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**Opiate Use Disorders and Overdose:
Medical Students' Experiences, Satisfaction with Learning, and Attitudes toward
Community Naloxone Provision**

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ABSTRACT

Introduction: Opiate use disorder is a common condition in healthcare services in Ireland, where over 200 opiate overdose deaths occur annually. There is limited addiction medicine education at undergraduate level and medical graduates may not be adequately prepared to diagnose and manage opioid use disorders and emergency drug overdose presentations. Therefore, we examined final-year medical students' learning experiences and attitudes toward opioid use disorder, overdose and community naloxone provision as an emerging overdose treatment.

Methods: We administered an anonymous paper-based survey to 243 undergraduate medical students undertaking their final professional completion module prior to graduation from University College Dublin, Ireland. Results were compared with parallel surveys of General Practitioners (GPs) and GP trainees.

Results: A total of 197 (82.1%) completed the survey. Just under half were male, and most were aged under 25 (63.3%) and of Irish nationality (76.7%). The students felt moderately prepared to recognise opioid use disorder, but felt less prepared to manage other aspects of its care. Most had taken a history from a patient with an opioid use disorder (82.8%), and a third had witnessed at least one opioid overdose. Although 10.3% had seen naloxone administered, most had never administered naloxone themselves (98.5%). Half supported wider naloxone availability; this was lower than support rates among GPs (63.6%) and GP trainees (66.1%).

Conclusions: Our findings suggest an unmet learning need in undergraduate training on opioid use disorder, with potential consequences for patient care.

Word Count: 240

Keywords: *Substance-related disorders; Medical Education; Family Practice; Overdose Education; Overdose Prevention; Naloxone Distribution;*

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1. INTRODUCTION

Substance use disorders are widespread and are a major contributor to global disease burden and overdose related mortality worldwide (1). There are approximately 1.3 million opioid users in Europe, and 2.2% of deaths among Europeans aged 15 to 39 are due to drug overdoses involving opioids (2). Over 200 opiate overdose deaths occur annually in Ireland, which is a higher rate than annual deaths due to road traffic accidents (3, 4). Naloxone is an effective opioid antagonist that has been demonstrated to reduce mortality among people who use opioids, and its distribution to trained lay users is effective for reducing fatal overdose (5). However, its administration in Ireland has traditionally been restricted to doctors, nurses and paramedics (6). A 2016 Naloxone Demonstration Project in Ireland has recommended wider availability of naloxone in the community (7), and our previous research suggests support among GPs (8) and GP Trainees (9) in Ireland for its wider availability .

Despite the high prevalence of substance use disorders, their teaching in medical undergraduate curricula is often deficient (10-15). However, where addiction medicine is taught, it has been demonstrated to improve medical students' knowledge, skills and self-rated competence in treating patients with substance use disorders (16, 17). Negative attitudes toward patients with substance use disorders have been reported among medical students (18-20), and several studies suggest that these attitudes persist in qualified doctors (10, 14, 21). Education on substance use disorders, including diagnosis, treatment and management, may not be formally defined in many medical school curricula. A qualitative survey of 32 UK medical schools found that such teaching was delivered primarily in psychiatry and general practice modules, with some teaching in public health and professional modules (22). The International Centre for Drug Policy's (ICDP) 2007 Substance Use in the Undergraduate Medical Curriculum guidelines defined core aims and learning outcomes for undergraduate

medical curricula (23). These guidelines recommended that students should on graduation be able to recognise overdose as a life-threatening complication of substance use, and carry out appropriate interventions, though they don't explicitly recommend training in naloxone administration as a treatment for opiate overdose. An early phase of this programme was introduced in UK medical schools between 2008 – 2011 which aimed to improve the extent and quality of substance-use related education (24).

No exact figures for the number of opiate users is available for Ireland, though the European Monitoring Centre for Drugs and Drug Addiction's 2011 Annual Report reported that it had the highest estimated prevalence of 'problem opiate use' across 17 countries in the European Union (25). As an example of the scale of the problem, a reported 9,917 people received treatment for opioid use disorders via opioid agonist therapy (methadone) in Ireland in 2017 (26), and opioids are involved in large numbers of hospitalisations and deaths (27). The Irish Medical Organisation has called for expansion of services for patients with heroin dependence as a priority (27) and legislative changes to allow wider access to naloxone have been sought (6).

