

Survey of Anxiety in Ordinary Workers and Doctors Regarding Sedative Use during Endoscopic Examination in the Seoul Metropolitan Area

Yoon-Suk Ra, Chi-Hyo Kim, Youn-Jin Kim, and Jong-In Han

Department of Anesthesiology and Pain Medicine, School of Medicine, Ewha Womans University, Seoul, Korea

Background/Aims: Sedative use is common in endoscopic examinations. The anxiety regarding sedative use may be different between doctors and nonmedical individuals. **Methods:** A questionnaire survey was conducted by a research company (DOOIT Survey), and responses were collected from 649 doctors and 1,738 individuals who perform typical jobs in nonmedical fields. In this study, these ordinary workers are considered to represent nonmedical individuals. Anxiety was measured using a 5-point Likert scale. **Results:** The nonmedical individuals exhibited more anxiety regarding the sedative use than the doctors. Age <40 years (odds ratio [OR], 2.27; $p < 0.001$), female sex (OR, 1.62; $p = 0.002$), experience of an adverse event (OR, 1.79; $p = 0.049$), and insufficient explanation (OR, 2.05; $p < 0.001$) were the significant factors that increased the anxiety of the nonmedical individuals. The doctors who experienced a sedative-related adverse event reported increased anxiety compared with the doctors who did not report this experience (OR, 1.73; $p = 0.031$). **Conclusions:** Anxiety regarding sedative use during an endoscopic examination was significantly different between doctors and non-medical individuals. A younger age, female sex, an adverse event, and insufficient explanation affect the anxiety of nonmedical individuals. An adverse event also affects the anxiety of doctors. (*Gut Liver* 2016;10:786-795)

Key Words: Conscious sedation; Endoscopy; Anxiety; Risk; Surveys and questionnaires

INTRODUCTION

Sedation is commonly used for simple surgeries, endoscopic procedure, and medical imaging such as magnetic resonance imaging (MRI). In recent years, the use of sedation with colo-

noscopy procedures for medical examination purposes has sharply increased. Of the 366,000 screening colonoscopies carried out on Medicare and Medicaid patients in the United States in 2013, 50% had the procedure done with sedation.¹ In Korea, according to Shin *et al.*,² endoscopy with sedation was increased from 693,055 in 2008 to 779,327 in 2012. There are also many cases of using sedation during medical imaging procedures such as an MRI, and thus sedation takes up 25% of anesthesia procedures taken outside of the surgery room.³ In Korea, sedation is not only used during endoscopy and medical imaging, but also during plastic surgery and dermatological laser procedures.

Sedation is performed for comfortability of target procedures. Sedation is able to give comfort to patients who undergo various kinds of procedures, and there has been proof that sedation during endoscopy procedures in particular, contributes to high patient satisfaction rates, comfort, and diminished anxiety, giving the patient the willingness to undergo a repeated endoscopy procedure.⁴⁻⁹

Many adverse events from sedation include dyspnea, hypotension, oxygen desaturation, awakening during sedation, and delayed emergence.¹⁰ In particular, it is known that even during endoscopic procedure, where sedation is relatively light, the rates of airway and hemodynamic events are 1.44% and 0.74%, respectively.¹¹ In rare cases, when sedation is performed poorly, this can lead to hypoxic brain damage or death.

These sorts of side effects can make it difficult for the patient to decide on which type of anesthesia to use, as well as bring obscure fear when undergoing surgery or a procedure. Also, if a side effect does indeed occur during sedation, it can lead to a legal disputes between doctor and patient. Upon reviewing the anesthesia-related disputes from July 2009 to June 2014 case files of the Korean Society of Anesthesiologists (KSA) database, the KSA Legislation Committee uncovered that the disputes

Correspondence to: Chi-Hyo Kim

Department of Anesthesiology and Pain Medicine, School of Medicine, Ewha Womans University, 1071 Anyangcheon-ro, Yangcheon-gu, Seoul 07985, Korea

Tel: +82-2-2650-5285, Fax: +82-2-2655-2924, E-mail: 120060@ewha.ac.kr

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related to general anesthesia were the most common. However, cases related to sedation made up 37.1% of all the cases, which is similar to the number of general anesthesia cases. Especially, in all cases of the sedation-related medical disputes, 51.3% was related to propofol side effects, 38.5% was related to propofol plus other drugs and 5.1% was related to midazolam side effects.¹²

The difficulty in deciding which type of anesthesia and procedure to undergo, and the consideration of going into a legal dispute with the doctor after the procedure can be largely different depending on ordinary anxiety that the patient has about sedation. However, until now, there has been no investigation into the anxiety that the general population has towards sedation.

