increase [13]. While doctors use less nicotine than they did 30 years ago, their use of alcohol and associated health harms are very similar to non-medical populations. This may subliminally influence physicians’ attitudes about the use of alcohol by patients and how they highlight the deleterious effects of it, resulting in gaps in addressing drinking as a problem [14].

Taken together, substance-related disorders are highly prevalent and have a major affect on a broad variety of health hazards that will only increase over time if medical professionals are not adequately trained to intervene.

ROLE OF MEDICAL PROFESSIONALS

In the UK, for example, it is estimated that 90 percent of patient contact in the National Health Service (NHS) takes place in primary care [15]. In addition, older people are required to have an annual health check with their general practitioner at age 75. Thus, doctors are in a key position to detect and treat older people with substance issues. Doctors, health professionals, and those in allied professions play an important role in the development and delivery of services for the treatment of older individuals with substance-related problems and disorders. Studies have indicated that health professionals often miss the evidence of substance misuse in their patients because of insufficient knowledge [16]. The recognition and effective management of substance-related problems by all health professionals — whether specialists or generalists in the fields of addiction and geriatric medicine — are of utmost importance, making the education and training of health professionals in these areas vital for the future health of Europe [17].

We consider that the systematic education of health care professionals is an important intervention that will enable all physicians (especially those specializing in the care of older people) and addiction specialists to develop their knowledge and understanding of substance use and abuse. A great deal of work has been done on this in the UK and, in 2007, the Substance Misuse in the Undergraduate Medical Curriculum Guidance [18] was published.

Professor Sir Liam Donaldson, then-chief medical officer, in his foreword to the guidance stated, “Future doctors do have an important role in shaping and delivering the advice and treatment we can offer people with substance misuse problems. The misuse of alcohol, drugs and tobacco leads to serious and widespread health problems, the scale is such that practitioners are likely to see its impact on patients on most days. This document is an important and positive contribution to support medical schools and to help them in delivering a strong and co-ordinated approach on substance misuse within their curricula.”

The guidance sets out key objectives and learning outcomes for undergraduate curricula training and

assessment within medical schools, and provides three core goals for undergraduate medical education in substance misuse:

1. Students should be able to recognize, assess and understand the management of substance misuse and associated health and social problems and contribute to the prevention of addiction.
2. Students should be aware of the effects of substance misuse on their own behavior and health and on their professional practice and conduct.
3. Students' education and training should challenge the stigma and discrimination that are often experienced by people with addiction problems.

Raising awareness by teaching medical students about the risk of substance misuse to their own health and professional practice and conduct promotes good health, as well as the proper care and protection of the public. Addressing stigma and discrimination is important in promoting fair and equitable access to advice and care for those with substance-related health problems, and for future doctors to understand the needs of vulnerable people who are at added risk of other health and social problems. Finally, teaching trainee doctors in the prevention and management of substance misuse is crucial to the promotion of health and well-being, and in reducing harm [19].

HOW TO IMPROVE UNDERGRADUATE TRAINING: UK/ENGLAND INITIATIVES

The UK project, Substance Misuse in the Undergraduate Medical Curriculum, was funded by the Department of Health. The first phase (2005-07) resulted in the production of corporate guidance on the integration of alcohol, drugs, and tobacco training in medical undergraduate curricula. This guidance was endorsed by the General Medical Council and the Department of Health.

The second phase (2008-11) supported the integration and implementation of the guidance into their curricula; promoted a self-sustaining network of all English medical schools involved in changing their curricula; and developed and validated a tool kit and factsheets to implement the program.

A National Steering Committee with a wide membership, including the General Medical Council, British Medical Association, Department of Health, and the Home Office, oversaw the work. Local champions and coordinators, as well as medical students, were also involved.

Mapping of teaching in the medical schools was aligned to the six key learning areas of the corporate guidance: bio-psychosocial models of addiction; professionalism, fitness to practice, and medical students' own health; clinical assessment of patients; treatment interventions; epidemiology, public health and society; and specific disease and specialty topics.

