Piloting a novel cancer care pathway: socioeconomic background as a barrier to access

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ABSTRACT

Background

The multidisciplinary diagnostic clinic (MDC) model for 'non-specific' symptoms has been piloted in the UK. We aimed to assess the degree to which the MDC pathway was influenced by socioeconomic factors.

Methods

We collected data for all patients referred to the MDC from 01 January 2017 – 28 March 2019. Indices of multiple deprivation (IMD) scores were matched to patients' postcodes and referring general practitioner (GP) location. Socioeconomic data for MDC patients was compared with all other cancer patients diagnosed in the MDC's base hospital, Airedale General Hospital (AGH), in 2018. Statistical significance was tested using the Mann–Whitney *U* test and Spearman's rank correlation.

Results

No significant difference was found between MDC pathway and the rest of AGH when comparing social deprivation of patients.

There was a moderate negative correlation between the IMD associated with the location of GP premises and the number of referrals; practices in more deprived locations referred fewer patients ($p \leq 0.025$).

Conclusion

The MDC pathway referral rate seems to be affected by social deprivation in a similar manner to other cancer diagnosis pathways. Our work highlights the importance of engaging GP practices with socially deprived populations as the MDC programme is rolled out across the UK.

KEYWORDS: access to care, health disparities, cancer, socioeconomic

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Background

Cancer outcomes in the UK have significantly improved over the last few decades with successive governments prioritising improving cancer care. Most recently, the 2015 *Five year forward view* identified cancer as a national clinical priority and the government accepted the independent task force's 96 recommendations for 'achieving world class cancer outcomes'.[1] Despite these improvements, the UK continues to lag significantly behind other European countries in key measures, such as stage at diagnosis and 5-year survival.[2]

One observation is that in countries with a 'gatekeeping role' for primary care, onward referral to specialist care is later and 1-year survival is lower than in countries without this role.[2] These problems are compounded in a system with lengthening waiting lists for patients with non-specific symptoms who do not fit into traditional 'fast-track' clinics with 2-week wait (2WW) targets.[3]

The Airedale and Craven multidisciplinary diagnostic clinic (MDC) is part of the Accelerate, Coordinate, Evaluate (ACE) Programme, running since 2017 and designed for patients with non-specific symptoms.[4] As mandated by recommendation 21 of achieving world class cancer outcomes, this model has shown promise in tackling non-specific symptoms, complex cases and rare cancers.[3,5,6]

The clinic allows general practitioners (GPs) to refer these patients directly to a medical physician-led clinic with dedicated radiological testing to pick up diagnoses that may otherwise present late.

Equality is a key tenet of the NHS constitution.[7] As such, the MDC should aim to assess and diagnose patients regardless of their socioeconomic status. It is known that socioeconomic factors can have a significant impact on access to cancer diagnosis and treatment.[8]

Previous research has estimated that up to 11% of cancer deaths could be avoided if socially deprived areas had 3-year survival rates that met those of higher socioeconomic groups.[9] As such, mitigating these factors should be at the heart of implementing new cancer diagnosis pathways, such as the MDC, and evaluation of the pilot project is required.

Aim

Our project aimed to find out how socioeconomic background of patients diagnosed by the MDC compared with traditional cancer diagnosis pathways in the hospital and how GP referral rate varied depending on deprivation.

Methods

Clinic referral criteria

Patients were referred to the clinic based on five criteria: persistent unexplained abdominal pain, persistent unexplained weight loss, non-specific but concerning symptoms with a high risk of cancer, GP clinical suspicion and too unwell for 2WW.

Data collection

We collected data for all patients referred to the MDC over a 27-month pilot period from 01 January 2017 – 28 March 2019. The indices of multiple deprivation (IMD) scores were acquired by matching the lower layer super output area (LSOA) score to their given postcodes. IMD scores were taken from 2015 Public Health England data.[10] In order to compare this with conventional cancer diagnosis pathways, we used a control group consisting of all other patients diagnosed with cancer in Airedale General Hospital (AGH) in 2018. The Mann–Whitney *U* test was used to compare the two groups for statistical significance.

We also compared referral rates with the deprivation scores for each referring GP practice (taken as the IMD score for that GP's electoral ward). We controlled GP patient population size giving referrals per 1,000 patients and used the standardised methodology for expanding IMD scores to different areas suggested by Public Health England.[10]

We analysed the effect of including and of omitting the Ilkley Moor Medical Practice, where a partner was an MDC lead, and the practice had a significantly higher referral rate. We chose to omit emergency department (ED) patients from this analysis; however, we separately analysed these patients in our results.