Therefore, this study aims to research how anxious the ordinary workers at companies perceives sedation to be, and discover which people with what sort of specific characteristics more likely to be anxious about the sedation. This study will also research how doctors be anxious about sedation and analyze how it is different from general population's anxiety.

MATERIALS AND METHODS

1. Survey design

Questions of the survey for the ordinary workers included: (1) demographic data: age, sex, marital status, and previous and current state of the health; (2) prior sedation experience of respondent, their family and friends: whether they experienced the sedation, whether the experience had the adverse events, what was the target procedure, whether the procedure was comfortable, whether they received sufficient explanation about the sedation; (3) overall anxiety about sedation; (4) level of concern about six known adverse events related to sedation: awakening or inadequate sedation, delayed emergence, dyspnea, hypotension, hypoxic brain damage, death; (5) whether they think that sedation is more anxious than general anesthesia; and (6) how often do adverse events occur during sedation. Education levels were surveyed. However, educational level variable has been removed from this study because increasing the uncertainty of the overall statistical results. Occupation and economic status has not been investigated in detail.

Questions of the survey for the doctors included: (1) demographic data: age, sex, subspecialty; (2) prior sedation experience: whether their patients had experience of the adverse events and whether they provided sufficient explanation about the sedation to the patients; (3) overall anxiety about sedation; (4) level of concern about six known adverse events related to sedation: awakening or inadequate sedation, delayed emergence, dyspnea, hypotension, hypoxic brain damage, death; (5) whether they think that sedation is more anxious than general anesthesia; and (6) how often do adverse events occur during sedation.

A 5-point Likert scale was used to measure the overall sedation-related anxiety score (1, never anxious; 2, rarely anxious; 3, sometimes anxious; 4, very often anxious; and 5, always anxious), adverse event concern score (1, not concerned; 2, a little concerned; 3, moderately concerned; 4, concerned; and 5, very concerned), and adverse event frequency score (1, never happens; 2, rarely happens; 3, happens sometimes; 4, happens very often; and 5, happens every time).¹³

The survey respondents included 1,747 members of the ordinary workers at companies in Seoul metropolitan area and 655 doctors. The study lasted from January 2015 to July 2015. In the case of the ordinary workers, the study pool was made up of adult males and females that general office employee at sixteen companies residing in Seoul and Gyeonggi province (Samsung, Hyundai, Munhwa Broadcasting Corporation, and so forth). In the case of doctors, the study pool was made up of doctors who were working at hospitals in Seoul and Gyeonggi province and were having Korea doctor's license. The survey was conducted through email, website and face to face survey for both the ordinary workers and the doctors group. For this survey, a typical response rate is difficult to obtain because the survey only those who answered they would respond to the survey.

2. Statistical analysis

To know the group more worried about the sedation, the collected ordinary workers' and doctors' sedation anxiety scores were collapsed into the two dependent outcome categories. The overall sedation anxiety scores, and the anxiety score that compared sedation to general anesthesia collected from the ordinary workers group and the doctors group were divided into the two dependent outcome categories of never/rarely/sometimes anxious (using raw scores of 1, 2, and 3) and very often/always anxious (using raw scores of 4 and 5) in order to use the scores for further analysis. The adverse event concern scores were collapsed into two dependent outcome categories of not/a little/moderately concerned (using raw scores of 1, 2, and 3) and concerned/very concerned (using raw scores of 4 and 5). Also, the adverse event frequency scores were collapsed into the two dependent outcome categories of never happens/rarely happens/happens sometimes (raw scores of 1, 2, and 3) and happens very often/happens every time (raw scores of 4 and 5). These cut-points were chosen to reflect the most clinically meaningful differences in scale values.

For the categorical questions the frequency and percentage of each answer were described.

