Correlation between socioeconomic status and opioid utilisation in primary care in different metropolitan cities of England

Miriam Kerry[1], Teng-Chou Chen[1], Li-Chia Chen[2], Roger Knaggs[1,3]

[1]. Division for Pharmacy Practice and Policy, School of Pharmacy, University of Nottingham, Nottingham, NG7 2RD, UK.
[2]. Division of Pharmacy and Optometry, School of Health Sciences, Faculty of Biology, Medicine and Health, The University of Manchester, Manchester, M13 9PT, UK.
[3]. Nottingham University Hospitals NHS Trust, Queen's Medical Centre Campus, Nottingham, NG7 2UH, U.K.

PPP Division of Pharmacy Practice & Policy — The University of Nottingham — UNITED KINGDOM · CHINA · MALAYSIA

Introduction

Substantial geographic variation in opioid utilisation has been identified in the US and Australia. Several factors have been linked to this variation, such as health care providers' clinical knowledge, population characteristics, healthcare utilisation, and prevalence of pain related co-morbidities. Socioeconomic status (SES) is considered to be an important indicator as high physical labour and unemployment levels may lead to a greater opioid utilisation. Despite several studies into the association between SES and opioid utilisation, their relationship is still controversial.

Regional variation in health care in the UK has been identified for many diseases, however there is a lack of information on the variation of opioid utilisation and its association with SES. The importance of regional variation in opioid prescribing is most significant in light of recent concerns of over prescribing and prescription opioid abuse. Therefore, this study aimed to explore the variation in opioid utilisation and the association between SES and the variation in GP practices in England.

Methods

Study design and data source

- This cross-sectional study used practice-level dispensing data from the United Kingdom (UK) National Health Service Digital between October 2014 and September 2015, and the Index of Multiple Deprivation 2015 (IMD) from the Department of Communities and Local Government.
- Characteristics of General practices (GP) registrants and Quality of Outcomes Framework (QoF) indicators were retrieved from the UK Office for National Statistics publications 2015.

Study Cohort

- All GP practices that issues opioid prescriptions which could be assigned a defined daily dose (DDD) were included and identified as basic unit of region in this study.

Outcome measure

- Total opioid utilisation (DDD/1000 registrants/day) for each practice was calculated and grouped into Clinical Commissioning Groups (CCGs) to present geographical variation.

Data analysis

- The correlation between opioid utilisation and IMD in each practice was analysed by multi-level regression analysis and adjusted for characteristics of registrants and the cluster effect of CCGs.
- Subgroup analysis was conducted in practices located within four metropolitan cities (London, Birmingham, Manchester and Newcastle) with diverse SES and large populations.

Results

Characteristics of study cohort

- Overall, 7856 practices were included and grouped into 209 CCGs in England. The median number of registrants was 6565 (interquartile range [IQR]: 3974, 9898).
- The median opioid utilisation among practices and CCGs were 36.9 (IQR: 3.1, 52.5) and 39.5 (IQR: 29.4, 51.4) DDD/1000 registrants/day.
- Among the four cities, the lowest median IMD score (least deprived) was 28.6 (IQR: 18.7, 37.5) in London.
- There were higher proportions of registrants aged more than 65 years (median: 18.9, IQR: 15.4, 21.7), obese (median: 11.8, IQR: 9.1, 13.9) and diagnosed with cancer (median: 2.5, IQR: 2.1, 2.9) for practices in Newcastle when compared to the other three cities.
- Furthermore, Manchester had the higher proportion of registrants listed as current smokers (median: 22.7, IQR: 18.8, 28.5) or diagnosed with depression (median: 8.1, IQR: 5.4, 10.8).

Opioid utilisation in London, Birmingham, Manchester and Newcastle

- Opioid utilisation varied in practices located within Manchester (n=204), Newcastle (n=175), Birmingham (n=326) and London (n=825) where the median DDD/1000 registrants/day were 53.1 (IQR: 36.8, 71.4), 48.9 (IQR: 38.8, 60.1), 35.3 (IQR: 23.1, 49.4) and 13.9 (IQR: 8.1, 18.8), respectively (Table 1).

