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Audit of the two-week pathway for patients with suspected cancer of the head and neck and the influence of socioeconomic status

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Abstract

Rates of head and neck cancer are high in patients with a low socioeconomic status (SES) and outcomes are often poor. The degree to which people from different socioeconomic groups use the fast-track, two-week suspected cancer referral system is, however, unclear. The aim of this audit was therefore to analyse these referrals with reference to SES, and to focus on differences in clinical characteristics, source of referral, and rates of disease. The sample included all patients who were referred to the head and neck department at an inner-city hospital in the northwest of England between July and September 2017. According to the Index of Multiple Deprivation (IMD), most (62%) of them lived in the most deprived quintile. A total of 390 referrals were analysed of which 60% were female, 53% were under 60 years of age, 33% smoked, and 69% consumed fewer than 10 units of alcohol/week. Only 24 were referred by dentists, but these accounted for almost one quarter of those referred to maxillofacial surgery. Common symptoms included a swelling or lump (n = 153, 39%), hoarseness (n = 101, 26%), ulcer (n = 29, 7%), and sore throat (n = 23, 6%). Forty-five per cent were referred with other symptoms. A total of 28 (7%) were diagnosed with cancer of the head and neck. Rates were higher in patients referred by dentists (p = 0.02) and in those who drank more alcohol (p = 0.02). The positive predictive value was higher in the least deprived (17%) than in the most deprived (6%). In primary care, more education that is aimed specifically at people of lower SES might reduce the number of "worried well" and lessen the pressure on departments to achieve the two-week target.

Keywords: head and neck cancer; Suspected cancer; Two-week pathway; Deprivation; Delay

Introduction

In 2005, the National Institute for Health and Care Excellence (NICE) first published clinical guidelines for the recognition and referral of suspected cancer. This was updated in 2015.[1] The Department of Health has specified periods of time within which patients with suspected cancer should be seen, the national target being 14 days from the day of referral from primary care. NICE also provides guidelines on the

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clinical signs and symptoms of potential cancer of the head and neck for primary care doctors and dentists, but since the two-week pathway was introduced, the proportion of patients who are referred and diagnosed with cancer has remained relatively low. In their systematic review of the two-week rule in head and neck cancer between 2000 and 2014, Langton et al reported conversion rates (positive predictive values) in 17 studies that ranged from 2.2% to 14.6%.[2] Evidence that the two-week conversion rates were falling at the same time as detection rates (sensitivity) were rising, probably reflected an increase in the number of referrals. Any rise in this number adds to the demand for timely outpatient clinic appointments, and puts pressure on NHS resources. Brocklehurst et al[3] found that the hospital's location was the most important variable in predicting delay, and that those with large numbers of referrals struggled to meet the target. Improvements in infrastructure are required in terms of administration ("cancer trackers") and there is a need to increase the capacity for urgent appointments at outpatient clinics.

The number of referrals correlates with socioeconomic status (SES),[3] which is not surprising given that cancer of the head and neck is known to be more prevalent in patients from lower-status groups.[4] However, to our knowledge, the association between SES and referrals on the two-week pathway has had little attention, and this might be important, as delays could be linked to later stages of disease at diagnosis and poorer survival.[5]

As the catchment area for our hospital includes some of the most deprived wards in England, the aim of this audit was to analyse the two-week referrals over a period of three months and to focus on the association with SES in terms of clinical characteristics, source of referral, and cancer rates.

Patients and methods

The sample comprised patients with suspected cancer of the head and neck who were referred to our hospital on the two-week pathway between 3 July and 29 September 2017. We obtained information on smoking status, intake of alcohol, date of birth, postcode (for small area deprivation), and delay since the symptom(s) were first noticed, from both electronic and paper records. The data on smoking, alcohol, and time since the patient first became aware of the symptoms varied considerably and required broad categorisation for the purposes of analysis rather than numerical analysis of pack years, units of alcohol consumed, and number of days since the symptoms started. Details on the latter depended on patients' recall about when they were first seen by their general practitioner (GP) or dentist.

