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Greater Glasgow NHS Board

Board Meeting

Tuesday 21 January 2003 **Board Paper No. 03/1**

DIRECTOR OF PUBLIC HEALTH

PUBLIC HEALTH ISSUE – WHY DO AFFLUENT CANCER PATIENTS HAVE BETTER SURVIVAL THAN DEPRIVED?

Recommendation:

Members are asked to note this new analysis which suggests that socio-economic factors influence cancer survival independently of other lifestyle factors.

1 Background

Glasgow was one of the first areas in the world to draw attention to strong relationship between socio-economic deprivation and poor outcome amongst patients with cancer. Over the years many studies carried out in a large number of developed countries in Europe, USA and Australia have confirmed our observation that cancer patients from affluent areas are more likely to survive. This observation has been shown to hold for cancers occurring at different sites of the body and it is reasonable to assume that there is an underlying process at work which is general to most, if not all, types of cancer.

The difference in survival between rich and poor is most marked amongst those cancers that tend to appear at a less advanced stage. This observation has led to the suggestion that the underlying effect of deprivation is to make recurrence of tumour more likely. Recurrences occur either at the local site of the tumour (usually because the tumour has not been completely removed) or, more commonly, at a distant site due to spread of tumour within the bloodstream.

This paper reports work carried out recently by colleagues at the West of Scotland Cancer Surveillance Unit which examined the question as to whether or not spread of tumour was more likely to occur with greater frequency in deprived than amongst affluent patients.

2 Method and Data Collection

MIDSPAN is a study that has been underway for the past 30 years in the Renfrew/Paisley districts of the West of Scotland. As part of this study, several thousand residents in the 1960s gave their agreement to have their health monitored and have been followed up for various risk factors for ill health and subsequently their illness records have been examined. 4,512 cancers were identified from the MIDSPAN datasets, including 344 breast cancers, 603 colorectal cancers, 209 gynaecological cancers, 58 melanoma cancers and 118 Non-Hodgkin's Lymphomas (NHL). The usefulness of the NHL data was limited because, over time, the classification of these tumours has changed. As many as possible of the remaining tumours were followed up through analysis of audit datasets and case records. The study was approved by the Multi-Centre Research Ethics Committee.

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3 Results

The study examined a number of questions. In particular, it examined whether lifestyle characteristics and risk factors such as smoking, obesity or high alcohol intake, which are associated with deprivation, could explain the relationship between deprivation and cancer survival. This relationship is shown in Table 1. The analysis has been carried out using a technique called Cox's proportional hazards model which estimates the strength of effect of a risk factor in influencing outcome. Table 1 shows that affluent patients had about a 40% lower risk than deprived patients of dying from their cancer. After adding in risk factors such as smoking, FEV1 level (which is a measure of chronic lung disease), alcohol consumption or obesity, the risk of death from cancer is not materially affected. It is, therefore, unlikely that deprivation is purely a marker for any of these other risk factors and deprivation appears to have an effect independent of the presence of these risk factors.

Table 1: *Effect of lifestyle factors as a potential explanation of the deprivation effect in cancer survival outcome*

Cox's proportional hazards model estimates

Deprivation	***Affluent***	***Intermediate***	***Deprived***	**Trend**
	0.62 (0.44-0.87)	1 baseline	1.03 (0.86-1.24)	1.06 (1.01-1.12)
Deprivation effect after including				
Smoking	0.62	1	1.03	1.06
FEV1	0.64	1	1.03	1.06
Alcohol	0.73	1	1.09	1.04
Obesity	0.62	1	1.04	1.06

The second question to be examined was whether cancers treated by "curative" resection were those in which the largest survival difference was apparent between affluent and deprived. If the survival difference disappeared amongst patients treated by curative resection, it could be said that the difference in survival across the entire patient group was simply due to the presence of more advanced cancers in the deprived. This could be a reflection of the fact that patients from poorer socio-economic groups either held onto their symptoms longer or were less likely to be treated urgently by the Health Service. Table 2 shows this not to be the case. The difference in survival between affluent and deprived amongst all patients and those in whom the tumour was able to be resected and for whom the operation was thought to be curative is largely similar. Indeed, in the case of gynaecological cancer, there is a larger difference when considering all patients irrespective of the extent of treatment. This observation supports the hypothesis that recurrence of tumour spread by the bloodstream and the development of distant metastasis is more likely to occur in deprived patients.

