Healthcare resource utilisation and economic burden attributable to back pain in primary care: A matched case-control study in the United Kingdom

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Abstract

Objective: Incremental healthcare costs attributed to back pain, and characterisation by patient and clinical factors have rarely been documented. This study aimed to assess annual healthcare resource utilisation and costs associated with back pain in primary care.

Methods: Using the IQVIA Medical Research Data (IMRD), patients with back pain were identified (study period: 01 January 2006 to 31 December 2015) using diagnostic records and analgesics prescriptions (n = 133,341), and propensity score matched 1:1 to patients without back pain. The annual incremental costs of back pain associated with consultations and prescriptions were estimated and extrapolated to a national level. Sensitivity analysis was conducted by restricting the study population to the most recent diagnosis of back pain. Variations in cost were assessed stratified by gender, age-groups, deprivation, and comorbidity categories.

Results: The mean age was 57 years, and 62% were females in both the case and control groups. The total incremental healthcare costs associated with back pain was £32.5 million in 2015 (£35.9 million in 2020), with per-patient cost of £244 (£265 in 2020) per year. On a national level, this translated to an estimated £3.2 billion (£3.5 billion in 2020). Eighty percent of the costs were attributed to consultations; and female gender, older age, higher deprivation, and higher comorbidity were all associated with increased mean healthcare costs of patients with back pain.

Conclusion: Our findings confirm the substantial healthcare costs attributed to back pain, even with primacy care costs only. The data also revealed significant cost variations across socio-demographic and clinical factors.

Keywords
Back pain, cost-of-illness, primary care, healthcare cost

Introduction

Back pain is a major public health problem and is the leading cause of years lived with disability in industrialised countries.[1,2] The annual prevalence of low back pain (LBP) in these countries is estimated at 15%–45%.[3,4] In the UK, it is estimated that up to 80% of the population will experience back pain at some point during their life time.[5] Although back pain has low impact in terms of mortality, it imposes great costs on

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patients and their families, employers, health care providers and society as a whole.[6,7] Therefore, estimating and understanding the costs imposed by 'back pain' are important. Unless the true cost burden is properly valued and recognition of who bares the cost is understood, the importance and value of interventions to reduce the burden of back pain may be inappropriately dismissed.

The costs associated with back pain in the UK were last estimated over 20 years ago using a cost of illness (COI) methodology carried out from a societal perspective.[8] The study reported that the direct health care cost of back pain in 1998 was £1.6 billion.[8] The authors, Manniadakis and Gray (2000), argued at the time that the economic burden of back pain was expected to rise in the future due to a combination of changing methods of healthcare provision, and an anticipated change in health seeking behaviour.[8] At the time Manniadakis and Gray carried out their valuation of the economic burden of back pain, the best available sources of data to estimate direct cost items such as consultations and prescriptions were population surveys. The authors expressed some doubt in their data from these surveys suggesting that other data (less widely available at the time) indicated lower rates of consultations and prescriptions than the population surveys had actually suggested.

In the intervening years, national primary care databases or electronic health records (EHRs) have emerged such as the IQVIA Medical Research Data (IMRD), formerly known as The Health Improvement Network (THIN), and the Clinical Practice Research Datalink (CPRD). These routine administrative databases comprise anonymised, detailed longitudinal data on primary care consultations and prescriptions. The availability of these data sources provides an opportunity to present revised estimates of the healthcare resource utilisation and costs associated with back pain in the UK. A very large number of GP practices and patients contribute data to these databases allowing more precise estimation of the cost involved. The patient-level data comprised within these databases are derived from a representative subset of the UK population, hence the findings are likely to be generalisable to the wider population.[9,10] The large size and representation also enable analyses of the costs by subgroups of the population such as by demographics and clinical characteristics.

This study aims to utilise the IMRD database to provide an up-to-date estimate of the annual healthcare resource utilisation and associated direct medical costs for patients with a diagnosis of back pain in their medical records compared to patients without a recorded diagnosis of back pain. We hypothesise that the consumption of resources and medical costs incurred by back pain patients has increased since the last estimate originating from 1998. We adopt a primary care perspective and interrogate consultations and prescriptions data for patients presenting in UK primary care. The study also explores variation in costs for sub-groups of back pain patients based on socio-economic and clinical indicators.