Table 1. Opioid utilisation and characteristics of registrants in practices in England and the four cities
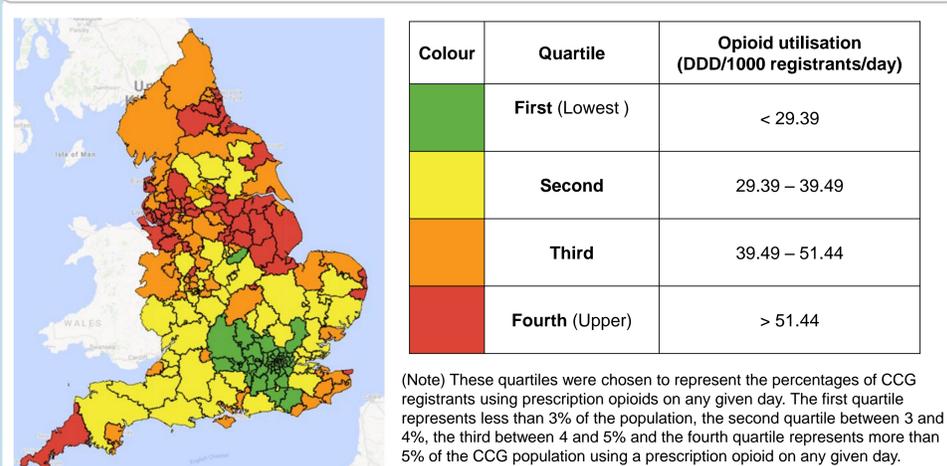
	All practices (n=7,856)	Practices in London (n=825)	Practices in Birmingham (n=326)	Practices in Manchester (n=204)	Practices in Newcastle (n=175)
Number of registrants	6565 (3974, 9898)	6229 (3827, 9123)	5054 (3054, 8871)	5631 (3557, 8403)	6095 (4295, 9153)
IMD score	22.4 (12.4, 37.0)	28.6 (18.7, 37.5)	38.5 (21.6, 52.6)	37.0 (24.8, 51.5)	25.9 (13.5, 45.2)
Opioid utilisation (DDD/1000 registrants/day)	36.9 (23.1, 52.5)	13.9 (8.1, 18.8)	35.3 (23.1, 49.4)	53.1 (36.8, 71.4)	48.9 (38.8, 60.1)
Proportion of registrant demographics and Quality of Outcomes Framework indicators					
Age over 65 years	17.1 (12.1, 21.2)	9.2 (6.8, 12.2)	14.4 (9.4, 18.4)	12.6 (9.1, 16.7)	18.9 (15.4, 21.7)
Female gender	50.3 (49.0, 51.2)	49.9 (47.9, 51.6)	49.8 (47.5, 50.8)	49.6 (47.6, 50.7)	50.6 (49.0, 51.3)
Current smokers	18.5 (14.6, 22.9)	19.7 (16.2, 22.5)	19.2 (15.4, 23.6)	22.7 (18.8, 28.5)	19.4 (14.5, 23.1)
Overweight	9.0 (6.8, 11.6)	6.9 (4.9, 9.6)	9.4 (7.3, 11.6)	9.3 (7.3, 11.9)	11.8 (9.1, 13.9)
Depression	6.9 (4.9, 9.1)	5.4 (3.7, 7.1)	6.4 (4.4, 9.1)	8.1 (5.4, 10.8)	7.4 (5.1, 9.7)
Mental health diseases	0.83 (0.64, 1.1)	1.2 (0.89, 1.5)	0.92 (0.70, 1.2)	1.0 (0.75, 1.3)	0.85 (0.69, 1.1)
Cancer	2.2 (1.6, 2.8)	1.4 (1.0, 1.8)	1.9 (1.1, 2.5)	1.8 (1.2, 2.3)	2.5 (2.1, 2.9)

(Note) IMD: Index of Multiple Deprivation, all statistics are presented in median and interquartile range

Geographical variation in opioid utilisation among CCGs in England

- There was marked geographic variation in opioid utilisation across CCGs in England with opioid utilisation rates being 8.2 times higher when comparing CCGs with the highest and lowest opioid utilisation.
- The 7856 practices in England were grouped into their 209 CCGs, and the opioid utilisation for each CCG ranged from 13.0 to 107.1 with a median of 39.5 (IQR: 29.4, 51.4) DDD/1000 registrants/day). The CCG with the highest opioid utilisation of 107.1 DDD/1000 registrants/day equates to 10% of all registrants using oral morphine equivalent (OMEQ) 100mg on any given day.
- CCGs located in northern areas had higher opioid utilisation and were mostly ranked in the highest third and fourth quartiles. The majority of CCGs located in London and surrounding areas prescribed less than 30 DDD/1000 registrants/day in 2015 and were mostly ranked in the lowest quartile (Figure 1).

