

Article title: Association Between the Type of Dental Care Setting and the Risk of Dental Implant Failure in Korea: A Retrospective Nationwide Population-Based Cohort Study

Journal name: International Journal of Health Policy and Management (IJHPM)

Authors' information: Yu-Rin Kim^{1¶}, Seon-Rye Kim^{2¶}, Minkook Son^{3,4*}

¹Department of Dental Hygiene, Silla University, Busan, Republic of Korea.

²Institute of Health Medical Education Convergence Research, Kangwon National University, Gangwon-do, Republic of Korea.

³Department of Physiology, Dong-A University College of Medicine, Busan, Republic of Korea.

⁴Department of Data Sciences Convergence, Dong-A University Interdisciplinary Program, Busan, Republic of Korea.

***Correspondence to:** Minkook Son; Email: physionet@dau.ac.kr

¶ Both authors contributed equally to this paper.

Citation: Kim YR, Kim SR, Son M. Association between the type of dental care setting and the risk of dental implant failure in Korea: A retrospective nationwide population-based cohort study. Int J Health Policy Manag.2025;14:9238. doi:[10.34172/ijhpm.9238](https://doi.org/10.34172/ijhpm.9238)

Supplementary file 1

Table S1: Dental implant (per tooth) procedure code

Table S2: Baseline characteristics by quartile group for dental implant procedures in private dental practices

Figure S1: Distributions of propensity scores before and after IPTW across groups

Table S1. Dental implant (per tooth) procedure code

	ICD-10	Procedure content	Dental care settings	Procedure codes
Dental implant users (Stage 2 <u>Hospital-based dental clinics</u> <u>UB115, UB117</u> completed case)	K081	Stage 1 Diagnosis and treatment plan	Private dental practices Group dental practices	UB111 UB112, UB113, UB116, UB118
		Stage 2 Dental implant fixture (body) placement surgery	Private dental practices	UB121
			Group dental practices	UB122, UB123, UB126, UB128
			<u>Hospital-based dental clinics</u>	<u>UB125, UB127</u>
		Stage 3	Private dental practices	UB131

	Dental implant prosthesis restoration	Group dental practices	UB132, UB133, UB136, UB138
		<u>Hospital-based dental clinics</u>	<u>UB135, UB137</u>
Dental implant failure	Definition 1	Private dental practices	UB121002
	Dental Implant reimplantation (only reimbursable dental implants)	Group dental practices	UB122002 UB123002, UB126002, UB128002
		Hospital-based dental clinics	UB125002, UB127002
	Definition 2	Simple (when the fixture was unstable due to osseointegration failure)	U4981
	Dental implant removal surgery (includes both reimbursable and non-reimbursable dental implants)	Complex (when there was no mobility in the dental implant fixture, but the implant fixture was removed using a trephine burr or a separate dedicated removal kit due to periimplantitis, fracture, or nerve damage)	U4982

Table S2. Baseline characteristics by quartile group for dental implant procedures in private dental practices

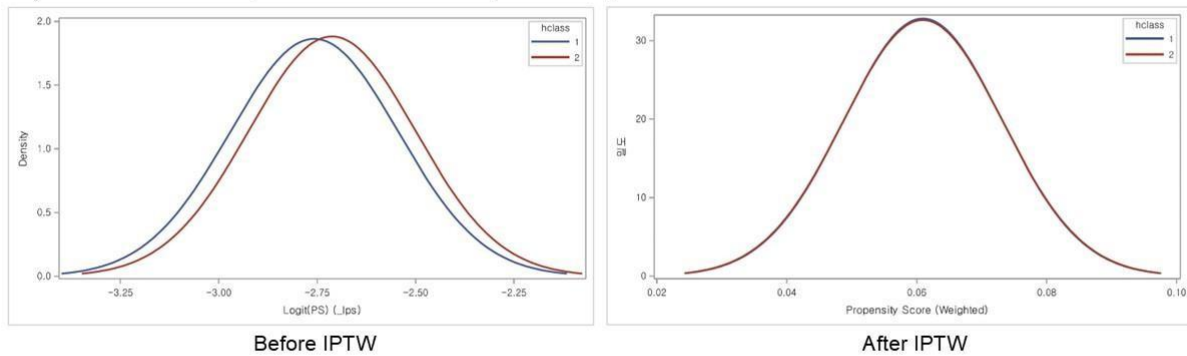
Variable		1 st quartile (n = 8959)	2 nd quartile (n = 11280)	3 rd quartile (n = 9859)	4 th quartile (n = 10404)	P-value
Sex (%)	Male	5082 (56.7)	6205 (55.0)	5293 (53.7)	5520 (53.1)	<0.001
	Female	3877 (43.3)	5075 (45.0)	4566 (46.3)	4884 (46.9)	
Age (years)		70.8 (4.8)	71.0 (4.9)	71.4 (5.0)	71.5 (5.0)	<0.001
Income level (%)	1st quartile	1544 (17.2)	1866 (16.5)	1470 (14.9)	1521 (14.6)	<0.001
	2nd quartile	1533 (17.1)	1965 (17.4)	1609 (16.3)	1719 (16.5)	
	3rd quartile	2409 (26.9)	3101 (27.5)	2840 (28.8)	2984 (28.7)	
	4th quartile	3473 (38.8)	4348 (38.5)	3940 (40.0)	4180 (40.2)	
Disability (%)	No	7936 (88.6)	9962 (88.3)	8545 (86.7)	8957 (86.1)	<0.001
	Mild	149 (1.7)	202 (1.8)	218 (2.2)	227 (2.2)	
	Severe	874 (9.8)	1116 (9.9)	1096 (11.1)	1220 (11.7)	
Residence (%)	Rural	2346 (26.2)	3561 (31.6)	4216 (42.8)	5985 (57.5)	0.001
	Urban	6613 (73.8)	7719 (68.4)	5643 (57.2)	4419 (42.5)	
Hypertension (%)		6177 (68.9)	7815 (69.3)	6851 (69.5)	7300 (70.2)	<0.001
Diabetes (%)		2264 (25.3)	2927 (25.9)	2517 (25.5)	2784 (26.8)	<0.001
Dyslipidemia (%)		5200 (58.0)	6551 (58.1)	5621 (57.0)	6003 (57.7)	<0.001