This mapping identified variations within and between schools, as well as gaps within individual school curricula such as iatrogenic addiction; professionalism,

self-care and fitness to practice; attitudes and issues relating to stigma; child-related issues; and social consequences. Changes implemented by the schools included the development of problem-based learning scenarios, teaching resources such as virtual patient tutorials, and video resources playing out clinical scenarios. Independent learning resources included an online addictions study guide, and in one school students planned and held an "Alcohol Awareness Week." Medical students were actively engaged in the project, revealing that they consider substance misuse an important aspect of undergraduate medical education in order to equip them for the future.

This major initiative has enhanced the quality of training and education of future doctors with the development of teaching resources. It has established a solid basis for substance misuse teaching through the implementation of national guidance in English medical schools [19].

In 2013, further funding was provided to develop a third phase, which is now in place. Its goal is to ensure that the changes implemented in the teaching of substance misuse are maintained so that future graduating medical students continue to be better-equipped to deal with substance misuse issues.

The major activities undertaken include the ongoing development of a network of academics teaching substance misuse to embed changes in curricula and champion substance misuse teaching within their schools. Updates to the learning resource factsheets have been completed and these are freely available [20], with one focusing specifically on the needs of older people.

HOW TO IMPROVE POSTGRADUATE ADDICTION MEDICINE TRAINING: THE EXPERIENCE IN THE NETHERLANDS

Since 2007, there has been a full-time, two-year professional training in Addiction Medicine in the Netherlands: the Dutch Master in Addiction Medicine (MiAM) program. In 2012, Addiction Medicine was approved as a medical profile specialty by the Royal Dutch Society of Medicine. The MiAM is a competency-based, professional training program with theoretical courses integrated with learning in clinical practice under the guidance of an experienced clinical teacher. The theoretical courses consist of evidence-based medicine, communication and basic psychotherapeutic skills, neurobiology of addiction, Addiction Medicine, addiction and psychiatry, clinical leadership, and public health. Throughout these courses, the effects of psychoactive substances on the brain in both young adults and the elderly are of special concern. The seven main competencies are set within Characteristic Professional Situations (CPS), which are integrated in the Personal Education Plan (PEP), and are evaluated using different examination methods [21]. This training has been described as answering the needs of the mental health and addiction treatment field [22]. More recently, there have been initiatives for inter-professional learning.

For example, residents from the MiAM have joined with specialists from the departments of Geriatrics and Primary Care at Radboud. Similarly, several clinics specializing in psychiatric care for the elderly and patients with neurocognitive impairment have provided internships for MiAM residents. Many MiAM graduates are now involved in undergraduate and postgraduate medical courses as teachers.

HOW TO IMPROVE POSTGRADUATE ADDICTION MEDICINE TRAINING: THE EXPERIENCE IN NORWAY

In 2012, the Norwegian Minister of Health and Care Services put forward a Governmental White Paper on “Drug and Alcohol Policy,” which included the decision to establish a full medical specialty in Addiction Medicine. The Norwegian substance problems are diverse in terms of prevalence of use, treatment demand, drugs used, patterns of use, and drug-related harms [23]. In the last 20 years, addiction treatment in Norway has developed from a social service-based approach to comprehensive, interdisciplinary hospital-based treatment with a focus on patients’ rights [23].

There has been increasing awareness of the physical and mental health condition of substance use of patients and the rising morbidity and mortality. Both nationally and internationally, there has been an expansion of the knowledge base for Addiction Medicine. The organization and responsibility for the education and approval of all medical specialties are undergoing a major change to match the future needs of the patients in a changing and modern society.

The specialty in Addiction Medicine is in many ways an acid test for these changes, as it’s been 15 years since a new medical specialty was launched in Norway. A broad process has been to, and is taking place in order to, develop all necessary parts of the new specialty. The specialty regulations and the interim regulations for a full medical specialty in Addiction Medicine were decided by the Norwegian Ministry of Health in November 2014. The specialty regulations include five years of internship in accredited institutions, including:

1. Forty-two months of internship in interdisciplinary specialized treatment (IST), including 12 months in a detoxification department, six months in inpatient addiction treatment, and 12 months of outpatient addiction treatment. One of a range of services can be chosen for the last 12 months.