The Index of Multiple Deprivation (IMD)[6] is the official measure of relative deprivation for small areas in England. The IMD 2015 is based on seven domains that were all based on indicators that related mainly to the tax year 2012/13. Every neighbourhood in England is ranked from 1 (most deprived) to 32 844 (least deprived), but there is no definitive cut-off below which an area is considered "deprived". We analysed the deprivation quintiles and, since most of our patients lived in the most deprived quintile, compared them with patients who lived in less deprived neighbourhoods.

Fisher's exact test was used to compare groups with regard to delay (delay by patients of less than 30 days, and professional delay of more than 14 days), a diagnosis of cancer, the presence of specific symptoms, and referral by a dentist. Missing data are reflected by the varying denominators in the tables. Probabilities of less than 0.05 were considered significant.

The University Hospital Clinical Audit Department approved the study.

Results

Demographics

A total of 390 patients were referred within the three-month period (233 (60%) female, and 157 (40%) male, median (IQR) age 58 (46-71) years). Three-quarters (n = 291) were referred to ear, nose, and throat (ENT), and one-quarter (n = 99) to the maxillofacial unit. GPs referred 366 (94%), and dentists 24 (6%). Nearly two-thirds of patients (235/382, 62%) lived in neighbourhoods that were in the most deprived quintile in England, and 58 (15%), 46 (12%), 20 (5%), and 23 (6%) lived in the second, third, fourth, and fifth most deprived quintiles, respectively.

Social habits

One third (127, 33%) smoked at the time of referral, 78 (20%) were ex-smokers, 148 (38%) did not smoke, and in 37 (9%) it was not recorded. Half (198, 51%) drank less than 10 units of alcohol/week, 61 (16%) had a moderate intake (10-39 units/week), and 29 (7%) a heavier intake (40 or more units/week). Amounts were not known in 102 (26%).

Presentation

The symptoms first suspected by patients included a swelling or lump (n = 153, 39%), hoarseness (101, 26%), ulcer (n = 29, 7%), sore throat (n = 23, 6%), and other symptoms (n = 174, 45%). A total of 104 patients had other symptoms only. These included mucosal lesions (n = 32), throat issues, globus, or problems with swallowing (n = 27), pain or soreness not otherwise specified (n = 16), altered hearing (n = 8), cough (n = 5), and other (n = 23). Three-quarters (307, 79%) had one symptom, 74 (19%) had two, and eight (2%) had three or four. In one this was not known. The method of referral was recorded in 355 cases (174 by letter, 113 by fax, and 68 electronically).

Table 1
Patients' and professional delay. Data are number (%).