Osteoporosis (%)		1044 (11.7)	1399 (12.4)	1361 (13.8)	1468 (14.1)	0.187
Charlson comorbidity index (%)	0	2237 (25.0)	2533 (22.5)	2124 (21.5)	2073 (19.9)	<0.001
	1			2441 (24.8)	2462 (23.7)	
	2			2066 (21.0)	2079 (20.0)	
	≥ 3			3228 (32.7)	3790 (36.4)	
		2259 (25.2)	2888 (25.6)			
		1736 (19.4)	2317 (20.5)			
Body mass index (kg/m²)		2727 (30.4)	3542 (31.4)			
		24.5 (3.0)	24.4 (3.0)	24.4 (2.9)	24.4 (3.0)	0.150
Systolic blood pressure (mmHg)		128.3 (14.3)	128.2 (14.5)	128.4 (14.4)	128.6 (14.6)	0.351
Diastolic blood pressure (mmHg)		76.4 (9.3)	76.2 (9.4)	76.5 (9.4)	76.6 (9.3)	0.027
Fasting blood glucose (mg/dL)		105.1 (24.5)	105.7 (24.4)	105.5 (26.0)	106.1 (25.7)	0.033
Hemoglobin (g/dL)		14.0 (1.4)	13.9 (1.4)	13.8 (1.5)	13.8 (1.5)	<0.001
Glomerular filtration rate (mL/min/1.73 m²)		80.3 (39.7)	80.0 (36.4)	79.8 (35.2)	79.3 (33.1)	0.265
Smoking (%)	Nonsmoker	5809 (64.8)	7530 (66.8)	6741 (68.4)	7351 (70.7)	<0.001
	Ex-smoker	2436 (27.2)	2856 (25.3)	2401 (24.4)	2316 (22.3)	
	Smoker	714 (8.0)	894 (7.9)	717 (7.3)	737 (7.1)	
Alcohol consumption (%)		3231 (36.1)	3818 (33.8)	3157 (32.0)	3134 (30.1)	<0.001
Regular exercise (%)	No	5003 (55.8)	6407 (56.8)	5934 (60.2)	6396 (61.5)	<0.001
	1-2 times/week	1335 (14.9)	1689 (15.0)	1352 (13.7)	1420 (13.6)	

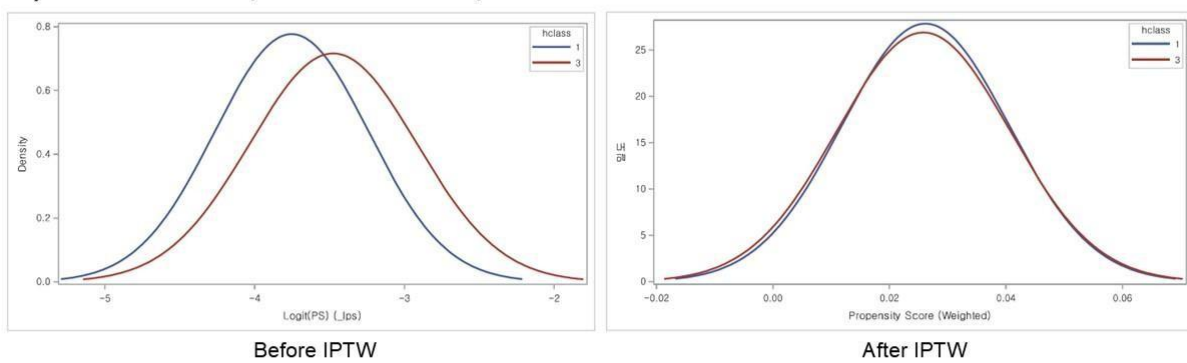
Variable		1 st quartile (n = 8959)	2 nd quartile (n = 11280)	3 rd quartile (n = 9859)	4 th quartile (n = 10404)	P-value
	3-4 times/week	1302 (14.5)	1552 (13.8)	1244 (12.6)	1169 (11.2)	
	5 times/week	1319 (14.7)	1632 (14.5)	1329 (13.5)	1419 (13.6)	
Dental procedural counts		2.1 (0.8)	5.4 (1.1)	10.4 (1.9)	33.6 (26.3)	<0.001

Figure S1. Distributions of propensity scores before and after IPTW across groups

1) Private dental practices vs Group dental practices



2) Private dental practices vs Hospital-based dental clinics



3) Group dental practices vs Hospital-based dental clinics