2. Twelve months in psychiatry, with a minimum of six months in an acute ward or in an ambulatory acute service.

3. Six months in other relevant areas including somatic ward, pharmacology, psychiatry, or general practice.

The candidate must also have 270 hours of coursework and regular clinical supervision and 30 hours of specialized supervision in therapy related to addictions. The

teaching goals include knowledge about elderly people and substance use, including changes in pharmacokinetics and other related issues.

As of December 2015, 16 specialists in Addiction Medicine have been approved according to the interim regulations. More than 100 specialists in Addiction Medicine are expected to be approved after the interim regulation by December, when this opportunity closes. The compulsory coursework program for the candidates in Addiction Medicine is established and more than 60 candidates have started the full course training [23].

KEY ASPECTS OF POSTGRADUATE ADDICTION PSYCHIATRY TRAINING

A vital aspect of training residents in psychiatry is to highlight the inter-relationship between problematic substance use and psychiatric and physical morbidity.

These inter-relationships are in general quite complicated, particularly in older patients who have multiple chronic illnesses. For this reason residents need, as a first step, to understand the myriad effects each individual substance may have on a person, as well as ways of distinguishing these from the features of psychiatric conditions. Moreover, psychological and physical morbidity not amounting to a “disorder” may precipitate substance use (e.g. dysphoria or distress). A psychiatric illness may lead to a substance-related disorder and vice-versa. Substance use, intoxication, or withdrawal may worsen or alter the course of pre-existing psychological and physical symptoms, psychiatric disorders, physical illness, and social environment.

Patients do not necessarily need to have a severe disorder to be associated with substance use and for it to be debilitating. Several psychiatric syndromes are now well-recognized as being associated with substance problems, such as affective disorders, anxiety and psychotic disorders, personality disorders, eating disorders, post-traumatic stress disorder (PTSD), attention deficit hyperactivity disorder (ADHD), memory disorders, and learning disabilities [24].

Residents need to know that the social context, especially the effect of stigma and exclusion, further heighten the concern about suicide and self-harm, hospitalization, re-hospitalization, victimization, neglect, criminality, violence, arrests, imprisonment, homelessness, poverty, isolation, and unemployment. Residents need to be competent in the assessment and diagnosis of patients with co-occurring disorders. Thus, effective training in undertaking a detailed assessment is vital, as is having an in-depth knowledge about drugs of abuse and mental illness.

Residents need to understand the distinctive issues that apply to older people, who may be at risk of adverse physical effects of substances even at low levels due to physiological effects of aging [24]. The comorbidities older people experience are complex and therefore more difficult to treat. There is a high level of stigma associated

with being older and with substance misuse, and older people and their families may be unwilling to disclose information because they may not understand the relationship of substance use and presenting symptomatology [25]. All of these aspects need to be addressed in training.

Furthermore, residents need to understand that pharmacological and psychosocial treatments are available and effective, but constant adaptation to the needs of the older patient is required.

An addiction psychiatrist should be competent in clinical issues such as assessment, diagnosis, and treatment. However, there are additional aspects to team leadership in that role, which include service development, multidisciplinary teamwork, and training psychiatrists and other professionals in this field. It is also of considerable importance that addiction psychiatrists appreciate how to analyze research findings critically, to undertake service evaluation, and to audit their practice against set standards as they have a vital role in policymaking.