Ethical approval and consent to participate

This report was created as part of an ongoing quality improvement project registered at AGH to improve access to cancer care for patients from lower socioeconomic backgrounds. The project was registered with the hospital audit department and, as such, no further formal ethical approval was required.

Results

Four-hundred and forty-seven patients were referred to the MDC during the period chosen. The control group of other cancer diagnosis consisted of 1,095 patients with a primary diagnosis of cancer recorded in AGH in 2018. The demographics for these patients are recorded in Table 1 with an increase in proportion of women referred to MDC but a similar age distribution.

Table 1. Patient demographics

	MDC referrals	AGH diagnoses
Total patients, n	447	1,095
Gender, n (%)		
Men	205 (45.9)	660 (60.3)
Women	242 (54.1)	435 (39.7)
Age, years		
Mean	69	70
Median	72	73
SD	14	12.6
Range	75	78

AGH = Airedale General Hospital; MDC = multidisciplinary diagnostic clinic; SD = standard deviation.

For our MDC data, six patients' postcodes were not recorded or could not be found in public health data and had to be excluded. This left 441 patients for the analysis between MDC and AGH diagnosis IMD scores.

Of these patients, five did not have a GP noted and 24 patients were referred from the ED, they were excluded from GP referral analysis leaving 412 patients.

Fig 1 shows the proportion of cancer diagnosis in AGH and MDC referrals for each socioeconomic status decile. Both AGH and MDC referrals are skewed towards patients of higher socioeconomic status reflecting the population served by the hospital that is largely suburban and rural. We found no significant difference in the socioeconomic pattern between the two groups with both having a median IMD decile of 7 ($Z=-0.258$; $p=0.797$).

Table 2 shows median IMD decile for common tumour sites found in the AGH population as well as the tumour sites for MDC diagnosis. Of the nine cancers classified under 'other' for the MDC, six were cancers of unknown primary.

Fig 2 shows that there was a moderate negative correlation between the IMD associated with the location of GP premises and the number of referrals; practices in more deprived locations referred fewer patients. This was statistically significant (Spearman's $\rho=-0.485$; $p<0.025$). When the Ilkley Moor Medical Practice is excluded from the analysis, the

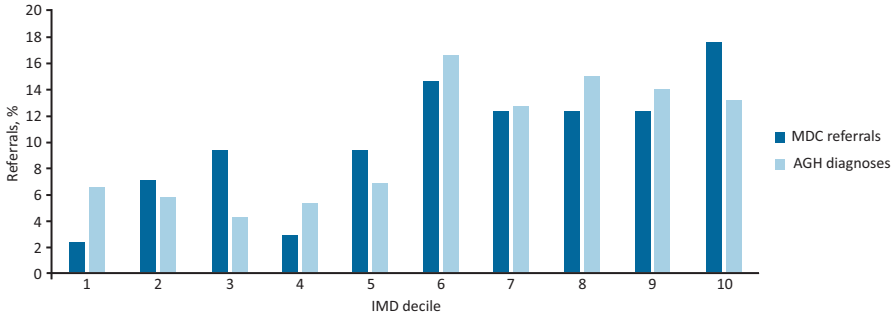

Fig 1. Indices of multiple deprivation of patients diagnosed with cancer in Airedale General Hospital in 2018 and those referred to the multidisciplinary diagnostic clinic 2017–2019. Deciles range from 1 = most deprived to 10 = least deprived. AGH = Airedale General Hospital; IMD = indices of multiple deprivation; MDC = multidisciplinary diagnostic clinic.

Table 2. Cancer site breakdown for Airedale General Hospital and multidisciplinary diagnostic clinic diagnoses

Cancer diagnosis area	Patients, n	Average IMD decile	MDC patient, n
Brain / central nervous system	3	6.0	1
Breast	125	6.9	1
Gynaecological	49	6.2	1
Haematological	87	6.7	3
Head and neck	6	5.2	0
Hepatopancreatobiliary (HPB)	54	6.2	1
Lower gastrointestinal	144	6.4	4
Lung	163	5.9	3
Other	17	6.3	9
Sarcoma	8	7.3	0
Skin	5	5.6	3
Thyroid	3	3.3	0
Upper gastrointestinal	50	6.1	1
Urological	381	6.9	6
Total	**1,095**	**6.5**	**33**

Average IMD decile is also given for each cancer site for AGH diagnoses. AGH = Airedale General Hospital; IMD = indices of multiple deprivation; MDC = multidisciplinary diagnostic clinic.

correlation was slightly more strongly significant ($\rho=-0.511$; $p\leq0.025$; Fig 2).

