Cancer risks among residents of Manitoba Indian reserves, 1970-79

T. Kue Young,*† MD, MSc, FRCPC
N.W. Choi,*‡ MD, MPH, PhD

A descriptive epidemiologic study of malignant neoplasms among residents of Indian reserves in Manitoba from 1970 to 1979 based on the Manitoba Cancer Registry revealed an unusual pattern. There was a greater risk for kidney cancer in both sexes and for gallbladder and invasive cervical cancer in women. The risk was reduced, however, for cancer of the lung in men and of the breast in women, cancers with a high incidence in the general Canadian population. Overall the risk for cancer was lower in both sexes. The results are compared with those of other studies in Indians, and possible exposure to risk factors in this population is discussed.

À partir du Registre du cancer du Manitoba on a fait un relevé épidémiologique des néoplasmes malins chez les habitants des réserves indiennes du Manitoba de 1970 à 1979. Il en ressort certaines particularités. En comparaison de l'ensemble de la population manitobaine, ces résidants ont un risque plus élevé de cancer du rein pour les deux sexes et de cancer de la vésicule biliaire et de cancer envahissant du col utérin chez les femmes, mais un risque plus bas de cancer du poumon chez les hommes et du sein chez les femmes dont on connaît la grande fréquence dans l'ensemble de la population canadienne. Le taux global de cancer pour les deux sexes est plus bas que dans celle-ci. Ces données sont mises en regard de celles d'autres enquêtes réalisées chez des Indiens. On considère le rôle possible des facteurs de risque dans cette population.

With the decline of infectious diseases as causes of mortality and morbidity among Indians and Inuit in Canada over the past 3 decades, increasing attention is now being paid to the role of chronic diseases in the health of the native population. The role of cancer is of particular interest since the few existing reports have indicated an unusual pattern of the disease among Indians and Inuit as well as a reduced incidence compared with that among Canadians nationally.

While there have been occasional clinical and pathological reports,[1-3] adequate epidemiologic data on cancer among Canadian native groups are limited. Since the national review of the 1950s,[4] there have been regional studies in the Inuit of the Northwest Territories,[5,6] Indians in British Columbia,[7] the Cree-Ojibwa of northwestern Ontario[8] and Indians in Alberta.[9,10] A study on the distribution of gastrointestinal cancer among ethnic groups in Manitoba also provided some limited data on Indians.[11] By comparison, more detailed information on a larger native population is available from the United States, especially from studies on Alaskan natives and southwestern Indian tribes.[12-14]

A national Indian cancer registry does not exist in Canada, and most provincial registries do not identify ethnic origin. The Department of National Health and Welfare's Medical Services Branch, which is responsible for the delivery of health services to registered Indians in the provinces and to all residents of the territories, provides only nonstandardized proportionate mortality rates for all cancers (and other causes of death) in its annual reports. In Manitoba about 8% of all deaths among Indians during the 1970s were attributable to cancer. Cancer accounted for 1.5% of separations for Indians and 2.5% of days spent in hospital.[15]

We undertook a study to investigate the risk of cancer in the Manitoba Indian population relative to the general population in response to inquiries from various communities that were concerned about a possible increase in the incidence of cancer in recent years.

Methods

Sources of data

Cancer cases were identified from the cancer registry of the Manitoba Cancer Treatment and Research Foundation. The registry was started in 1937 and became population-based in 1951. Its quality and completeness in case ascertainment is recognized nationally.

From *the Department of Social and Preventive Medicine and †the Northern Medical Unit, Faculty of Medicine, University of Manitoba and ‡the Manitoba Cancer Treatment and Research Foundation, Winnipeg

Reprint requests to: Dr. T. Kue Young, Assistant professor, Department of Social and Preventive Medicine, University of Manitoba, 750 Bannatyne Ave., Winnipeg, Man. R3E 0W3

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It currently contains about 130 000 computerized records. In addition to physicians' notifications (required by law under the 1950 Manitoba Public Health Act), the sources of cases include pathology reports, death certificates and health insurance claims records.[16]

There is no specific code for ethnic origin in the cancer registry. However, it is possible to identify residents of Indian reserves from the residence codes, which refer to the usual address of patients at the time of diagnosis, not where the diagnosis is made and care provided. There is no ready means of identifying cases of cancer among Indians not resident on reserves. It is possible also that some cases could have occurred among non-Indians (e.g., missionaries) living permanently on Indian reserves.