This can only be achieved through thorough systematic training and an educational program, such as that of the Addiction Psychiatry Residency Training Program at Yale University School of Medicine [26]. This program provides advanced training in the evaluation, treatment, research, and teaching of substance-related disorders. Trainees are also taught techniques required in the treatment of patients with dual diagnosis (those with substance-related and comorbid psychiatric disorders). The goals of the program are to develop the skills, knowledge, and competencies needed to:

- Understand the basic science and clinical science medical knowledge needed to care for patients with substance-related disorders.
- Provide outstanding patient care to relieve the suffering of patients with substance-related disorders.
- Effectively demonstrate interpersonal communication skills with patients, their families, and others caring for the patient.
- Understand and implement professional responsibilities to patients with substance-related disorders and their families, colleagues, the profession, the department of psychiatry, the community, and society.
- Assess practices and use advanced learning skills in order to stay current with evidence-based approaches to patient care.
- Use resources in the system effectively, and to be able to advocate for improvement in the system of care.
- Lead in the development and dissemination of knowledge in the field of addiction psychiatry.

At the conclusion of a year's training in the US, a specialty board examination is taken before candidates can enter practice without supervision. In the UK, the wider six-year training program in psychiatry that leads to the qualification to practice independently would include one year's training exclusively in addiction. The individual would then be able to practice as an addiction psychiatrist at the consultant level. However, there are different struc-

tures for those professionals training in geriatric medicine, and in the future there may be a case to integrate at least some aspects of training for those who wish to specialize in older people and substance misuse.

THE NEEDS

As seen from the UK and elsewhere, the development of an integrated addiction education model has brought about changes to curricula. This needs to be looked at in more detail in order to consider how it can be drawn upon or adapted to enable those countries where training remains less well-developed, or where existing initiatives are fragmented, poorly integrated, or not sustained over time. A starting point for this is to build upon the international collaboration that has taken place and further explore the question of what we can learn from good practice. A first step is to learn from each other what specific needs there are for Addiction Medicine training in different countries [27].

The National Center on Addiction and Substance Abuse at Columbia University (CASA) in its report, "Addiction Medicine: Closing the Gap between Science and Practice," states that, "Physicians and other medical professionals, who make up the smallest share of providers of addiction treatment services, receive little education or training in addiction science, prevention and treatment."

Furthermore, it is stated that addiction treatment providers such as nonmedical providers of treatment, self-help groups such as Alcoholics Anonymous and others are not equipped with the knowledge, skills, or credentials necessary to provide the full range of evidence-based services to treat the disease [28].

CASA considers that the gap between the science of addiction and current practice related to prevention and treatment has resulted from decades of marginalizing addiction as a social problem rather than treating it as a medical condition [28]. It provides examples of where knowledge is scant, specifically citing a study of fourth-year medical students in New York City, NY, which found that 85 percent did not know of local smoking cessation programs to which to refer patients [29].

A national survey of directors and assistant directors of medical school obstetrics/gynecology training programs in the US found that only 9 percent reported offering students at least 15 minutes of time dedicated to improving students' tobacco cessation skills, and only 32.9 percent reported that their programs taught students both how to intervene with patients who smoke and how to refer them for follow-up [30]. A review of the literature undertaken in the US in 2011 [31] concluded that medical educators must define, design, implement, and evaluate curricula to ensure that all medical graduates — across disciplines — have the basic skills to address substance abuse disorders with patients. In a survey of German medical students, Strobel et al. identified a lack of knowledge of how to treat smoking and problem drinking [32].

Clearly, there have been changes to curricula, but there is still a need to understand the reasons why medical education is not preparing doctors properly in this respect.

IMPORTANCE OF TRAINING

Specific to substance misuse, future medical professionals must understand the effective and safe use of prescription drugs, understand the principles of promoting health, and be aware of social issues including alcohol, tobacco, and drug abuse. With increasing elderly populations, the issue of patient safety is important and needs to be included in substance misuse/addiction training.

The education and training of future health professionals, including qualified medical staff in this area, must be a vital part of our response, given the pivotal role that they have in diagnosing, treating, and preventing health problems arising from substance misuse, and ensuring the prevention of adverse events with psychotropic medications. Doctors, and increasingly other health professionals, are central to controlling the availability of psychotropic (prescription) drugs. These professionals are responsible for promoting the safe availability of effective treatments for appropriate patients. It is also apparent that this control could and should be exercised more effectively. Progression in addiction or developing a dependency after prescription of opioid analgesics is not infrequent.