Methods

Data source and study design

Data for the study were obtained from IMRD primary care database which contains pseudo-anonymised medical records of more than 15 million patients derived from 760 general practices in the United Kingdom (UK). IMRD has been demonstrated to be representative of the UK population in terms of demographic structure and common morbidity prevalence.[11] Information relating to symptoms, investigations and diagnoses are recorded within IMRD as Read codes, a clinical hierarchy coding system.[12] To reduce under-recording of events and improve data quality, general practices were included in our analysis 12 months after their instalment of electronic medical records system in the practice.[13] A retrospective, matched case-control design was used to isolate resource use and costs associated with back pain in 2015 as that was the year with the most complete recent data available at the time of extraction. The healthcare costs of consultations and prescription drugs for patients with back pain (cases) and those without back pain (controls) were compared to obtain the incremental costs associated with back pain.

Study sample selection

Patients aged 18 years or older who had their first diagnosis of back pain (Supplementary file 1) in the 10-year observation period (01 January 2006 until 31 December 2015) were included in the cohort. If patients had multiple diagnoses of back pain in their records, we used the first date; and this is referred to as the index date. The same index date was assigned to the matched controls. Patients were followed up from this date until they died, left the database, or their most recent data upload. Cases were also required to have at least one prescription drug for pain (Supplementary file 2) in the same index year as the back pain diagnosis to ascertain their back-pain status. For each, a propensity-score matched control was selected based on age, sex, general practice, Townsend deprivation quintiles, body mass index (BMI) categories, smoking status, and Charlson comorbidity index (CCI). The matching

Table 1. Unit costs per episode for consultations in primary care.

Consultations	Unit cost (2015 values)
GP consultation in surgery	£40 (lasting 11.7 min)
GP home visit	£81.9 (lasting 23.4 min including travel)
GP telephone consultation	£25 (lasting 7.1 min)
Nurse consultation	£14.5 (lasting 15.5 min)

method adjusted for any differences in average outcomes for differences in patients' characteristics (confounding variables).[14,15] The balancing hypothesis was that observations with the same propensity score must have the same distribution of observable (and unobservable) characteristics independently of back pain status.[14] Quality of matching for both cohorts were checked with density plots using their propensity scores before and after matching.

Outcome measures

This study focussed on primary care healthcare resource utilisation, in particular primary care consultations and prescribed drugs, which can be accurately estimated from primary care databases. Therefore, physiotherapy and secondary care healthcare resource use including emergency visits (A&E) which were only available as free text entries and referrals codes were not included. Annual healthcare resource utilisations for 2015 were examined for both the case and control groups, and the UK unit costs for the same year were applied to the resources used. Where appropriate, national cost estimates were converted to 2020 GBP using country-specific gross domestic product inflator index.[16]

Consultations. Three major types of consultations (Supplementary file 3) were included: surgery consultations, home visits, and telephone consultations.[17,18] We focussed on two healthcare professional types (GPs and nurses) in order to estimate the costs associated with consultations. Each consultation was then attached to a healthcare professional for assessing resource use and costs associated with it. The unit cost per visit for each type of consultation (Table 1) was taken from the Unit Costs of Health & Social Care 2015, Personal Social Services Research Unit (PSSRU).

Prescription drugs. Pain relief drugs and additional drugs that are likely to be related to back pain (Supplementary file 4) were included in order to assess healthcare resource use and costs of prescription drugs. This was guided by the National Institute for Health and Care Excellence (NICE) 2016 guideline for LBP,[19] existing literature, and consensus with clinician. The pain relief medications included opioids/opioid-like agents, non-opioids, nonsteroidal anti-inflammatory drugs or NSAIDs, rubefacients, topical NSAIDs, capsaicin, and poultices. In addition, drugs that are usually prescribed along with pain relief medications to counteract the effects of pain killers (e.g. laxatives) or to ameliorate anxiety and depression associated with back pain (e.g. hypnotics and anxiolytics) were considered in the analysis as their usage is associated with back pain. These included proton pump inhibitors, bulk-forming laxatives, stimulant laxatives, faecal softeners, osmotic laxatives, corticosteroids, hypnotics, and anxiolytics. The costs of prescription drugs were obtained primarily from NHS Electronic Drug Tariff.[20] The British National Formulary (BNF) and Prescription Cost Analysis[21] were additionally used when drug prices could not be found from the Drug Tariff. Each prescribed drug in the patient's record was matched to the unit costs using drug name and formulation. The estimated total costs of drugs for each patient reflected the quantities specified in the prescriptions.