Patients referred to the MDC from the ED included 14/24 (58%) IMD deciles 1–5 (ie the most-deprived half of the English population) compared with 116/412 (28%) for GP referrals. Out of the 24 ED referrals, two patients were diagnosed with cancer translating to a 7% (95% confidence interval (CI) 2.4 to –15.9) diagnosis rate. Of these patients, one was referred to palliative care and one for nephrectomy.

The overall diagnosis rate for the GP referrals was 33/412 (8.0%; CI 95% 5.8–11.0). Fig 3 shows that the diagnosis rate was variably dependent on the practice referring, independent of number of referrals. Table 3 shows the treatment outcomes for the patients diagnosed with cancer from the MDC. In summary, 60% of MDC AGH cancer diagnoses went on to treatment or referral to site-specific team and 25% were referred to palliative care with a confirmed diagnosis. Of the rest, 15% had no active treatment while 10% died while still on the diagnostic pathway.

Discussion

The finding that 8% of referrals to the MDC from primary care led to a cancer diagnosis shows that this approach performed well compared with referral to a site-specific service. For comparison, the National Institute for Health and Care Excellence (NICE) guidance uses a 3% positive predictive value threshold to underpin the recommendations for suspected cancer pathway referrals and urgent direct access investigations, such as computed tomography or endoscopy.[11] This diagnosis rate is consistent with other published literature on the MDC programme in the UK showing a mean diagnosis rate of 8%.[5]

Recent research has highlighted how onward referral to specialist care in countries with a 'gatekeeping role' for primary care is later, such as the UK and Denmark, despite relatively prescriptive NICE guidance for fast-track cancer referral pathways.[2,3] Meanwhile, it has also been shown that a GP's subjective impression that a patient may have cancer performs equally as well as these guidelines, showing the need to expand our current approach.[5,12]

Socioeconomic status is a well-documented risk factor for late diagnoses and poor outcomes in cancer treatment independent of associated comorbidities and peri-diagnostic factors.[12–14] Our analysis supports this concern. When split at GP level (Fig 2), referral rate dropped significantly with lower socioeconomic status of the surrounding area ($p\leq0.025$) indicating that these problems may be synergistic in deprived populations. This is especially significant given the known associations of disease incidence among patients with lower socioeconomic status when split by tumour type reinforced in our data; for example, lung cancer has a

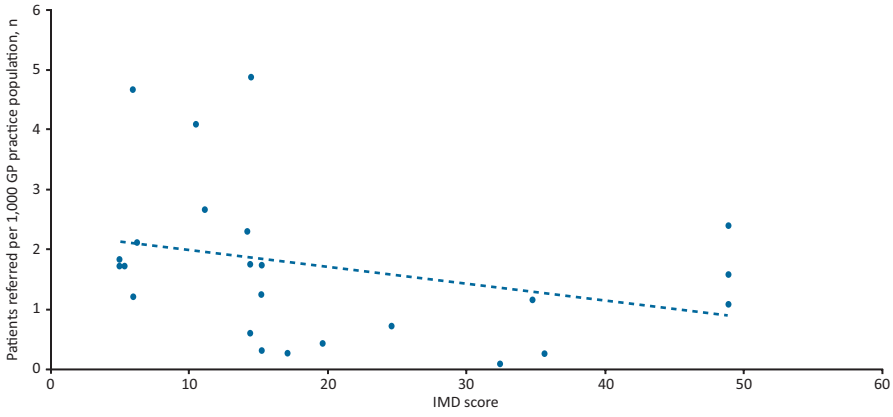

Fig 2. Number of referrals per 1,000 patients against indices of multiple deprivation score. Higher IMD score indicates more deprived. IMD = indices of multiple deprivation.