This can result in adverse drug interactions, poly-substance misuse and dependence, reduction in effectiveness of treatment for co-occurring disorders, as well as increased mortality. This is compounded by the lack of specific training that could be overcome by developing resources that cover identifying at-risk patients and interventions [33].

Recent linear increases in rates of death and use of prescription opioids with suicidal intent among older adults have important implications as the Western world undergoes a rapid expansion of its elderly population [34]. Addiction Medicine training should include specific attention to the needs of the elderly so that age-sensitive treatment can be provided.

Crome, in a commentary piece on treatment effectiveness in older people with substance problems, describes the need for staff, “to be well trained, to enjoy working with older people, to be flexible to change with the fluctuating needs of their clients, as well as being cognizant of the appropriate goals, approaches, location, mode and duration of treatment for older people. Other problems which may affect older people need to be given due recognition, e.g. accommodation, finance, physical illness, cultural differences, transport and accessibility. Patients may need to work at a slower pace, with shorter treatment sessions, and with the opportunity for reviewing and summarizing information in a written format. Other components may include mutual self-help, age segregated treatment, care coordination and the use of information technology, which may be less stigmatizing.” [35].

CONCLUSIONS AND OUTLOOK

Although these important issues are high on the agenda of many international scientific and specialist medical groups, their calls for improvements in education and training have been largely unheeded. While there are examples that show that changes in the medical curricula or training are effective in shifting attitudes, further developments are difficult to achieve without a coherent strategy that can encourage learning across the medical education sector internationally. As an international group of physicians and addiction educational specialists, we consider that there is a need for coordinated action. We need to bring together existing initiatives to focus on improving Addiction Medicine training, evaluate effect, and share best practices in order to develop a comprehensive educational model that can be used effectively to enhance education worldwide. We invite all those interested and involved in these matters to join us to work together in this greatly needed endeavor.

There is an increasing need to acknowledge, recognize, and treat the older population who have escalating needs related directly or indirectly to substance use. A growing number of older people are presenting to emergency, primary-care, and secondary-care health services, as well as social services, with substance-related problems [25]. Older people are more likely to suffer from comorbid disorders directly or indirectly related to substance misuse including that of prescribed medications. There is accumulating evidence of the effectiveness of interventions by multidisciplinary teams. However, professionals have often not had the systematic training necessary to manage this group optimally [6,25,36-38].

It is therefore recommended that there should be a multilayered approach to training: First, developing curriculum content and guidance; second, using this prototype to enhance undergraduate and postgraduate medical curricula; and, third, ensuring that as a result of training, medical students and physicians have the confidence and skills to treat and refer. This series of training initiatives are likely to substantially affect the health of nations because the physician’s role is so central in the treatment, prevention, education, research, and policy relating to health problems arising from substance misuse. This is due to the fact that older patients present to all clinical services with varying degrees of substance problems, which doctors have a responsibility to detect.

REFERENCES

1. Crome IB. The trouble with training: substance misuse education in British Medical Schools revisited. What are the issues? *Drugs Education Prev Policy*. 1999;6(1):111-123.
2. American Society of Addiction Medicine - Definition of Addiction. [Internet]. [cited 2015 Oct 27]. Available from: <http://www.asam.org/for-the-public/definition-of-addiction>
3. Effertz T, Mann K. The burden and cost of disorders of the brain in Europe with the inclusion of harmful alcohol use and nicotine addiction. *Eur Neuropsychopharmacol*. 2013;23(7):742-8.