Statistical analysis

Patient demographics and descriptive statistics at baseline, which was the time period up to index date, were presented for the case and control groups. The annual cost of the individual healthcare resource for each patient was estimated as a product of the quantities of resource used in 2015 and the attached unit costs. The total cost of all healthcare resource utilisation for each patient was then aggregated to make up the total healthcare cost for the sample. The annual incremental costs associated with the treatment of back pain in 2015 were calculated as the difference between the total cost for the cases and the controls. The mean incremental cost for a back-pain patient was then extrapolated to the UK population using national prevalence estimates. In a sensitivity analysis, we restricted the study population to the most recent diagnosis (the previous 2 years) of back pain and their matched controls.

Mean healthcare costs were estimated in sub-groups of back pain patients stratified by gender, age-groups,

deprivation quintiles, and CCI categories. Variations in mean costs within the groups were tested using *t*-tests and analysis of variance (ANOVA) on bootstrapped samples of the same size as the original data obtained through repeated sampling. Bootstrap simulation has been shown to be effective for comparison of the arithmetic means without making distributional assumptions.[22–24] Data extraction was carried out using the Data Extraction for Epidemiology Research (DExtER) tool,[25] and data management and analyses were conducted using Stata 16.1 SE (StataCorp, College Station, TX).

Results

Patient characteristics

The eligible population included 914,461 cases and 1,862,230 controls (Figure 1). Of these, a total of 133,341 cases met the sample selection and were 1:1 matched with controls using propensity score matching. Density estimate graphs plotted using their propensity scores before and after matching (Supplementary file 5) showed good quality of matching between the groups. Further checks were conducted to assess balance between matched samples using percentage bias between the case and control groups for each of the seven characteristics. Inspection of the standardised differences (Supplementary file 6) showed that the percentage bias remained well below 5% for all seven characteristics after matching.

The baseline characteristics of the case and control groups is shown in Table 2. The mean age was about 57 years and 62% were females in both groups, and nearly half of the population in both groups also presented with at least one co-morbidity.

Healthcare resource utilisation and costs

The annual all-cause healthcare resource use in the backpain group were nearly double that of the control group in both the main analysis and sensitivity analysis (Table 3). The annual incremental costs of consultations associated with back pain were £25.3 million (£27.9 million in 2020 prices), with the cost per patient amounting to £189.7 (£209.5 in 2020). In the sensitivity analysis, the incremental cost per patient was 18% higher at £223.5 compared to the main analysis. Counts of prescriptions and/or rates of prescriptions were three times higher in the back-pain group compared to the control group. The annual incremental costs of prescriptions per patient was £54.4 (£60.1 in 2020) in the main analysis while this dropped to £47.0 per patient in the sensitivity analysis.

The total incremental costs of back pain reported in this study amounted to £32.5 million (£35.9 million in 2020), with the per-patient cost of £244 (£265 in 2020) per year. At £270 per patient per year, the sensitivity analysis was also consistent with the findings of the main study. Using an alternative regression analysis method, we obtained an incremental cost per patient of £234 reported as a coefficient for the cases (Supplementary file 7). This confirmed the robustness of our matching analysis approach. Around 80% of the total cost difference between the case and control groups was attributed to consultations. The result was extrapolated to a national level using prevalence estimates calculated (Supplementary file 8) and the mid-year UK adult population level.[26] This generated an incremental cost associated with back pain costing the healthcare system an estimated £3.2 billion in 2015 (£3.5 billion in 2020).

Descriptive details of resource utilisation by consultation types and drug groups are shown in Figures 2 and 3, respectively. The largest difference in consultations between the cases and controls was in the GP surgery consultation category where cases utilised twice the number of consultations compared to controls. Home visits by GPs had the least attribution to the total consultations with 1.5% and 1.9% of the share for the case and control groups, respectively. For prescription drugs, the largest attribution came from the category of 'other drugs' which included anxiolytics/hypnotics, laxatives, corticosteroids and proton pump inhibitors. The attribution of the main drug groups to the incremental resource use associated with back pain was 29.5%, 27.2%, and 21.7% for the other drugs, strong analgesics, and the basic/weak analgesics groups, respectively.