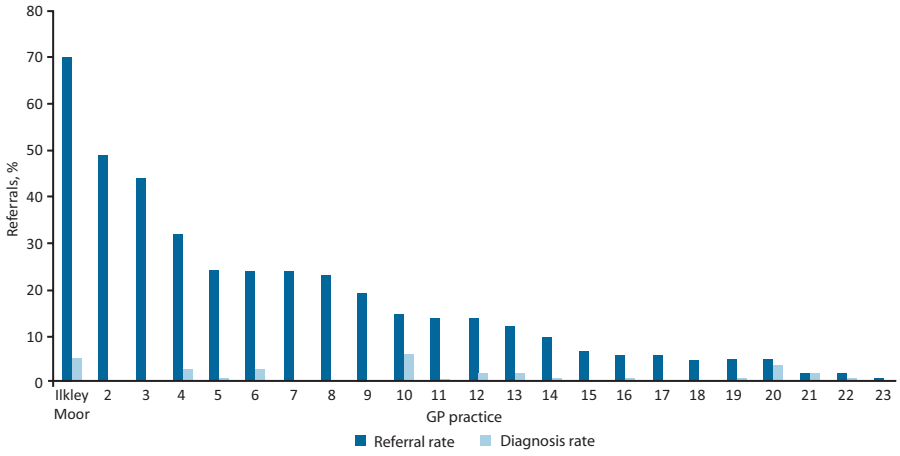

Fig 3. Proportion of referrals and cancer diagnoses from general practitioners.

known correlation with low socioeconomic status with smoking as the main risk factor.[8]

However, we also show that the MDC appears to have a patient population with a similar socioeconomic status to that of other cancer diagnoses at AGH (Fig 1). Airedale's population has a relatively high proportion of socioeconomically favoured residents with several small deprived urban communities within the catchment area. Our data suggest that this new pathway is no more affected by these factors than site-specific fast-track pathways. The literature in this area is inconclusive, with some previous research suggesting that presentation with cancer-alarm symptoms is not necessarily correlated with socioeconomic status and others suggesting lower socioeconomic status can be linked to delayed presentation.[15,16] Our findings suggest referrals to the pathway are affected in similar ways to other cancer pathways; however, a larger sample size is needed to study effects on time to diagnosis and treatment outcomes.

The demographic information in Table 1 shows a greater proportion of women were referred to the MDC compared with fast-track diagnoses. This relatively low proportion of female cancer diagnosis in AGH (40%) reflects the fact that Airedale is not a major tertiary centre with some cancer sites underrepresented compared with the known incidence, resulting in a relative paucity of breast cancer cases. However, this does not explain the relatively high percentage of referrals to the MDC for women. Previous site-specific studies have shown that women are more likely to present early and it is possible this effect is magnified with non-specific symptoms.[17,18] It could also reflect how certain malignancies such as ovarian cancer can present insidiously with limited screening opportunities. Further research when larger datasets are available is suggested.

Table 3. Treatment outcomes

Intervention	Patients (total n=33), n
Chemotherapy	6
Surgical intervention	6
Radiotherapy	3
Hormonal	1
Referral to site-specific team	4
Palliative care referral	8
No active treatment	3
Died during pathway	2

Limitations of this study include the differences in population between different GP practices and our known outliers; for example, if all the other practices referred at that same rate per 1,000 patients as Ilkley Moor Medical Practice, the total referral rate would have been approximately 1,005 patients rather than the current 446 over 2 years.

To manage these limitations, we showed that the correlation was present when the population was controlled for and analysis was carried out with and without the high-referring practice to check for consistency. Including known outliers did not change the overall trend.

Another limitation of our study is the generalisability of our results given the relatively high proportion of socioeconomically favoured residents. Further similar research is suggested in large urban communities as the MDC programme expands across the UK.

Access to services through the ED is regarded as a relative failure in delivering care.[1] Attendance at a primary care practice and subsequent referral is currently the preferred route in the UK. We, therefore, decided to exclude these patients from our statistical analysis. Twenty-four patients were referred from ED and we show in our results that this route is strongly associated with residence in a relatively deprived area.

Conclusion

Overall, the MDC is meeting its aim to provide access to all socioeconomic groups equal to that of conventional cancer diagnostic pathways; however, known trends in reduced referrals from socioeconomically deprived areas remain.

Our work highlights the importance of engaging GP practices with socially deprived populations that have both a higher diagnosis rate and a lower referral rate.

Further work is needed to research best engagement approaches with practices in the MDC pathway. Research with a larger sample size is needed to see how socioeconomic factors affect other cancer outcomes in the MDC, such as stage of diagnosis.

Key points

- The non-specific symptom clinic had a diagnosis rate comparable to the fast-track pathway.
- Patients' socioeconomic background remains a significant barrier to referral.
- Practices with deprived populations had higher diagnosis and lower referral rates.
- Engaging local general practices will be vital to overcome this in future. ■

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