Proportion of Death Certificate Only Cases and Its Related Factors, Kwangju Cancer Registry (KCR)

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Purpose: To ascertain the factors associated with the proportion of death certificate only (DCO) cases contained in the Kwangju Cancer Registry (KCR) that are not as yet in the good range.

Materials and Methods: The distribution of DCO cases was analyzed by sex, age, cancer site, histological verification (HV) as well as the physician's death certificate status.

Results: All cases (n=4,243) in Kwangju diagnosed as having cancer between 1997 and 1998 were registered with the KCR. Death certificates (n=2,390) reporting cancer as the causes of death were collected from the National Statistics Office and reviewed with hospital data linkage and a total of 590 cases were registered as DCO. DCOs accounted for 12.2% (male 12.8%, female 11.5%) of all registrations in Kwangju, 1997-1998. The proportion of DCO cases was high in subjects under 15 (male

13.5%, female 9.4%) as well as those 75 and over (male 20.3%, female 27.2%). For cancer sites, the proportion of DCO cases was high (over 10%) for liver, bronchus-lung, esophagus and pancreas and low (under 3%) for skin, bladder, uteri cervix and breast. The proportion of DCO cases was inversely associated with HV%. When the death certificate was issued by physician, the possibility of DCO decreased.

Conclusion: The proportion of DCO is positively associated with increasing age and negatively associated with HV% and the issuance of a physician's death certificate. These findings suggest that further socio-cultural efforts are required to reduce the DCO proportion. (*Cancer Research and Treatment 2001;33:512-519*)

Key Words: Cancer registry, Death certificate, Kwangju, Korea

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1997 (Kwangju Cancer Registry, KCR)

가 ,

1)

DCO 가 (10 12). 1,326,478 (18,19)

DCO 가 1997 1 1 1998 12 31 2 4,243

, 가 (2,360 , 1,883)

(Central Cancer Registry; CCR)

DCO 411

(9,13). DCO 1997 1 1 1998 12 31

DCO가 가

11,279 (20,21) , (ICD-10; C00-C97)

2,390 (1,554 , 836)

2) KCR DCO

(8,13,14).

DCO 1997 1998

(10,11,15), 2,390 , KCR

DCO KCR

(5,13,16,17). (1997 1998) 1,583 (66.2%) ,

DCO 807 (33.8%)

가 2

Fig. 1. Detection procedure for the death certificate only (DCO) in Kwangju Cancer Registry (KCR). *‘NC’ denotes for ‘Not Confirmed’, which does not mean the case is not cancer, but means the case could not be confirmed as cancer.

164 KCR 가 , KCR
 53 International Classification of Diseases for Oncology Second
 Edition(22) ICD-O
 KCR DCO%
 590 DCO
 DCO%
 (Fig. 1)
 3)

$$DCO\% = \frac{\text{Number of true DCOs during two years}}{\text{Total number of cancer cases during two years}} = 100$$

 DCO ICD-10

Table 1. General characteristics of death certificate only (DCO)

Variables		No.	%
Sex	Male	345	58.5
	Female	245	41.5
Year at death	1997	296	50.2
	1998	294	49.8
Age group (years)	Under 15	8	1.4
	15-29	10	1.7
	30-44	54	9.2
	45-59	113	19.2
	60-74	240	40.7
	75 and over	165	28.0
Place of death	Home	379	64.2
	Hospital	170	28.8
	Others	41	6.9
Issuer of death certificate	Physician	339	57.5
	Herb doctor	3	0.5
	No	248	42.0
Occupation	Unemployed	137	23.2
	Farmer & fisher	65	11.0
	Engineer	26	4.4
	Service worker	26	4.4
	Others	66	11.2
Education	No	270	45.8
	Elementary school	211	35.8
	Middle school	74	12.5
	High school	87	14.7
	College & university	50	8.5
Cancer site	No and uneducated	168	28.5
	Liver	143	24.2
	Stomach	115	19.5
	Lung	109	18.5
	Colo-rectum	27	4.6
	Pancreas	24	4.1
	Haematopoietic system	23	3.9
	Unknown primary site	18	3.1
	Esophagus	15	2.5
	Gall bladder, etc.	14	2.4
	Uterus, nos	14	2.4

DCO% , 41.5% 245 가
 . (histological verification; HV%) . 60 74 가 40.7%, 75 28.0%
 DCO%가 가 69.5% 가 64.2%,
 , 28.8% 가 가 ,
 HV% DCO% 가 57.5% .
 가 DCO 가 62.2%
 가
 DCO% 15
 15 , 15 29 , 30 44 , 45 59 , 60
 74 , 75 6 .

(Table 1).