Variation of costs by subgroups of population

Variation of all-cause mean healthcare costs by sociodemographic factors in patients with back pain is shown in Table 4. With the exception of nurse consultations, the mean healthcare costs per patient were higher for females than males. Similarly, costs generally increased by age groups and deprivation with older patients and patients living in more deprived areas incurring higher costs. The mean healthcare costs also showed clear patterns with costs increasing with comorbidities across all cost components with no exception. The cost variations by these sociodemographic and clinical factors were statistically significant. Similar patterns were observed among the control population, but the costs were lower compared to the cases (Supplementary file 9).

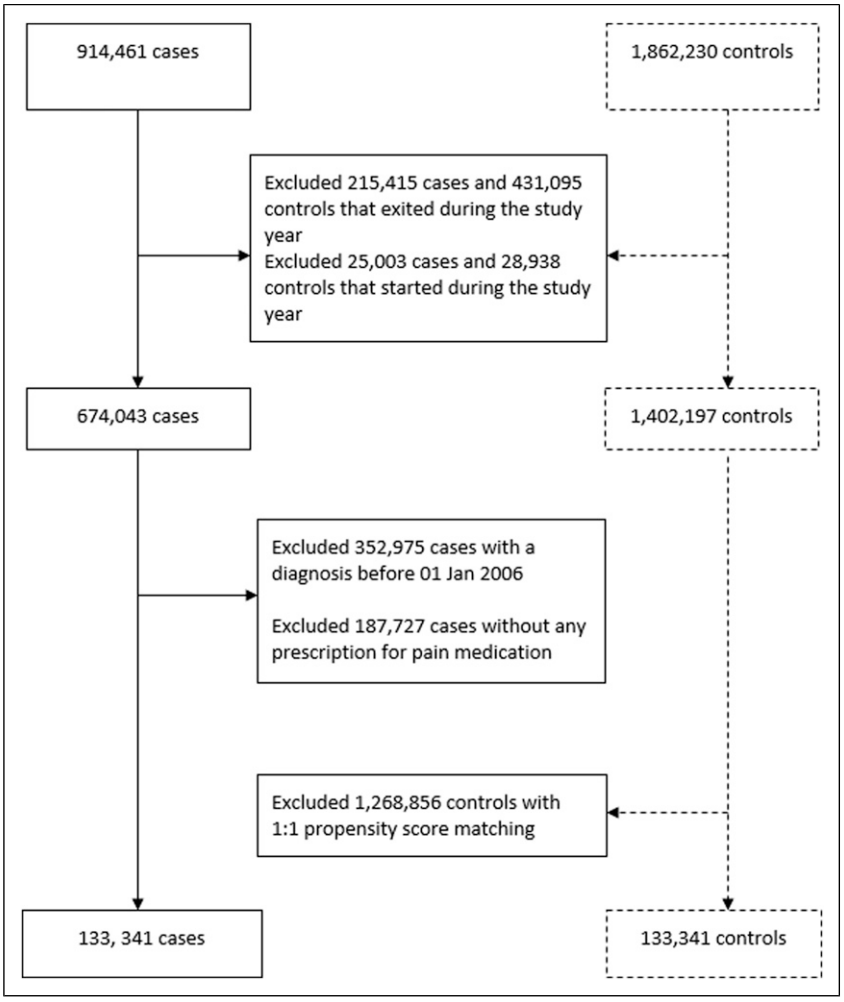

Figure 1. Flowchart of patient inclusion.