	Total cases	Delay by patients from first awareness of symptoms to decision to refer (n = 297) (days)				p value*	Patients' delay		Professional delay from referral to first appointment with specialist (n = 388)	p value
		<30	30-89	90-364	≥365		Asymptomatic	Unknown	>14 days	
All patients	390	77 (26)	100 (34)	68 (23)	52 (18)		3	90	42 (11)	
Sex:										
Male	157	33 (27)	43 (35)	28 (23)	19 (15)	0.80	1	33 (21)	20 (13)	0.32
Female	233	44 (25)	57 (33)	40 (23)	33 (19)		2	57 (24)	22 (9)	
Age (years):										
<45	94	17 (23)	24 (33)	21 (29)	11 (15)		–	21 (22)	8 (9)	
45–59	114	23 (26)	28 (32)	19 (22)	18 (20)	0.39	2	24 (21)	9 (8)	0.32
60–74	119	29 (32)	29 (32)	17 (18)	17 (18)		1	26 (22)	15 (13)	
≥75	63	8 (18)	19 (43)	11 (25)	6 (14)		–	19 (30)	10 (16)	
IMD quintile 2015:										
Q1–Q4	147	22 (20)	37 (34)	29 (27)	20 (19)	0.08	2	37 (25)	20 (14)	0.18
Q5 (most)	235	55 (30)	60 (33)	37 (20)	31 (17)		1	51 (22)	22 (9)	
Source of referral:										
GDP	24	5 (31)	7 (44)	3 (19)	1 (6)	0.57	–	8 (33)	2 (8)	>0.99
GMP	366	72 (26)	93 (33)	65 (23)	51 (18)		3	82 (22)	40 (11)	
Specialty referred to:										
MFU	99	22 (33)	24 (36)	11 (16)	10 (15)	0.16	1	31 (31)	9 (9)	0.58
ENT	291	55 (24)	76 (33)	57 (25)	42 (18)		2	59 (20)	33 (11)	
Smoking status:										
Current	127	22 (22)	31 (30)	31 (30)	18 (18)	0.10excl NK	–	25 (20)	8 (6)	0.08 e xclNK
Ex	78	15 (24)	23 (37)	15 (24)	10 (16)		–	15 (19%)	12 (15)	
Never	148	39 (34)	38 (33)	18 (16)	19 (17)		1	33 (22)	18 (12)	
Not known	37	1 (6)	8 (44)	4 (22)	5 (28)		2	17 (46)	4	
Alcohol intake (units/week):										
<10	198	44 (28)	53 (33)	36 (23)	26 (16)	0.36excl NK	1	38 (19)	21 (11)	0.28 excl NK
10–39	61	15 (31)	15 (31)	12 (24)	7 (14)		–	12 (20)	7 (11)	
≥40	29	3 (14)	8 (38)	7 (33)	3 (14)		–	8 (28)	6 (21)	
Not known	102	15 (22)	24 (35)	13 (19)	16 (24)		2	32 (31)	8	
Symptoms:**										
Ulcer	29	6 (33)	7 (39)	4 (22)	1 (6)	0.41	–	11 (38)	4 (14)	0.54
Swelling/lump	153	43 (37)	36 (31)	20 (17)	17 (15)	0.001	3	34 (22)	10 (7)	0.03
Hoarseness	101	16 (19)	28 (33)	26 (31)	15 (18)	0.08	–	16 (16)	15 (15)	0.14
Sore throat	23	3 (14)	7 (32)	8 (36)	4 (18)	0.021	–	1 (4)	2 (9)	>0.99
Other	174	30 (22)	48 (35)	31 (23)	28 (20)	0.15	–	37 (21)	26 (15)	0.02
No. of symptoms:										
1	307	58 (26)	77 (34)	50 (22)	39 (17)	0 > .99	3	80 (26)	29 (10)	0.11e
2–4	82	19 (26)	23 (32)	18 (25)	13 (18)		–	9 (11)	13 (16)	

IMD2015: quintile for neighbourhood deprivation; GDP: general dental practitioner; GMP: general medical practitioner.
p values from Fisher's exact test throughout the table.

* p values compare patients' groups with regard to the percentage with a patient delay < 30 days.

** p values are for symptom present compared with symptom absent.

Delay

Delay by patients between first being aware of their symptoms and presenting to primary care was known for 297 while three were asymptomatic. One quarter (77/297, 26%) of these delays were under 30 days (Table 1), 34% were between one and three months, 23% between three and 12 months, and 18% were over one year. Professional delay from referral from primary care to first being seen by a hospital specialist (Table 1) was more than 14 days for 42/388 (11%), with a median (IQR) overall delay of 9 (7-13) days, and a median (range) of 20 (15-43) days for those delayed more than 14 days. In 20 of the 42 delayed cases this was because of cancellation or non-attendance by the patient. The remainder reflected a lack of clinic capacity. A swelling or lump indicated a greater likelihood of presentation within 30 days ($p = 0.001$). Otherwise, there were no significant associations, but there were trends towards earlier presentation in those who had never smoked and those who lived in the most deprived neighbourhoods. Other trends suggested later presentation by patients with hoarseness or a sore throat, those who consumed more than 40 units of alcohol/week, and those who were over 75 years of age. There were no notable associations between patient factors and professional delays of more than 14 days (Table 1) or between delay by patients and professional delay (results not shown).