2) , , DCO %

(1) : 1997 1998 , DCO 12.2%

1) DCO

590 DCO 가 58.5% 345 , 가

Table 2. Proportion of death certificate only (DCO) by sex

Sex	KCR* (A)	Death Certificate	DCO (B)	DCO % (B/(A+B))
Male	2,360	1,554	345	12.8
Female	1,883	836	245	11.5
All	4,243	2,390	590	12.2

*Kwangju Cancer Registry

Fig. 2. Proportion of death certificate only (DCO) by sex and age at diagnosis.

Table 3. Proportion of death certificate only (DCO) by selected cancer sites

	Male		Female	
	Cancer site	DCO %	Cancer site	DCO %
Over 14%	Liver	20.0	Liver	27.4
	Bronchus, lung	18.2	Pancreas	26.2
	Haematopoietic system	18.2	Esophagus	25.0
	Esophagus	14.9	Bronchus, lung	17.3
5 ~ 14%			Stomach	14.5
	Pancreas	11.4	Haematopoietic system	13.0
	Stomach	10.6	Gall bladder, etc.	9.9
	Larynx	7.8	Ovary	8.3
	Gall bladder, etc.	7.3	Bladder	7.4
	Prostate	7.0	Colo-rectum	7.3
	Colo-rectum	5.1		
Under 5%	Skin	2.9	Breast	4.9
	Bladder	2.5	Skin	3.8
			Uterine cervix	2.1
			Thyroid	0.5

, 가 12.8%, 11.5% 가 8.5%, 4.4% 가 HV% 86.2%, 92.8% (Table 2).

(2) : DCO% , 27.2% 가 , HV% 61.9%, 52.9% 가 HV%가 DCO%가 (Fig. 3).

75 DCO%가 20.3%, (2) : , , , DCO%가 10% , HV% 75% DCO%가 5% HV% 85% (Table 4).

(3) : DCO% , , - , , (10%), (3%) (Table 3).

4) DCO%

3) HV% DCO%

(1) : 15 29 , 30 44 DCO%가 가 (21.0%)가

Fig. 3. Proportion of histological verification (HV) and death certificate only (DCO) by age group at diagnosis in male and female.

Table 4. Proportion of histological verification (HV) and death certificate only (DCO) by selected cancer sites in male and female

Male			Female		
Cancer site	DCO%	HV%	Cancer site	DCO%	HV%
Liver	20.0	21.5	Liver	27.4	14.9
Bronchus, lung	18.2	74.8	Pancreas	26.2	26.7
Brain	15.2	71.8	Esophagus	25.0	83.3
Esophagus	14.9	83.8	Brain	20.2	71.4
Kidney	14.7	82.8	Bronchus, lung	17.3	59.7
Pancreas	11.4	43.5	Stomach	14.5	85.6
Stomach	10.6	92.7	Bladder	7.4	76.0
Prostate	7.0	84.9	Colo-rectum	7.3	87.4
Colo-rectum	5.1	88.4	Kidney	6.7	71.4
Bladder	2.5	85.9	Breast	4.9	96.6
			Uterine cervix	2.1	96.8

Fig. 4. Relation between age at diagnosis and proportion of death certificate only (DCO) by attachment of physician's death certificate in only deceased cases, in male and female.

(32.7%) , , 가
.
DCO%가
15 29 가 DCO%
가 42.9% , 15.0% , 75
47.9%, 28.6% .
30 44 가 29.4%,
17.8% , 75 54.7%, 37.9%
(Fig. 4).

(5,6,9). DCO%
 , DCO%가
 .
 , DCN
 .
 , 가
 , 가 .
 DCO%가
 (5 7).
 DCO%
 가

가

가 (5,6,8).

가 DCO%

/ (mortality/incidence ratio, M/I ratio)

, capture-recapture .

(validity) 가 DCO%,

HV%, 가

(primary site unknown, PSU%),

(age unknown, Age UNK%) .

DCO 가 .

DCO%

, IARC (International Agency for Research on
 Cancer) 5
 DCO%† 10%
 A (A=good), 11 19% B (B=acceptable),
 20% C (C=not acceptable) (23)
 . KCR 12.2% B , acceptable
 10%
 .
 IARC Parkin(6)
 DCO%† 24%
 , Jensen Storm 1%
 15%
 ,
 SEER (Surveillance, Epidemiology,
 and End Results) ,
 1.5%
 (24). 2 3%† , 5%
 (25) ,