Discussion

Statement of principal findings

The objective of this study was to estimate the annual healthcare resource utilisation and costs associated with back pain in UK primary care setting. We found that the annual healthcare costs of patients with back pain were estimated to be double those of the matched controls (63 million vs 30.5 million). Our estimates would be equivalent to £3.2 billion at a national level, hence revealing a significant economic impact of back pain to the National Health Service (NHS). The full economic burden is likely to be greater if secondary care costs such as inpatient and outpatient costs, and indirect costs of productivity loss through absence and reduced work performance are taken into account. Our prescription cost estimates may also represent a conservative estimate given that some antidepressant medication types such as selective serotonin reuptake inhibitors (SSRIs) and serotonin–norepinephrine reuptake inhibitors (SNRIs) were excluded based on the prevailing guideline for LBP; [19] nevertheless, these drugs may still be relevant for some chronic patients. It is also possible that some patients with back pain were prescribed other medications more often than controls due to back pain related non-painful conditions which may have led to further underestimation of costs. However, this effect is likely to be small as the two groups have been matched by existing comorbidities.

The sensitivity analysis supported our main findings although there were some discrepancies. We observed a drop in mean prescription cost for the cases in the sensitivity analysis compared to the main analysis. The study also provided evidence that the reported primary care utilisation and costs in patients with back pain varied greatly by patient and clinical characteristics. Female gender, increasing age, higher Townsend index, and higher comorbidity index were all found to be

Table 2. Baseline characteristics of the study population.

Variables	Case (*n* = 133,341) *n* (%)	Control (*n* = 133,341) *n* (%)
Gender		
Male	50,798 (38.1)	50,162 (37.6)
Female	82,543 (61.9)	83,179 (62.4)
Age (mean, sd)	56.5 (16.9)	56.7 (16.8)
Age group		
18–24	3,167 (2.4)	3,210 (2.4)
25–34	11,633 (8.7)	11,590 (8.7)
35–44	19,831 (14.9)	19,151 (14.4)
45–54	27,431 (20.6)	26,991 (20.2)
55–64	24,958 (18.7)	25,022 (18.8)
65–74	23,823 (17.9)	25,280 (18.9)
75 & overs	22,498 (16.9)	22,097 (16.6)
Townsend quintiles		
Least deprived 1	22,233 (16.7)	26,046 (19.5)
2	23,244 (17.4)	26,341 (19.7)
3	25,543 (19.2)	25,275 (19.0)
4	24,503 (18.4)	21,528 (16.2)
Most deprived 5	20,180 (15.1)	15,607 (11.7)
Missing	17,638 (13.2)	18,544 (13.9)
BMI category		
<25	38949 (29.2)	42298 (31.7)
25–30	44901 (33.7)	44187 (33.1)
>30	40655 (30.5)	37895 (28.4)
Missing or implausible	8836 (6.6)	8961 (6.7)
CCI category		
0	71,853 (53.9)	75,961 (56.9)
1	33,076 (24.8)	28,479 (21.4)
2	16,163 (12.1)	16,648 (12.5)
3	7,253 (5.4)	7,156 (5.4)
4	2,905 (2.2)	2,969 (2.2)
5 and above	2,091 (1.6)	2,128 (1.6)

Table 3. Estimates of annual healthcare resource use and costs associated with back pain.

	Main analysis		Sensitivity analysis*	
Cost component	Back pain (*n* = 133,341)	No back pain (*n* = 133,341)	Back pain (*n* = 24,607)	No back pain (*n* = 24,607)
Consultations				
Count	1,269,228	705,234	244,069	124,011
Per patient	9.52	5.29	9.92	5.04
Total costs	£52,700,000	£27,400,000	£10,300,000	£4,801,599
Per patient	£395.23	£205.49	£418.58	£195.13
Prescriptions				
Count	1,601,863	550,969	282,742	89,942
Per patient	12.01	4.13	11.49	3.66
Total costs	£10,300,000	£3,051,975	£1,654,807	£498,190
Per patient	£77.25	£22.89	£67.25	£20.25
Sum				
Total costs	£63,000,000	£30,451,975	£11,954,807	£5,299,789
Per patient	£472.47	£228.38	£485.83	£215.38