Table 2: *Percentage of affluent and deprived patients surviving their cancer or remaining free of recurrence*

	ALL PATIENTS		RESECTED PATIENTS	
	Affluent	Deprived	Affluent	Deprived
Breast cancer	64.3	54.9	63.6	53.4
Colorectal cancer	59.3	34.5	60.5	40.4
Gynaecological cancers	46.2	43.8	75.0	52.8
Melanoma	100.0	50.0	100.0	50.0

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The researchers also examined the distribution of stage at presentation amongst the patients. They found little evidence of any difference in stage distribution by deprivation for any of the tumours.

The third main question they examined was the extent to which other illnesses or co-morbidities played a role in influencing poor outcome. Such co-morbidities might include angina or other forms of ischaemic heart disease, high blood pressure, high cholesterol and the presence of bronchitis. They did in fact observe that patients with lower blood pressure, lower cholesterol and better lung function were more likely to be free of disease and survive their tumours although this was not true for patients with heart disease. However, Table 3 again shows that the magnitude of these differences was not of sufficiently large order to suggest that they might be the explanation for deprivation differences.

Table 3: *Impact of co-morbidity on relationship of deprivation with cancer survival outcome*

Cox's proportional hazards model estimates

Deprivation	***Affluent***	***Intermediate***	***Deprived***	**Trend**
	0.62 (0.44-0.87)	1 baseline	1.03 (0.86-1.24)	1.06 (1.01-1.12)
Effect on deprivation of adding co-morbidity as an additional factor				
Co-morbidity (yes / no)	0.62	1	1.03	1.06
Number of co-morbidities	0.62	1	1.04	1.06

4 Conclusions

This project has examined whether patient characteristics other than deprivation are related to survival outcome and whether they may in fact provide an explanation for the differences in survival seen in affluent and deprived patients. The study examined the importance of lifestyle factors such as smoking and alcohol intake on risk of recurrence of tumour and also examined the effect of co-morbidities such as heart disease, lung disease and other aspects of general health on outcome. While smoking, poor diet and high alcohol consumption are commoner amongst deprived patients and lead to a higher incidence of co-morbidity in these patients, statistical analysis suggests that the strength of effect of these lifestyles is insufficient to explain the relationship between deprivation and outcome. These lifestyles act independently of deprivation and do not explain the differences observed in survival in the West of Scotland between affluent and deprived populations.

5 Implications for Health Improvement

The study has been unable to establish that specific behavioural characteristics such as cigarette smoking and alcohol consumption were responsible for the deprivation differences seen in cancer survival outcome. They are important influences but so is deprivation which plays an independent role in determining survival. The study results are consistent with, but do not definitely prove, the hypothesis that recurrence of tumour is more likely to occur amongst deprived populations. If were are to improve survival amongst deprived cancer patients – and Glasgow has a considerable proportion of its population amongst the most deprived decile of patients as estimated by the Arbuthnott Index – it is important for us to tackle lifestyle factors such as smoking, high alcohol consumption and obesity but these measures will be insufficient by themselves to narrow the gap in cancer survival between rich and poor. The precise mechanism by which deprivation leads to poor

cancer survival may be through impaired immunological status or a more sensitive stress response or some as yet unsuspected biological pathway. Further research in this area will be required to elucidate the precise mechanism by which this occurs if we are to deal effectively with health inequalities amongst cancer patients.