According to data from the 1981 census of Canada, there were 27 975 residents on Indian reserves in Manitoba. The total number of registered Indians in the province was 39 710 (Statistics Canada: unpublished data, 1981).

Analysis

Cases from the period 1970–79 were analysed. The ICDA-8[17] was in use during most of these years, and its codes were converted to those of the ICD-9[18] in the presentation of data. Cancer of the cervix refers to invasive cancer only and excludes carcinoma in situ.

Owing to the difficulty in identifying Indians not resident on reserves, the incidence rates computed do not accurately reflect the actual cancer risk among Manitoba Indians. Instead, emphasis was placed on determining the relative risks for the various types of cancer among residents of Indian reserves compared with all Manitobans. Age-standardized incidence ratios (SIRs) were computed. For a specific site the SIR is the ratio of the observed number of cancer cases among residents of Indian reserves to the expected number of cases, derived from applying the Manitoba age- and sex-specific rates to the Indian reserve population. The 1976 census figures were used in the age standardization computations. The table by Bailar and Ederer[19] provided significance levels for the ratios of Poisson-distributed variables to their expected values.

Results

A total of 226 cancer cases among residents of Indian reserves were identified (Table I).

When specific age groups were examined, lower risks for all types of cancer were found for all age groups (Table II).

Table II—Number of cases of cancer and ratios of observed to expected number by age group among residents of the reserves

	Cases in			
	Males		Females	
Age group (yr)	No.	Ratio	No.	Ratio
< 25	6	0.37*	9	0.58
25–34	3	0.38	9	0.71
35–44	6	0.37*	15	0.62
45–54	9	0.28*	11	0.30*
55–64	18	0.26*	23	0.54*
> 64	69	0.43*	48	0.55*

*p < 0.01, based on tables of significance factors for Poisson-distributed variables.[19]

Table I—Number of cases of cancer in residents of Manitoba Indian reserves, 1970–79, and age-standardized incidence ratios of cancer among the residents compared with all Manitoba residents

		Cases in			
		Males (n = 111)		Females (n = 115)	
ICD-9[18] code no.	Site or type of cancer	No. (and %)	Ratio	No. (and %)	Ratio
151	Stomach	5 (4.5)	0.41*	3 (2.6)	0.58
153	Colon	4 (3.6)	0.19†	6 (5.2)	0.35†
154	Rectum	6 (5.4)	0.51	0 (0.0)	0.00
156	Gallbladder/bile duct	1 (0.9)	0.74	6 (5.2)	3.07*
157	Pancreas	1 (0.9)	0.13†	5 (4.3)	1.08
162	Trachea/bronchus/lung	15 (13.5)	0.33†	6 (5.2)	0.72
173	Other skin	11 (9.9)	0.16†	9 (7.8)	0.23†
174	Breast	NA	NA	22 (19.1)	0.44†
180	Cervix	NA	NA	16 (13.9)	1.34
182	Body of uterus	NA	NA	6 (5.2)	0.48
183	Ovary	NA	NA	1 (0.9)	0.12†
185	Prostate	26 (23.4)	0.68*	NA	NA
188	Bladder	4 (3.6)	0.28†	1 (0.9)	0.32
189	Kidney/other genitourinary	9 (8.1)	1.17	8 (7.0)	2.86*
200–202	Lymphoma	4 (3.6)	0.33*	1 (0.9)	0.12†
204–208	Leukemia	3 (2.7)	0.28*	5 (4.3)	0.85
	Other/ill defined	22 (19.8)	–	20 (18.3)	–
All sites			0.37†		0.53†

*p < 0.05, †p < 0.01, based on tables of significance factors for Poisson-distributed variables.[19] NA = not applicable.