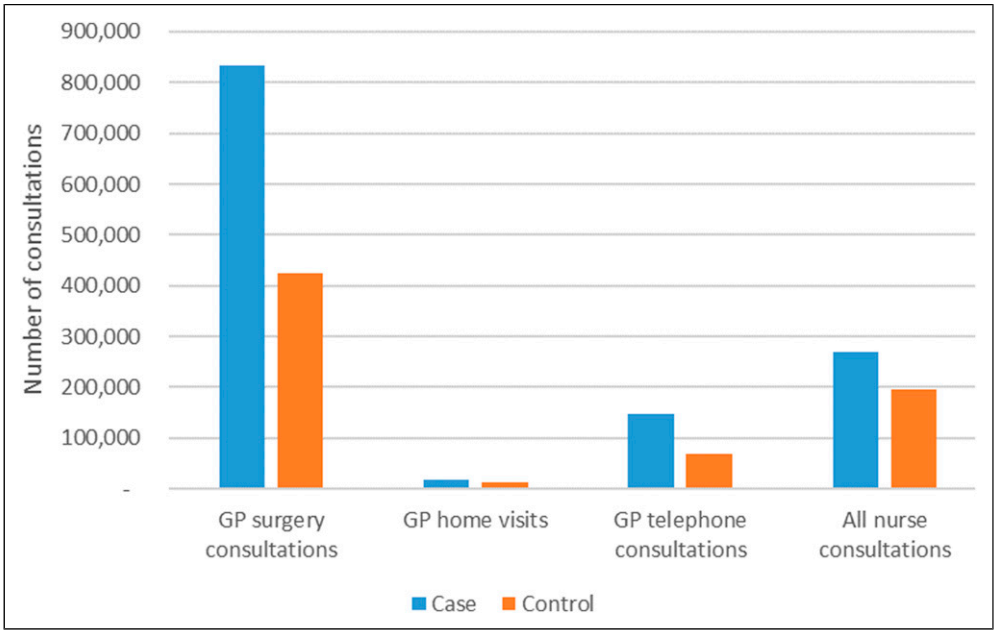

Figure 2. Attribution of resource utilisation by consultation groups in patients with and without back pain.

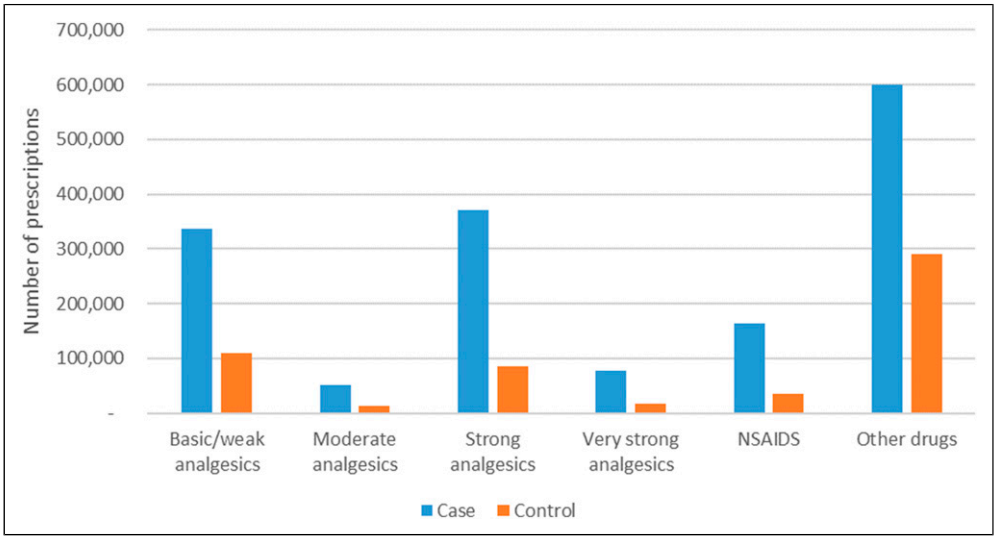

Figure 3. Attribution of resource utilisation by drug groups.

associated with increased healthcare costs in patients with back pain.

Strengths and limitations of the study

This is the first comprehensive study of the direct medical costs in those with back pain in UK primary care. Our study provided the first estimates of healthcare resource utilisation and costs associated with a broad range of back pain diagnoses using one of the largest primary care databases in the UK. Given the large sample used and generalisability of IMRD, our findings can be considered credible. Although we used data from 2015 available at the time of the analysis, we don't expect the resource utilisation to have changed drastically, and we inflated the national cost estimates to 2020 using an appropriate conversion index to reflect change in unit costs. Certainly, in the last 3 years of the COVID-19 pandemic, one would expect the estimates to have remained stable or declined as less

Table 4. Mean healthcare costs (2015 £s) in sub-groups of back pain patients.