Figure 1. Geographical variation in opioid utilisation among CCGs in England

Colour	Quartile	Opioid utilisation (DDD/1000 registrants/day)
	First (Lowest)	< 29.39
	Second	29.39 – 39.49
	Third	39.49 – 51.44
	Fourth (Upper)	> 51.44

(Note) These quartiles were chosen to represent the percentages of CCG registrants using prescription opioids on any given day. The first quartile represents less than 3% of the population, the second quartile between 3 and 4%, the third between 4 and 5% and the fourth quartile represents more than 5% of the CCG population using a prescription opioid on any given day.

Association between opioid utilisation and socioeconomic status

- After adjusting for registrant characteristics and cluster effect of CCGs, for every decrease in IMD decile there was an 1.0 (95% confidence interval [CI]: 0.85, 1.2, P<0.001) DDD/1000 registrants/day increase in opioid utilisation for all practices in England.
- For practices in Manchester, Birmingham and London, opioid utilisation significantly increased by 2.7 (95%CI: 1.2, 4.1), 0.82 (95%CI: 0.08, 1.6) and 0.60 (95%CI: 0.29, 0.90) DDD/1000 registrants/day for each decrease in IMD decile. However, IMD decile was not significantly associated with opioid utilisation in Newcastle (Table 2).
- In addition, opioid utilisation significantly increased with greater proportions of registrants aged over 65 years, female gender and current smokers in England and the majority of the four cities, but the proportion of female registrants was not significantly associated with opioid utilisation in Manchester.
- Furthermore, proportion of registrants with mental health diseases was negatively associated with opioid utilisation for practices in England and a negative association between cancer and opioid utilisation was only found for practices in Birmingham.

Table 2. Association between socioeconomic status, registrant characteristics and opioid utilisation in the multi-level regression analysis

	Practices in England	Practices in London	Practices in Birmingham	Practices in Manchester	Practices in Newcastle
Socioeconomic status					
IMD decile	-1.0* (-1.2, -0.85)	-0.60* (-0.90, -0.29)	-0.82* (-1.6, -0.08)	-2.7* (-4.1, -1.2)	-0.16 (-0.98, 0.65)
Proportion of registrant demographics					
Age over 65 years	1.2* (1.1, 1.3)	0.69* (0.50, 0.88)	1.8* (1.3, 2.3)	2.6* (1.7, 3.4)	1.2* (0.53, 1.9)
Female	0.83* (0.71, 0.95)	0.39* (0.24, 0.54)	1.7* (1.1, 2.3)	0.76 (-0.27, 1.8)	1.9* (0.88, 2.8)
Proportion of Quality of Outcomes Framework indicators					
Current smokers	1.3* (1.2, 1.3)	0.49* (0.35, 0.63)	1.4* (1.1, 1.7)	1.9* (1.4, 2.4)	2.3* (1.7, 2.8)
Overweight	0.38* (0.29, 0.48)	0.03 (-0.15, 0.21)	0.38 (-0.03, 0.79)	-0.26 (-1.0, 0.50)	0.23 (-0.43, 0.89)
Depression	0.43* (0.34, 0.53)	0.20 (-0.01, 0.42)	0.69* (0.23, 1.1)	0.64 (-0.03, 1.3)	0.35 (-0.23, 0.92)
Mental health diseases	-2.6* (-3.2, -2.0)	0.71 (-0.06, 1.5)	-1.6 (-5.1, 1.9)	-6.4 (-12.9, 0.13)	-5.3 (-12.9, 2.3)
Cancer	-0.07 (-0.73, 0.59)	0.07 (-1.2, 1.4)	-3.9* (-7.5, -0.39)	0.34 (-5.5, 6.1)	-0.48 (-5.6, 4.6)

(Note) *p<0.05, IMD: Index of Multiple Deprivation, all statistics are presented in coefficient and 95% confidence interval

Conclusion

There was marked variation in opioid prescribing among GP practices in England and higher opioid utilisation was associated with greater deprivation, increasing age, female gender, and comorbidities in aggregate level. For practices in England, the aggregated population data showed that for every decrease in IMD decile, there would be one more registrant using OMEQ 100mg every day for every 1000 registrants. To further explore the care issues related to pain management and opioid optimisation, future longitudinal studies are needed to identify individuals with higher opioid utilisation and its association with SES in the UK.