4. Beddington J, Cooper CL, Field J, Goswami U, Huppert FA, Jenkins R, et al. The mental wealth of nations. *Nature*. 2008;455(7216):1057-60.
5. Whiteford HA, Degenhardt L, Rehm J, Baxter AJ, Ferrari AJ, Erskine HE, et al. Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *Lancet*. 2013;382(9904):1575-86.
6. Older Persons' Substance Misuse Working Group. Substance misuse in older people: an information guide. The Royal College of Psychiatrists [Internet]. [cited 2015 Oct 29]. Available from: http://www.rcpsych.ac.uk/pdf/Substance%20misuse%20in%20Older%20People_an%20information%20guide.pdf
7. Wu LT, Blazer DG. Substance use disorders and psychiatric comorbidity in mid and later life: a review. *Int J Epidemiol*. 2014;43(2):304-17.
8. Bommersbach TJ, Lapid MI, Rummans TA, Morse RM. Geriatric alcohol use disorder: a review for primary care physicians. *Mayo Clin Proc*. 2015;90(5):659-66.
9. Pescosolido BA, Martin JK, Long JS, Medina TR, Phelan JC, Link BG. A disease like any other? A decade of change in public reactions to schizophrenia, depression, and alcohol dependence. *Am J Psychiatry*. 2010;167(11):1321-30.
10. Cunningham JA, Breslin FC. Only one in three people with alcohol abuse or dependence ever seek treatment. *Addict Behav*. 2004;29(1):221-3.
11. Westman J, Wahlbeck K, Laursen TM, Gissler M, Nordentoft M, Hallgren J, et al. Mortality and life expectancy of people with alcohol use disorder in Denmark, Finland and Sweden. *Acta Psychiatrica Scandinavica*. 2015;131(4):297-306.
12. Livingston JD, Milne T, Fang ML, Amari E. The effectiveness of interventions for reducing stigma related to substance use disorders: a systematic review. *Addiction*. 2012;107(1):39-50.
13. ASH. Fact Sheet on Tobacco and the Developing World [Internet]. [cited 2015 Jan 16]. Available from: http://www.ash.org.uk/files/documents/ASH_126.pdf
14. Turner BJ. Gaps in addressing problem drinking: overcoming primary care and alcohol treatment deficiencies. *Curr Psychiatry Rep*. 2009;11(5):345-52.
15. NHS. Transforming Primary Care in London: A Strategic Commissioning Framework [Internet]. [cited 2015 Jan 06]. Available from: <https://www.england.nhs.uk/london/wp-content/uploads/sites/8/2015/03/londn-prim-care-doc.pdf>
16. Rehm J, Allamani A, Della Vedova R, Elekes Z, Jakubczyk A, Landsmane I, et al. General practitioners recognizing alcohol dependence: a large cross-sectional study in 6 European countries. *Ann Fam Med*. 2015;13(1):28-32.
17. WHO. European action plan to reduce the harmful use of alcohol 2012-2020 [Internet]. [cited 2011 Apr 1]. Available from: http://www.euro.who.int/_data/assets/pdf_file/0018/150552/RC61_R4.pdf
18. International Centre for Drug Policy. Substance Misuse in the Undergraduate Curriculum [Internet]. [cited 2007 Apr 15]. Available from: http://www.sgul.ac.uk/images/docs/idcp%20pdfs/Substance%20misuse%20in%20the%20undergrad%20medical%20curriculum/Substance_Misuse_Guidance_Undergraduate_Medical_Curriculum_2007.pdf
19. Goodair C, Crome I. Improving the Landscape of Substance Misuse Teaching in Undergraduate Medical Education in English Medical Schools from Concept to Implementation. *Canadian J Addict*. 2014;5(3):5-10.
20. Substance Misuse in the Undergraduate Curriculum Factsheets [Internet]. [cited 2015 Apr 15]. Available from: <http://www.addiction-ssa.org/index.php/factsheets>
21. De Jong CAJ, Luycks L. Addiction medicine training in the Netherlands. In: el-Guebaly N, Carrà G, Galanter M, editors. *Textbook of Addiction Treatment: International Perspectives*. Vol. XII. Milan Heidelberg New York Dordrecht London: Springer; 2015. p. 2381-94.
22. De Jong C, Luycks L, Delicat JW. The Master in Addiction Medicine Program in The Netherlands. *Subst Abuse*. 2011;32(2):108-14.