	Consultations mean (SD)		Prescriptions mean (SD)		Total cost	
Characteristics	GP	Nurse	Analgesics	Other drugs	Mean (SD)	*p*-value[a]
Gender						
Male	338.6 (306.7)	51.3 (71.5)	60.7 (215)	24.3 (60.6)	421.5 (424.4)	<0.001
Female	408.1 (348.8)	50.1 (64.4)	64.9 (213.4)	26.4 (81.3)	503.4 (464.7)	
Age-group						
18–24	362.0 (348.2)	46.5 (79.4)	20.1 (53.3)	9.8 (41.5)	397.6 (385.5)	<0.001
25–34	366.3 (325.1)	41.3 (44.2)	41.8 (208.9)	14.4 (62.4)	421.3 (438.1)	
35–44	347.0 (310.7)	40.9 (48.1)	57.2 (250.6)	18.9 (130.3)	418.2 (469.6)	
45–54	349.1 (303.9)	43.5 (53.2)	66.4 (253.7)	21.1 (55.6)	433.4 (445.7)	
55–64	358.2 (308.5)	48.0 (62.6)	71.6 (230.7)	25.1 (61.3)	454.5 (435.1)	
65–74	389.3 (335.1)	54.6 (72.4)	65.7 (165.1)	28.0 (58.3)	491.4 (421.5)	
75 & overs	481.1 (398.2)	64.6 (86.0)	70.6 (160.5)	37.8 (71.1)	603.2 (478.7)	
Townsend quintiles						
Least deprived 1	367.3 (318.2)	48.9 (66.4)	54.4 (206.2)	22.5 (47.8)	448.0 (425.0)	<0.001
2	374.7 (325.6)	51.2 (69.7)	56.2 (182.7)	23.5 (57.7)	456.6 (422.2)	
3	379.6 (337.5)	52.9 (72.0)	62.4 (185.0)	24.8 (58.1)	468.4 (436.7)	
4	391.7 (344.5)	52.5 (69.7)	71.7 (285.1)	26.8 (61.6)	492.9 (499.0)	
Most deprived 5	404.4 (351.5)	50.6 (63.6)	73.6 (208.9)	31.5 (133.7)	510.9 (484.5)	
Missing	373.2 (331.4)	44.7 (52.5)	61.9 (189.2)	25.3 (60.9)	455.7 (429.5)	
CCI category						
0	329.3 (287.3)	40.2 (51.3)	50.6 (183.6)	19.1 (47.3)	392.4 (378.7)	<0.001
1	409.2 (350.4)	52.3 (65.0)	70.5 (222.3)	27.6 (68.1)	514.9 (465.8)	
2	442.4 (366.6)	61.0 (80.0)	81.1 (264.4)	32.1 (69.4)	569.7 (504.3)	
3	494.3 (396.2)	67.2 (83.5)	88.8 (234.7)	38.0 (75.0)	645.1 (518.8)	
4	562.6 (442.3)	79.1 (100.3)	101.1 (301.3)	48.9 (269.2)	744.4 (704.2)	
5 and above	611.8 (485.4)	84.0 (113.0)	109.2 (329.0)	42.5 (79.2)	806.4 (643.6)	

[a]Bootstrap *t* test and ANOVA on total cost.

consultations were made in response to overwhelmed health services due to the pandemic.

The case-control design of our study enabled us to demonstrate the incremental costs incurred by back pain rather than presenting all-cause costs of patients with back pain. We have thus identified areas of increased healthcare resource utilisation compared with other primary care patients. Another strength of the study was that the matching technique used was effective in balancing the observed baseline covariates between the case and control groups. Our study has also shed light for the first time on how the costs associated with back pain varied by patient, and clinical characteristics. These variations might be a reflection of the heterogenic nature of back pain in relation to its diagnosis, duration, and severity of illness.