In Ireland, Bachelor of Medicine programmes are undertaken at undergraduate level in one of the six medical schools in the country, in contrast with countries such as the USA where medicine is available at graduate level only. In the senior clinical cycle of this medical curriculum, students at University College Dublin (UCD) undertake two years of formal clinical teaching and supervised clinical placements in university-affiliated sites in specialities such as clinical medicine, surgery, paediatrics, obstetrics, psychiatry and general practice. During these placements, some students are opportunistically exposed to patients with opioid use disorder and overdose, and a limited amount of structured teaching takes place. However, the current curriculum does not include formal teaching in opiate overdose and naloxone administration, and students are not expected to have administered naloxone during their medical programme.

Despite the high levels of substance use disorders in Ireland, medical students' exposure to people with these disorders is limited and usually occurs during general practice and psychiatry placements (11). There is a lack of formal substance use education at undergraduate level in Ireland. O'Brien and Cullen argue that a redesign of undergraduate teaching is required to foster positive attitudes in medical students toward patients with substance use disorders and to develop the skills needed to provide a high standard of care to this patient population (11).

Students' self-perceived competence in the area and their exposure to patients with opioid use disorder and overdose have not been studied to date. Given that defined addiction medicine education at undergraduate level is limited and the implementation of effective treatments such as naloxone for opiate overdose are urgently needed in Ireland (8), assessment of students' views and needs in this area is warranted. Therefore, we examined final-year medical students' exposure to opioid use disorder and overdose, self-perceived preparedness for opioid use disorder care and their attitudes toward community naloxone provision.

2. METHODS

An anonymous, paper-based survey was administered to all undergraduate medical students undertaking the final professional completion module in University College Dublin, Ireland, a total sample of 243 students. This module was undertaken around three months prior to graduation.

The development of the study instrument was informed by a prior epidemiological study of opioid overdose in Dublin, by an evaluation of an educational intervention for overdose prevention and naloxone distribution among GP trainees (28, 29) and by a modified version of the instrument used previously by this group to examine general practitioners' (GP) and GP trainees' experiences and attitudes toward opioid use disorder and overdose (8, 9). The survey consisted of 11 questions on demographics, experience of and attitudes toward opioid

use disorder and naloxone distribution, and perceived competence to recognise, assess and manage opioid use disorder, using a five point scale (1 = strongly disagree, 5 = strongly agree).

The data were analysed using IBM SPSS (Version 20). The results were compared with selected results from two earlier surveys of GPs and GP trainees (8, 9), that used similar methodology. All tests were chi-square tests of association. Respondents were informed about the context for the study and they took part voluntarily. The UCD Human Research Ethics Committee granted exemption from full ethical review prior to the commencement of data collection.

3. RESULTS

A response rate of 81.1% (197/243) was achieved. Of the 197 respondents, just under half were male (44.6%), and most were of Irish nationality (76.7%) and aged under 25 (63.3%; see Table 1). The respondents reported feeling reasonably prepared to recognise key markers of opioid use disorder (mean 3.26, SD 0.71), but felt less prepared for other aspects of opioid use disorder management: consultation with a patient about their opioid use disorder (mean 2.88, SD 0.74); assessing addiction severity (mean 2.78, SD 0.73); formulating a treatment plan (mean 2.82, SD 0.72) or managing an opioid overdose (mean 2.90, SD 0.77). Most had taken a history from a patient with an opioid use disorder (82.8%), and a third had witnessed at least one opioid overdose. A small proportion (10.3%) had seen naloxone administered, and three (1.6%) had themselves administered naloxone in overdose.

In comparison, 34.8% of GPs and 62.9% of GP trainees in parallel surveys had administered naloxone (see Table 2). Half (52.1%) of the respondents saw a need for wider naloxone availability; this was not significantly different to rates among GPs (53.1%, $p > 0.05$) and GP trainees (62.7%, $p > 0.05$) in Ireland. For those who were in opposition, concerns included potential use of naloxone, lack of evidence for the benefit of wider availability, and encouragement of opioid use. A similar proportion (54.2%) supported wider naloxone

distribution among laypeople. This contrasted with support among GPs (66.1%, $p < 0.05$), though not with GP trainees (63.6%, $p > 0.05$). Among the students who did not support wider distribution but provided reasons for this, four expressed their lack of knowledge and the need for evidence; four mentioned the need for training and monitoring of lay use, and two expressed concerns about potential harms.