23. Welle-Strand GK. Development of a Full Medical Specialty in Addiction Medicine: The Norwegian Experience. Vol. 143. In: el-Guebaly N, Carrà G, Galanter M, editors. *Textbook of Addiction Treatment: International Perspectives*. Vol XII. Milan Heidelberg New York Dordrecht London: Springer; 2015. p. 2410-21.
24. Crome I, Dar K, Jankiewicz S, Rao T, Tarbuck A. Our Invisible Addicts. First Report of the Older Persons' Substance Misuse Working Group of the Royal College of Psychiatrists. London: The Royal College of Psychiatrists [Internet]. [cited 2011 Jan 16]. Available from <http://www.rcpsych.ac.uk/files/pdfversion/cr165.pdf>.
25. Crome IB, Wu L, Rao R, Crome P, editors. *Substance use and older people*. Oxford: Wiley; 2015.
26. Addiction Psychiatry Residency Training Program at Yale University School of Medicine [Internet]. [cited 2011 Apr 15]. Available from: <http://www.medicine.yale.edu/psychiatry/education/clinfell/addiction/index.aspx>.
27. Pinxten WJL, Jokubonis D, Mazaliaukiene R, Achmad TH, De Jong CAJ. Comparing the Training Needs Assessments for a Competence-Based Addiction Medicine Curriculum in Lithuania and Indonesia: Strengthening the New Addiction Medicine Paradigm. In: Haber PS, editor. *International Perspectives on Training in Addiction Medicine*. London and New York: Routledge, Taylor & Francis Group; 2013.
28. CASA. Addiction Medicine: Closing the Gap between Science and Practice [Internet]. [cited 2012 Apr 15]. Available from: <http://www.casacolumbia.org/templates/NewsRoom.aspx?articleid=678&zoneid=51>.
29. Springer CM, Niang CMT, Matte TD, Miller N, Bassett MT, Frieden TR. Do medical students know enough about smoking to help their future patients? Assessment of New York City fourth-year medical students' knowledge of tobacco cessation and treatment for nicotine addiction. *Acad Med*. 2008;83(10):982-9.
30. Powers CA, Zapka J, Phelan S, Özcan T, Biello KB, O'Donnell J, et al. Tobacco education and counseling in obstetrics and gynecology clerkships: a survey of medical school program directors. *Matern Child Health J*. 2011;15(8):1153-9.
31. Strobel L, Schneider NK, Krampe H, Beibarth T, Pukrop T, Anders S, et al. German medical students lack knowledge of how to treat smoking and problem drinking. *Addict*. 2012;107(10):1878-82.
32. Kothari D, Gourevitch M, Lee JD, Grossman E, Truncali A, Tavinder A, et al. Undergraduate Medical Education in Substance Abuse: a Review of the Quality of the Literature. *Acad Med*. 2011;86(1):98-112.
33. Hooten WM, St Sauver JL, McGree ME, Jacobson DJ, Warner DO. Incidence and Risk Factors for Progression From Short-term to Episodic or Long-term Opioid Prescribing: A Population-Based Study. *Mayo Clin Proc*. 2015;90(7):850-6.
34. West NA, Severtson SG, Green JL, Dart RC. Trends in abuse and misuse of prescription opioids among older adults. *Drug Alcohol Depend*. 2015;149:117-21.
35. Society for the Study of Addiction. Treatment effectiveness in older people with substance problems [Internet]. [cited 2015 Dec 16]. Available from: <http://www.addiction-ssa.org/commentary/treatment-effectiveness-in-older-people-with-substance-problems>.
36. Bhatia U, Nadkarni A, Murthy P, Rao R, Crome I. Recent Advances in Treatment for Older People with Substance Use Problems: Systematic and Narrative Review. *Eur Geriatr Med*. 2015;6(6):580-6.
37. Crome IB, Rao T, Crome P. Editorial: Substance Misuse and older people better information, better care. *Age Ageing*. 2015;44(5):729-31.
38. Crome IB, Crome P, Rao R. Recommendations. In: Crome IB, Wu L, Rao R, Crome P, editors. *Substance use and older people*. Oxford: Wiley; 2015. p. 383-6.