

**Abstract**

**A Study on the Occupational Hazards Associated with Chronic Renal Failure**

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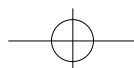
**Objectives:** Recently, chronic renal failure has become a major public health problem all around the world, and the number of patients in Korea affected by this disease has sharply increased since the 1980 's. Between 3% and 50% of all cases of chronic renal failure may be induced by toxic agents. The purpose of our study was to investigate the occupational hazards associated with chronic renal failure, in order to use the findings as a reference for further epidemiologic studies.

**Methods:** The author conducted a questionnaire and reviewed the medical records of chronic renal failure patients (161 people out of 238) in Gyeongju-si and Pohang-si from March 2 to 31, 2003. Those cases of chronic renal failure which were related to work were classified as either 'probable case' if they were of unknown origin or 'suspected case' if they were of known origin and were related to hypertension or diabetes mellitus.

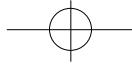
**Results:** The study subjects consisted of 92 males (57.1%) and 69 females (42.9%). The causalities listed in the medical records were diabetes mellitus in 55 cases (40.4%), hypertension in 28 cases (20.6%), chronic glomerulonephritis in 14 cases (10.3%), and other diseases. There were 10 cases (6.2%) that were believed to be related to the patients' occupations. The hazards that these 10 patients had previously been exposed to were silica, organic solvents, tin, copper, lead, cadmium, and other hazards.

**Conclusions:** Through this study, 10 cases that were reportedly related to occupational chronic renal failure were discovered. Further studies such as a case-control study of occupational risk factors related to chronic renal failure will be needed.

**Key Words:** Chronic renal failure, Occupational disease, Dialysis, Questionnaires







4)  
 86 ( : 45 , : 41 )  
 152 (14)  
 ( : 91 , : 61 ) 238  
 67 (Probable case)  
 (77.9%) 94 (61.8%) 161 (Suspected  
 (67.6%) (Table 1). case)

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1)

1.  
 가 92 (57.1%),  
 가 69 (42.9%), 60  
 58 (36.0%), 50 40 (24.9%), 40  
 ( ), 34 (21.1%)  
 31.1%,  
 25.5% (Table 2).

(1991) 2.

Environmental Health Criteria 119 (EHC

119)

가 16 55 (40.4%), 28 (20.6%),  
 4 14 (10.3%)  
 15 (11.0%) (Table 3).

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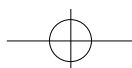
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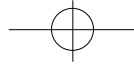
가 41 (25.5%)  
 가 , 27 (16.7%),  
 25 (15.4%), 21 (13.0%)  
 (Table 4).

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 33 15 (45.5%),  
 9 (27.3%), 7 (21.2%),  
 6 (18.2%), 4 (12.1%)





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1 1 2 가

(Table 5).

33 (20.5%)

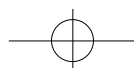
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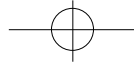
**Table 2.** General characteristics of study subjects

Variables	Male		Female		Total	
	No.	%	No.	%	No.	%
<b>Age (yrs)</b>						
<30	7	7.6	4	5.8	11	6.8
30~39	10	10.9	8	11.6	18	11.2
40~49	19	20.6	15	21.7	34	21.1
50~59	23	25.0	17	24.7	40	24.9
60	33	35.9	25	36.2	58	36.0
<b>Smoking</b>						
Nonsmoker	20	21.7	67	97.1	87	54.0
Exsmoker	24	26.1	0	0.0	24	14.9
Smoker	48	52.2	2	2.9	50	31.1
<b>Drinking</b>						
Nondrinker	28	30.4	66	95.7	94	58.4
Exdrinker	25	27.2	1	1.4	26	16.1
Drinker	39	42.4	2	2.9	41	25.5
<b>Total</b>	<b>92</b>	<b>100.0</b>	<b>69</b>	<b>100.0</b>	<b>161</b>	<b>100.0</b>