4. DISCUSSION

In this study, medical students reported varying levels of confidence in their ability to recognise and manage opioid use disorder issues. While recognition of opioid use disorder was a reasonably well reported competence, management competencies were, in general, less positive. By contrast, it is notable that students had high levels of contact with patients with opioid use disorder, with more than 80% reporting at least one clinical learning opportunity. While exposure to opiate overdose was lower, it is of interest that a third had witnessed one or more opioid overdoses, and a few had seen naloxone administered or administered it themselves. Experience of naloxone administration was much higher for GP trainees than either of the other two groups, at 63%. It is not known why the GP trainees' rates of exposure were so much higher, though may reflect their experiences during hospital-based training posts after graduation, and changes over time in the GP Trainee Scheme curriculum.

Despite the evidence of the effectiveness of lay administration in preventing fatal overdose, half of the respondents supported wider naloxone availability in the community and its use by laypeople (5). Many others described themselves as unsure about such changes. Several students commented on their lack of knowledge or the lack of evidence for naloxone's wider availability in relation to their uncertainty. These results may reflect students' lack of exposure to patients with substance use disorder or to overdose, or to gaps in their education in the area. However, there was little real difference between the views of students, GPs or GP trainees on this issue, although GPs who provide opiate agonist care for drug users tended to be more supportive of greater flexibility in naloxone availability (9). Overall, final year students in

UCD School of Medicine, GP trainees and GPs in Ireland seem to share uncertainties about opioid use disorder and overdose care which may reflect inadequacies in education and training at undergraduate and postgraduate levels.

Despite recommendations that medical schools incorporate education on substance use disorders into undergraduate curricula (11, 30), our students reported limited confidence in many of the management tasks associated with management of opiate use disorder. Given that many patients with opioid use disorders are managed in primary care (27), training about their treatment and care may be more appropriate for postgraduate education based in primary care. However, managing opioid overdose is a lifesaving intervention that may present in a range of healthcare settings. Its management is arguably a necessary skill for medical students that have direct interaction with patients, and is supported by the ICDP Substance Use in the Undergraduate Medical Curriculum recommendation that students should be able to recognise overdose and carry out appropriate interventions (23). Despite this, few of our respondents had direct experience of overdose management even though it is a large and growing problem in Ireland. Our students' experience appears comparable to medical students' rates of exposure in UK medical schools (30). Our findings underscore that curriculum reforms, such as those implemented abroad (23), are needed to raise perceived competence, particularly for managing opioid overdose.

We acknowledge several limitations of our survey. Although we achieved a high response rate among a cohort of all undergraduate medical students of UCD close to graduation, the recruitment of students in a single medical school in a single academic year may limit its representativeness to the wider medical student population. The self-reported competencies of final year medical students may differ significantly from their ability to perform key clinical tasks (in either direction) and our study did not carry out any form of performance evaluation. The study instrument used for this study and for the previous studies of GPs and GP trainees was not formally validated, though it was piloted and adapted for each

subsequent study. The models were not adjusted for covariates which should be addressed in future studies. The medical student cohort will go on to specialise in a range of medical specialities after graduation and may not be widely exposed to patients with opioid use disorders in their careers. Nevertheless, to our best knowledge, a description of student satisfaction with substance-related education in Ireland has not been reported previously.

5. CONCLUSION

Despite the wide and growing opioid use epidemic, its importance as a public health challenge, and evidence suggesting the importance of inclusion of substance-related education in undergraduate medical training, medical students identified key gaps in their educations. These included diagnosis and management of opioid use disorders and opioid overdose and identified significant uncertainties which may influence their future care for patients. These findings suggest unmet learning needs in undergraduate training on opioid use disorder with potentially significant consequences for patient care.