Outcome trends and associations with deprivation

The outcome of the referral was known in 389 patients (one died during the referral process). A total of 28 (7.2%) were diagnosed with cancer (95% CI 4.8% to 10.2%) (Table 2). Patients referred by dentists were more likely to have cancer than those referred by their GP ($p = 0.02$). An increased intake of alcohol was associated with cancer ($p = 0.02$) and there were non-significant trends with regard to smokers being more likely, and those with hoarseness being less likely, to have cancer. Twice as many men (10%) had cancer than women (5%), which was of borderline significance. There was also a trend with regard to IMD deprivation, with cancer rates being 17% (4/23) for referrals who lived in the least deprived quintile of neighbourhoods, and 10% (2/20), 9% (4/46), 5% (3/58), and 6% (14/234) for those who lived in progressively more deprived areas ($p = 0.25$). The number who lived in the less deprived quintiles was small and, when aggregated, the rate (8.8%) was higher, but not significantly different ($p = 0.31$), from that of those living in the most deprived quintile (6%).

All but one of the referrals by dentists were to the maxillofacial unit. There was a trend in regard to IMD deprivation and source of referral: dentists referred 17% (4/23) of those from the least deprived neighbourhoods, and 15% (3/20), 7% (3/46), 3% (2/58), and 5% (11/235) of those from more deprived neighbourhoods ($p = 0.05$). The smaller numbers when aggregated gave a rate (8.2%) that was not significantly different ($p = 0.19$) from that of the most deprived quintile (4.7%). Finally, there were several significant associations with patients' symptoms (Table 3).

Table 2
Outcome of referral. Data are number (%).

	Total cases	With cancer	p value*
All patients	389	28 (7)	
Sex:			
Male	156	16 (10)	0.07
Female	233	12 (5)	
Age (years):			
<45	94	5 (5)	0.68
45–59	114	10 (9)	
60–74	119	10 (8)	
≥75	62	3 (5)	
IMD 2015 quintile:			
Q1-Q4	147	13 (9)	0.31
Q5 (most)	234	14 (6)	
Source of referral			
GDP	24	5 (21)	0.02
GMP	365	23 (6)	
Specialty referred to:			
MFU	99	11 (11)	0.11
ENT	290	17 (6)	
Smoking status:			
Current	126	14 (11)	0.08 excl NK
Ex	78	5 (6)	
Never	148	6 (4)	
Not known	37	3 (8)	
Alcohol intake (units/week)			
<10	197	10 (5)	0.02 excl NK
10–39	61	5 (8)	
≥40	29	6 (21)	
Not known	102	7 (7)	
Symptoms**			
Ulcer	29	4 (14)	0.15
Swelling/lump	152	13 (9)	0.43
Hoarseness	101	3 (3)	0.07
Sore throat	23	3 (13)	0.23
Other	174	10 (6)	0.33
No. of symptoms:			
1	306	23 (8)	0.81
2–4	82	5 (6)	
Patient delay:			
<30 days	76	7 (9)	0.38
30-89 days	100	7 (7)	
90-364 days	68	6 98)	
≥365 days	52	1 (2)	
Professional delay:			
≤14 days	345	25 (7)	>0.99
>14 days	42	3 (7)	

IMD2015: quintile for neighbourhood deprivation; GDP: general dental practitioner; GMP: general medical practitioner; MFU: maxillofacial unit; ENT: ear, nose, and throat.

* Fisher's exact test.

** p values are for symptom present compared with absent.

Discussion

It is useful to explore the referral pattern for cases of suspected head and neck cancer by SES because substantial NHS resources are given to enable early diagnosis. Despite this,

Table 3
Specific symptom associations. Data are number (%).

Factor and symptom	Patients with symptom	p value*
Ulcer		<0.001
Source of referral:		
GDP	11/24 (46)	
GMP	18/365 (5)	
Specialty		<0.001
MFU	28/98 (29)	
ENT	1/291 (<1)	
Swelling/lump:		
Source of referral		0.001
GDP	2/24 (8)	
GMP	151/365 (41)	
Alcohol intake (units/week):		0.005
<10	86/197 (44)	
10–39	23/61 (38)	
≥40	4/29 (14)	
Age (years):		<0.001
<45	56/94 (60)	
45–59	45/113 (40)	
60–74	36/119 (30)	
≥75	16/63 (25)	
Hoarseness:		
Source of referral:		0.001
GDP	0/24	
GMP	101/365 (28)	
Sex		0.03
Male	31/156 (20)	
Female	70/233 (30)	
Age (years):		<0.001
<45	11/94 (12)	
45–59	25/113 (22)	
60–74	42/119 (35)	
≥75	23/63 (37)	
Specialty:		<0.001
MFU	0/98	
ENT	101/291 (35)	
Sore throat:		
Specialty:		0.002
MFU	0/98	
ENT	23/291	