**Table 3.** The distribution of causalities listed in the medical records

Causes	Male		Female		Total	
	No.	%	No.	%	No.	%
Diabetes mellitus	31	39.7	24	41.4	55	40.4
Hypertension	18	23.1	10	17.3	28	20.6
Chronic glomerular nephritis	7	9.0	7	12.1	14	10.3
Diabetes mellitus + Hypertension	3	3.8	2	3.4	5	3.7
Acute renal failure	1	1.3	3	5.2	4	2.9
Polycystic kidney	1	1.3	2	3.4	3	2.2
Trauma	2	2.6	0	0.0	2	1.5
Pyelonephritis	1	1.3	1	1.7	2	1.5
Others	6	7.7	2	3.4	8	5.9
Unknown	8	10.2	7	12.1	15	11.0
<b>Total</b>	<b>78</b>	<b>100.0</b>	<b>58</b>	<b>100.0</b>	<b>136</b>	<b>100.0</b>



**Table 4.** The distribution of occupations by Korean Standard Classification of Occupations (KSCO)

Occupation	Male		Female		Total	
	No.	%	No.	%	No.	%
Legislators, senior officials and managers	0	0.0	0	0.0	0	0.0
Professionals	3	3.3	1	1.4	4	2.5
Techicians and associate professionals	8	8.7	0	0.0	8	5.0
Clerks	21	22.8	6	8.7	27	16.7
Service workers	3	3.3	5	7.3	8	5.0
Sales workers	5	5.4	3	4.4	8	5.0
Skilled agricultural, forestry and fishery workers	18	19.5	7	10.1	25	15.4
Craft and related trades workers	3	3.3	0	0.0	3	1.9
Plant, machine operations and assemblers	18	19.5	3	4.4	21	13.0
Elementary occupations	3	3.3	0	0.0	3	1.9
Students	6	6.5	2	2.9	8	5.0
Housewives	0	0.0	41	59.4	41	25.5
Armed forces	2	2.2	0	0.0	2	1.2
None	2	2.2	1	1.4	3	1.9
Total	92	100.0	69	100.0	161	100.0

**Table 5.** The distribution of hazards that patients had previously been exposed to

Hazards	No. of cases (N=33)	Positive rate (%)	(Probable case)
Paraquat	15	45.5	
Organic solvents	9	27.3	
Tin	7	21.2	(Suspected case)
Lead	6	18.2	9
Silica	6	18.2	
Chromium	4	12.1	16
Copper	3	9.1	
Others	14	42.4	20

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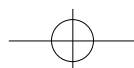
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**Table 6.** The characteristics of cases that were believed to be related to work

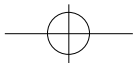
Case	Age	Job	Exposed		Past medical history		Chronic renal failure		Class
			Hazards	Duration	Disease	Year at diagnosis	Year at diagnosis	Duration until diagnosis	
3		Supply of electric power	Copper, lead	9	Unknow	-	1995	-	P
48		Molding	Tin, Organic solvents	16	Unknown	-	1989	-	P
51		Cutting	Tin	20	Unknown	-	2002	-	P
78		Repairing of auto	Organic solvents	40	Unknown	-	1997	-	P
60		Construction	Silica	20	Unknown	-	2002	-	P
27		Painting	Organic solvents	8	Hypertension	1994	2001	7	S
45		Welding	Cadmium, lead, Tin	18	Hypertension	1994	1999	5	S
64		Rolling	Tin, chrome	25	Diabetes mellitus	1985	2002	17	S
62		Transport of furnace	Silica	22	Diabetes mellitus	1993	2000	7	S
76		Mining	Silica	40	Hypertension	1973	2001	28	S