One of the limitations of our study was that some cost components such as physiotherapy in primary care were not accounted for in the analysis. This was due to limitations with data recording in primary care databases. The requirement that cases had to have at least one pain medication to ascertain their back pain status could have excluded some patients who only used over the counter medications or were referred onwards rather than prescribed a medication. Furthermore, the pain medication could potentially be for other pain conditions as it was not feasible to confirm this from coded IMRD data. However, given that the pain medication was prescribed in the same index year as the back pain diagnosis, it was likely that this was related to the back pain. We also acknowledge that the matching method did not balance baseline healthcare resource utilisation as well as potential unobserved characteristics, and hence unmeasured confounding could still exist. Another limitation was in the use Read codes to identify back pain where there may be miscoding and variation among practices and clinicians in the usage of specific codes due to lack of standardisation of diagnostic codes.[27] However, the study included a high number of Read codes covering a broad range of back pain diagnoses together with a large sample size, hence increasing the validity of the findings.

Interpretation in relation to other studies

Our study has similarities and important differences with other studies estimating the costs associated with back pain. Manniadakis and Gray[8] estimated the costs of consultations and prescriptions in 1998 to be £140.4 million and £93.7 million, respectively, for the UK.[8] Although this was the first study estimating the costs of back pain in the UK, the estimates were based on survey data and other aggregated sources of data. Using patient level data, our study estimated the incremental costs of consultations and prescriptions in 2015 to be £2.5 billion (£2.7 billion in 2020) and £718 million (£792.7 million in 2020), respectively, on a national level. This is consistent with predictions by Manniadakis and Gray who argued at the time that costs of back pain were expected to rise considerably in the future.[8] Hong et al.[18] investigated, using a case-control design, the costs associated with the treatment of chronic low back pain (CLBP) in the UK using CPRD data. They reported a much higher marginal cost per patient in 2009 of consultations (£328) and prescriptions (£105) compared to our study.[18] However, their study compared CLBP patients with patients without CLBP where the chronicity of the pain may explain the greater cost difference between the two groups. Moreover, Hong et al. matched the case and control groups on the basis of just three variables: year of birth, gender, and practice ID, which may have limited the comparability of the groups. This was in contrast to seven matching characteristics used in the current study providing better a basis for comparison and validity of the findings.

Consultations accounted for a greater proportion (78%) of the cost difference between the case and control groups in our study. Higher proportions of consultation costs compared to prescription costs were reported in other COI studies of back or spine conditions using the incremental costs approach.[18,28] While adopting different costing methodologies, similar findings were also reported by other European studies.[29–31] On the other hand, a US study by Gore et al.[32] found that consultations and prescriptions contributed almost equally to the marginal cost of CLBP. This could be partly due to the more relaxed prescribing patterns for analgesics in the US and the higher drug prices compared to the NHS in the UK. Hence there was no consistency due to methodological differences among the studies. For example, Martin et al.[28] had combined consultations and other ambulatory services into a single outpatient service category making direct comparison of the findings problematic. A systematic scoping review on methodologies used to assess the costs of back pain also highlighted the existence of several methodological challenges that influenced the magnitude and accuracy of estimates reported.[33]

Conclusion

This study presents the annual healthcare resource utilisation and costs of back pain in the UK primary care, highlighting cost variations across socio-demographic and clinical factors. These data confirm the substantial healthcare burden associated with back pain and the need for identifying subgroups of patients contributing to higher expenditure. Identification of the magnitude and patterns of expenditure can help guide research priorities for early treatment to improve health outcomes and reduce the economic burden of back pain. The results of this study may provide important information for researchers and public health policy makers, and will inform economic evaluations of interventions to treat or prevent the consequences of back pain.

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Authors' contributions

TR, GWJ, AG, and JK conceived and designed the study and supervised the work. DTZ analysed the data and drafted the manuscript. KN and TM contributed to acquisition of data and methodology. All authors reviewed, edited the manuscript, and approved the final manuscript.

Declaration of conflicting interest

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Ethical statement

Ethics approval

This study was approved by the IQVIA Scientific Review Committee (SRC reference: 18THIN041), and the use of the data was approved by the National Health Service (NHS) Research Ethics Committee (NHS Research Ethics Committee reference: 18/LO/0441).

Informed consent

This was a secondary data study and data were fully anonymized and dissociated from patients. Therefore, there was no need for providing informed consent. The study was carried out in accordance with the relevant guidelines and regulations.

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Supplemental Material

Supplemental material for this article is available online.

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