GDP: general dental practitioner; GMP: general medical practitioner; MFU: maxillofacial unit; ENT: ear, nose, and throat.
* Fisher's exact test.

however, the number of cancer diagnoses that are made after referral to the urgent pathway is quite low.[2] This audit reflects current practice in a geographical area in which the SES of many patients is low.[3,4] The number of referrals over three months was sufficient for the results to be meaningful, and the audit addressed those treated in ENT and in the maxillofacial unit.

The study, however, has inherent limitations, notably the single hospital and its catchment population, which does not necessarily reflect the national case mix. Others are the lack of precision in the information on symptoms and delay because of the pro forma used (although they do provide a useful indication), and the IMD, which is a recognised measure of deprivation, but is not necessarily specific at an individual patient level.

A predominance of patients had a relatively low risk of cancer (women, non-smokers, and those who consumed less than 10 units of alcohol/week). The gender balance was unexpected, as head and neck cancers are twice as common in men as in women. There are many possible explanations for this as, across all UK general practices in 2010, the crude consultation rate was 32% lower in men than in women, and these differences were greater in people from more deprived areas.[7] Whilst this study looked at all consultations and not specifically at those for cancer of the head and neck, it does suggest that health is less of a priority in men than in women.

The conversion rate of 7.2% agrees with the findings by Langton et al[2] and shows that it places demands on NHS resources in terms of clinic time. It also adds to the anxiety of the "worried well" who may have been referred for reassurance rather than a high clinical suspicion of cancer. Urgent referrals can vary threefold among general practices.[8] It is likely that a GP will be mindful that deprivation correlates with risk factors such as smoking and drinking, and therefore may be more cautious and more likely to refer. Most of those referred (62%) lived in the most deprived quintile of residential neighbourhoods in England, in contrast to the 37% of patients treated in 2008-2012, who lived in the most deprived quartile.[9]

The finding that patients from more deprived areas are less likely to be referred by a dentist might be because fewer are registered with a dentist,[10] possibly because of cost and ease of access to NHS dental care. We found significant differences in the rates of cancer between patients referred by the GP (6%) and dentist (20%). Several potential explanations for this need further investigation, but it is probably because it is easier to examine the mouth than to examine other sites in the head and neck.

Consideration should be given to improving the appropriateness of referrals, for example, through better education in oral medicine, and the inclusion of photographs.[11] Bethell and Leftwick thought that the two-week system could be better, and found that few GPs had attended training on referrals to our specialty.[12] The two main areas for further work are the development of communication between primary and secondary providers before referral, and the delivery of practical educational measures for GPs. The Cancer Research UK toolkit is a potentially valuable resource for professionals and patients alike, but it focuses solely on the oral cavity.[13]

It has been argued that links between GPs and dentists to improve the assessment of suspected cancer might lengthen delay, and that patients at highest risk are the least likely to go to a dentist.[14] Processes, however, could be streamlined to avoid delays, and in the case of lesions of the oral cavity, GPs could be assisted by a second opinion from a dentist. To enable earlier detection and better outcomes, professionals should keep their knowledge up to date and should educate their patients about the signs and symptoms of cancer.

In conclusion, more patients with a low SES are referred with suspected cancer of the head and neck, but overall, those who are referred tend not to have the highest risk in terms of

sex, smoking, and alcohol. Given the large percentage from the lower SES groups, more research is needed to explore how to reduce the number of "worried well" and streamline the referral process.

Conflict of interest statement

We have no conflicts of interest.

Ethics statement/confirmation of patient's permission

The data, which had been collected as part of a service audit rather than for research, met the criteria of the local Clinical Governance Department for service evaluation.

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