P: probable case, S: suspected case

**Table 7.** The characteristics of cases that were believed not to be related to work

Case	Age	Job	Exposed		Past medical history		Chronic renal failure	
			Hazards	Duration	Disease	Year at diagnosis	Year at diagnosis	Duration until diagnosis
35		Shoes manufacture	Organic solvents	1	Polycystic kidney	1982	1982	-
22		Student	Numerous metals and chemicals	1	Tuberculosis	1988	2002	14
43		Electronic accessory manufacture	lead	2	Herb intoxication	1993	1993	-
46		Public servant	Organic solvents	2	Diabetes mellitus	1986	2001	15
34		Tire manufacture	Organic solvents	5	Acute renal failure	2001	2001	-
53		Seat manufacture	Organic solvents	9	Acute renal failure	2001	2001	-
*	46	Tin plate manufacture	Numerous metals and chemicals	19	Hypertension	1992	1997	5
*	47	Alloying	Silica	20	Hypertension	1995	1998	3

\*Cases of No. and were rejected by Korea Labor Welfare Corporation, but they were approved by administrative litigation



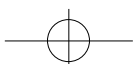
(Table 6).

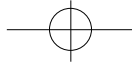
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가  
가  
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(WHO, 1991) Environmental Health Criteria 119, 31  
가  
(Parkinson and Brooks, 1995).

(Table 7).

가  
161 42 (26.1%)  
36 (85.7%) 가 (Parkinson and Brooks, 1995).  
4 가 3  
27  
(De Broe et al., 1996).  
125 7 (5.6%)  
가 (ANCA)가 (Hogan et al., 2001).  
2 ( , ) 가 (Rapiti et al., 1999),  
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( ) 1 가 (Parker et al., 1989).  
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( , 2000).  
(De Broe et al.,





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1996). Yaqoob (1994) , 가 , Nutys  
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 1993; Hotz, 1994). IgA 가 가  
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 al., 1992), IgA al., 1990), 가  
 가 ( , 77.9%  
 2002). 53.9% ,  
 ( , 1996)

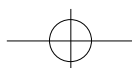
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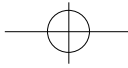
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 (Jha and Chugh, 2003).

(Elseviers and De Broe, 2001).







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(De Broe et al., 1996).

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가  
(suspected)

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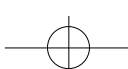
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Yaqoob (1994)  
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10 (6.2%) 3% 1 가  
Dieperink(1989) (suspected)

(19.8%) (0.2%)  
20%가

2 가  
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가 가 -

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가가

N-acetyl--D-Glucosaminidase (NAG), 2 가  
 ( 2-microglobulin, 2-MG), 3%가  
 (retinol-binidng protein, RBP) 50%  
 (Rocskay and Robins, 1994). NAG  
 , , , , , albumin  
 , , , , 2-MG  
 , , , RBP , , ,

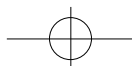
2-MG (OSHA, 1992).

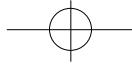
NAG  
 ( , 1993), NAG  
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 NAG ( , 238 161 (67.6%)  
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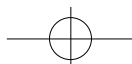
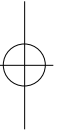
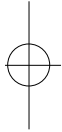
(Rocskay and Robins, 1994). (proba  
 ble case) ,  
 (suspected case)

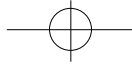




92  
 (57.1%), 69 (42.9%)  
 60 가  
 55 (40.4%), 28 (20.6%),  
 14 (10.3%)  
 33 (20.5%)  
 15 18  
 10  
 8  
 10 (6.2%)  
 3 (30.0%),  
 2 (20.0%), 5 (50.0%)  
 10 (6.2%)가

2001. pp 182-3.  
 N-acetyl  
 -D-Glucosaminidas 가.  
 1993;5(1):114-27.  
 1996;29(1):43-  
 50.  
 1997;9(1):1-11.  
 2002. pp 43-68.  
 22 . 2002.  
 1999;21(1):64-71.  
 1994;6(1):56-68.  
 가 N-acetyl--D-Glucosaminidase  
 1993;26(1):49-64.  
 N-acetyl- -D-  
 Glucosaminidase  
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 2000;148:32-43.  
 가 가





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