Table 1: Sociodemographic characteristics, satisfaction with learning experience, experience of opiate use disorders and beliefs about community naloxone provision among final year medical students in University College, Dublin Ireland (N = 197)

| | n | Missing (n) | % |
|---|------------------|-------------|-------|
| Sociodemographic characteristics of participating students* | | | |
| Male gender | 86 | 4 | 44.5% |
| Irish nationality | 145 | 8 | 76.7% |
| ≤25 years | 124 | 1 | 63.3% |
| 26-30 years | 58 | 1 | 29.6% |
| >30 years | 14 | 1 | 7.1% |
| Satisfaction with learning experience to: | | | |
| <i>(1=strongly disagree, 5=strongly agree)</i> | <i>Mean (SD)</i> | | |
| Recognise key markers of opioid addiction | 3.26 | (0.71) | |
| Manage a patient consultation about their addiction | 2.88 | (0.74) | |
| Assess the severity of opioid addiction | 2.78 | (0.73) | |
| Formulate a treatment plan for a patient seeking help | 2.82 | (0.72) | |
| Manage an opioid overdose | 2.90 | (0.77) | |
| Experience | | | |
| Has taken history from patient with opioid addiction | | | |
| No patients | 33 | 5 | 17.2% |
| 1-5 patients | 127 | 5 | 66.2% |
| >5 patients | 32 | 5 | 16.7% |
| Has witnessed opioid overdose | | | |
| None | 121 | 6 | 66.4% |
| 1-5 overdoses | 64 | 6 | 33.5% |
| >5 overdoses | 6 | 6 | 3.1% |
| Has seen naloxone administered in overdose | 20 | 2 | 10.3% |
| Has administered naloxone in overdose | 3 | 3 | 1.6% |
| Beliefs | | | |
| Agrees there is a need for wider naloxone availability | 101 | 3 | 52.1% |
| Is in favour of lay naloxone project | 104 | 5 | 54.2% |
| Knows prevalence of blood-borne virus infections among people who use illicit opioids | | | |
| HIV <5% | 113 | 8 | 59.8% |
| Hepatitis C 60% | 138 | 8 | 73.0% |

*Of the overall sample of 243 eligible students invited to participate in this study, 43.6% were male, 60.0% aged under 25, and 72.0% of Irish nationality. These values are similar to those of participating students, suggesting that the sample was representative of the overall student population.

Missing values were excluded.

Table 2: Comparison of Irish Medical Students', GPs' and GP Trainees' Experience and Beliefs of Opioid Addiction and Overdose, with *p*-values

| | Total (N = 781) | | Medical Students (N = 197) | | GP Trainees* (N = 136) | | GPs** (N = 448) | | <i>p</i> - value |
|--|--------------------|--------------|-------------------------------|--------------|---------------------------|--------------|--------------------|--------------|---------------------|
| | n (%) | Missing n | n (%) | Missing n | n (%) | Missing n | n (%) | Missing n | |
| <u>Sociodemographic characteristics</u> | | | | | | | | | |
| Male gender | 403 (52.75%) | 19 | 86 (44.46%) | 4 | 30 (23.4%) | 8 | 287 (64.8%) | 5 | p<0.001 |
| ≤40 years | 385 (50.07%) | 12 | 192 (97.96%) | 1 | 125 (97.7%) | 8 | 68 (15.3%) | 3 | p<0.001 |
| Experience | | | | | | | | | |
| Used naloxone for opiate overdose | 241 (31.26%) | 10 | 3 (1.55%) | 3 | 83 (62.9%) | 4 | 155 (34.8%) | 3 | p<0.001 |
| Beliefs | | | | | | | | | |
| Supports wider naloxone availability | 416 (54.5%) | 18 | 101 (52.06%) | 3 | 84 (62.7%) | 2 | 231 (53.1%) | 13 | p>0.05 |
| In favour of lay naloxone project | 480 (62.66%) | 15 | 104 (54.17%) | 5 | 84 (63.6%) | 4 | 292 (66.1%) | 6 | p>0.05 |

* Klimas J, Tobin H, Egan M., Barry T, Bury G. (2017) General Practice – a key route for distribution of naloxone in the community. *Int J Drug Policy*, 38:1-3

** Barry T, Klimas J, Tobin H, Egan M, Bury G. (In Press) Opiate addiction and overdose: Experiences, attitudes and appetite for community naloxone provision. *BJGP* (Accepted for publication on Dec 7, 2016)

All tests are chi-square tests of association. Missing values were excluded.

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Author Disclosure

Role of Funding Sources

This study received no financial support from any funding source.

Contributions

Gerard Bury, Jan Klimas and Tomas Barry contributed substantially to the conception, design and data interpretation of the study. Mairead Egan and Helen Tobin conducted the data collection. Helen Tobin conducted literature searches, provided summaries of previous research studies, conducted the statistical analysis and wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

Conflict of Interest

All authors declare that they have no conflicts of interest.

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