12% (5) . 3 5%, , 1%
 DCO%가 12.2% . (1991 1995) , 6%
 16.2% (1992 1995), 18.9% (1995 1997), 15.7% , , - , , 2 4%,
 (1997) , , , , 1%
 , SEER (198 (16). (1987 1989) , ,
 8 1992, 0.93%), (1987 1989, 1.6% 33% , ,
 13.8%), (1984 1988, 2.0%) 가 , , 17 19%, , 10%
 (13).
 (10,11,16,24). DCO 가
 1997 1998 , , 1998
 DCO 590 12.2% DCO% . ,
 , 12.8%, 11.5% , , - 20%
 . , 15 , , , 15 20%
 75 DCO%가 . 15 . , ,
 DCO%가 , 3% (15).
 69 , 2 DCO% 가
 가 , 가 , , - ,
 . 75 DCO가 , 가 , ,
 , , 가 . 가
 , 가 가 , KCR
 .
 (5) , DCO%가 .
 . KCR HV% 가
 , , , , , ,
 , - ,
 . DCO%가 (5,10,11).
 , , 가
 , 75 DCO% DCO% 가
 가 . Pollock DCO%가 .
 Vickers(13) 40 , 40 64 , 65 74
 , 75 4 ,
 가 , 가
 가 DCO%가 75
 (34.8%) DCO%가 (32.4%)
 . , 가 . 1997
 DCO% , , 67.0%
 , - , , 10% 74.7% . 1991 16.9%,
 , , 1995 32.1%
 3%
 . , (1991 1995) DCO 가 .
 , , 5% , - , ,

1. Jensen OM, Parkin DM, MacLennan R, Muir CS, Skeet RG. Cancer Registration: Principles and Methods, Lyon; IARC Scientific Publications No. 95, 1991.
2. Kim IS. Epidemiological usefulness of registered death information in Korea. Korean J Epidemiol 1989;11:143-149.
3. Meng KH. Problems and improvement of mortality data in Korea. Korean J Epidemiol 1989;11:150-154.

4. Percy C, Stanek E 3d, Gloeckler L. Accuracy of cancer death certificates and its effect on cancer mortality statistics. Am J Public Health 1981;71:242-250.
5. Parkin DM, Chen VW, Ferlay J, Galceran J, Storm HH, Whelan SL. Comparability and quality control in cancer registration. Lyon; IARC Technical Report No: 19, 1994.
6. Parkin DM, Whelan SL, Ferlay J, Raymond L, Young J. Cancer Incidence in Five Continents. Vol VII. Lyon; IARC Scientific Publications No. 143, 1997.
7. Brenner H. Limitations of the death certificate only index as a measure of incompleteness of cancer registration. Br J Cancer 1995;72:506-10.
8. Bullard J, Coleman MP, Robinson D, Lutz JM, Peto J. Completeness of cancer registration: A new method for routine use. Br J Cancer 2000;82:1111-1116.
9. Menck H, Smart C. Central cancer registries; design, management, and use. Harwood Academic Published GmbH 1994.
10. Ahn DH. Population-based Cancer Registry in Five Cities of Korea. 1998.
11. Ahn DH. Population-based Cancer Registry in Five Cities of Korea. 1999.
12. Choi JS, Sohn SJ, Na BJ, Sun BH, Park KS, Kweon SS, Im JS, Kim YJ, Hwang TJ. A feasibility study for the implementation of Kwangju Cancer Registry (KCR). J Korean Cancer Assoc 1999;31(4):749-757.
13. Pollock AM, Vickers N. Why are a quarter of all cancer deaths in south-east England registered by death certificate only? Factors related to death certificate only registrations in the Thames Cancer Registry between 1987 and 1989. Br J Cancer 1995;71:637-641.
14. Vercelli M, Capocaccia R, Quaglia A, Casella C, Puppo A, Coebergh JWW, EURO CARE Working Group. Relative survival in elderly European cancer patients: Evidence for health care inequalities. Crit Rev Oncol Hematol 2000;35: 161-179.
15. Shin HR, Lee DH. Busan Cancer Registry. Ministry of Health and Welfare. 2000.
16. Chen VW, Wu XC, Andrews PA. Cancer in North America, 1991-1995 Volume One: Incidence, North American Association of Central Cancer Registries, 1999.
17. Pollock AM, Vickers N. Reducing DCO registrations through electronic matching of cancer registry data and routine hospital data. Br J Cancer 2000;82:712-717.
18. Kwangju Metropolitan City. 1998 The Statistics of Registered Population. 1999.
19. Kwangju Metropolitan City. 1999 The Statistics of Registered Population. 2000.
20. Korean National Statistical Office. 1998 Annual Report on the Cause of Death Statistics. 1999.
21. Korean National Statistical Office. 1999 Annual Report on the Cause of Death Statistics. 2000.
22. Percy C, Van Holten V, Muir C. International Classification of Disease for Oncology. 2nd ed., Geneva; World Health Organization, 1990.
23. Esteban D, Whelan S, Laudico A, Parkin DM. Manual for Cancer Registry Personnel, Lyon; IARC Technical Report No. 10, 1995.
24. Seiffert JE. Standards for Cancer Registries Volume , Standards for Completeness, Quality, Analysis, and Management of Data. American Association of Central Cancer Registries, 1994.
25. Gaudette L. Personal Communication. Letter to editor January 7, 1994.