When all sites were considered together, the risk for cancer was significantly lower among residents of Indian reserves than among the provincial population. The only sites for which a higher risk was found were the kidney in both sexes and the gallbladder and cervix in women. The risk of cancer at all other sites, including the lung, breast and skin, was reduced among the reserve residents (Table I).

The SIRs for gallbladder and kidney cancer in female reserve residents were of the magnitude of 3, and they were also statistically significant at the 95% level ($p < 0.05$). Owing to the small sample sizes a statistically nonsignificant result may still have represented an increased or decreased risk for a particular site.

Discussion

The low overall risk for cancer among residents of Indian reserves in Manitoba found in this study confirms that reported in other Canadian Indian studies. There is an overall consistency in that rates of cancers that are "common" in the Canadian population, such as those of the lung, colon, breast and skin, were lower among the Indians.

There are few data on exposure to risk factors among Canadian Indians to account for the unusual pattern observed. Limited survey data indicate a higher prevalence of smoking than among the Canadian population,[20,21] but the incidence of lung cancer, at least during the 1970s, was low. Data on diet, apart from the Food Consumption Report of Nutrition Canada,[22] are fragmentary. It is generally recognized that Indian groups across the country have undergone substantial dietary changes in recent years, but detailed studies documenting such changes are lacking. The main nutritional problem of the 1980s seems to be obesity. The Nutrition Canada survey[23] indicated that Indian men had lower mean weight-for-age values than Canadian men up to age 40 to 49 but substantially greater gain beyond age 50. Indian women were heavier in all age groups. The development of cancer of the gallbladder — one of the few high-risk sites among Indians — has been linked to gallstones. A population study among the Micmacs of Nova Scotia suggested a high prevalence of gallbladder disease and altered bile chemistry.[24,25] However, there are no comparable data from Manitoba. The higher rate of cervical cancer and lower rate of breast cancer among Indian women could be due to their behaviour and practices relating to sexual intercourse, pregnancy, childbirth and lactation, but this can only be speculated

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upon on the basis of existing anecdotal evidence. There is, however, some evidence that the level of screening for cervical cancer among Manitoba Indian women has been inadequate: a study in seven reserves in northern Manitoba indicated that only one third of Indian women over the age of 15 had had a Papanicolaou smear in the previous 2 years, and 45% had never had one.[26]

There are obvious limitations to the incidence data reported in this paper. The sole use of the on-reserve Indian population resulted in an underestimate of the number of cancer cases among Manitoba Indians. Indians with cancer or chronic symptoms suggestive of cancer may have migrated to urban centres in the province for medical reasons, although the use of "usual address" at the time of diagnosis may have reduced this source of bias. The findings may reflect geographic more than ethnic differences in cancer risk. It would be useful, instead of having total provincial aggregates as comparison groups, to compare risk among Indians with that among non-Indians in defined geographic areas within the province. However, the number of cases available would be even smaller and the rates even more unstable.

Many cancer registries face the problem of misclassification of carcinoma in situ and invasive cancer of the cervix. The degree to which this problem exists in Manitoba is not certain. However, if it exists it should not affect the comparison between Indians and the general population of Manitoba except in the unlikely situation that classification procedures are systematically different in the two populations.

As a rapid and inexpensive means of assessing cancer risk among Indians in Manitoba, albeit only those residing on reserves, this study was adequate. Future studies need to address the problem of identifying all Indians with the aid of linkages with the federal government's Indian vital records and with those provincial health insurance plan databases that identify Indians by means of special codes.

The next step in the epidemiologic investigation of cancer among Canadian Indians should be to move from descriptive to analytic studies. The unusually high risk for gallbladder and kidney cancers can be studied by the case-control method to investigate factors responsible for their development. Given the small number of cases available for analysis, a national collaborative study may be needed.

From a health policy perspective there are specific actions that health professionals can take. Screening for cervical cancer — the efficacy of which does not seem to be in dispute[27] — should be vigorously applied in this high-risk population. The overall low risk for most types of cancer is grounds for optimism, but if current levels of risk factors such as smoking and obesity are maintained or substantially increased, "epidemics" may well occur, mimicking the epidemiologic history of the Canadian population. There is thus an urgent need to devise, test and apply culturally appropriate strategies for reducing exposure to risk factors.

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