In order to analyze the factors that influence the anxiety about sedation, a binary logistic regression model was used to assess what influence each individual's characteristics and existence of prior sedation experience has on the anxiety about sedation. First, in model I that adjusted age and sex, the relevance to anxiety was assessed through odds ratio (OR) form. Second, a multivariate model was made that included the variables

Table 1. Demographic Data of Ordinary Worker and Doctor Groups

Variable	No. (%)	Variable	No. (%)
Ordinary worker (n=1,738)*		Sufficient explanation of sedation	
Age, yr		Yes	586 (58.0)
<40	1,153 (66.4)	No	425 (42.0)
≥40	584 (33.6)	Adverse event (n=79)[†]	
Sex		Types[§]	
Male	811 (46.7)	Awakening or inadequate sedation	41 (51.9)
Female	927 (53.3)	Dyspnea	9 (11.4)
Marital status		Hypotension	7 (8.9)
Unmarried	841 (48.4)	Delayed emergence	25 (31.6)
Married	896 (51.6)	Occurrence of sequelae following adverse event	
Recognition of sedation drug		Yes	15 (19.2)
Propofol	659 (37.9)	No	63 (80.8)
Another	1,079 (62.1)	Family	
Previous state of health		No	521 (30.0)
Experience of general anesthesia		Yes	1,217 (70.0)
Yes	517 (29.7)	Adverse event	
No	1,221 (70.3)	No	1,113 (64.1)
Experience of admission		Yes	102 (5.9)
Yes	996 (57.3)	Friends	
No	741 (42.7)	No	536 (30.9)
Current state of health		Yes	1,201 (69.1)
Chronic disease		Adverse event	
Yes	158 (9.1)	No	1,074 (61.9)
No	1,580 (90.9)	Yes	126 (7.3)
Confidence of health		Doctor (n=649)	
Self-reported healthy	1,321 (76.0)	Age, yr	
Self-reported unhealthy	417 (24.0)	<40	440 (67.8)
Prior sedation experience		≥40	209 (32.2)
Myself		Sex	
No	721 (41.6)	Male	382 (58.9)
Yes [†]	1,012 (58.4)	Female	267 (41.1)
Adverse event		Subspecialty	
No	931 (92.2)	All excluding Anesthesiology and Pain Medicine	588 (90.6)
Yes [†]	79 (7.8)	Anesthesiology and Pain Medicine	61 (9.4)
Prior experienced (n=1,012) [†]		Experience of adverse event	
Target procedure of sedation		Yes	234 (36.1)
Endoscopy	793 (78.7)	No	415 (63.9)
Medical imaging/surgery	215 (21.3)	Sufficient explanation of sedation	
Comfortability of target procedure		Yes	457 (70.4)
Yes	905 (89.5)	No	192 (29.6)
No	106 (10.5)		

*Includes non-responses; [†]Respondents with sedation experience; [†]Respondents with sedation experience, as well as an adverse event during sedation; [§]Includes multiple responses.

that were $p < 0.2$ from model I, so that model II had odds ratio of variables that were recalculated after being mutually adjusted.

The differences in the sedation-related anxiety score between

the general population and doctors was compared using a chi-square test.

A $p < 0.05$ was considered to have statistical significance and

for SPSS version 22.0 (IBM Corp., Armonk, NY, USA) was used for the statistical analysis.

3. Ethics statement

The protocol of this study was approved by the Institutional Review Board of the Ewha Womans University Medical Center (EUMC 2015-10-036). Before the survey, it was explained to all participants that their name and personal identifying number would not be collected, and that their answers would only be used for scholarly purposes. And this fact has been demonstrated once again in the first page of the surveys.

RESULTS

1. Demographics of participants

Of the 1,747 respondents from the ordinary workers and 655 doctors who participated in the survey, nine and six respondents of the ordinary workers and the doctors did not finish the survey and their responses were thus excluded from the statistical analysis. Table 1 shows the demographic data of the 1,738 respondents from the ordinary workers and the 649 doctors respondents who were included in the statistical analysis. Among 1,738 respondents of the ordinary workers, 66.4% were age <40 years, 53.3% were female, and 51.6% were married. For the drug used during sedation, 37.9% answered that they knew of "propofol" due to frequent media mentions of the drug in sedation-related accident mortality. Among 1,738 respondents of the ordinary workers, 29.7% answered that they had received general anesthesia before, 57.3% had been hospitalized before, 9.1% currently had a chronic disease and 76.0% considered themselves to be healthy. Of the entire pool of survey respondents, 58.4% answered that they had received sedation before, and of them, 7.8% had experienced adverse events during sedation. Among 1,012 people of the ordinary workers who answered that they had received sedation before, 78.7% answered that they had received the sedation for an endoscopy only, while 21.3% answered that they had received the sedation for medical imaging or plastic surgery. Of the 1,012 respondents who had prior sedation experience, 10.5% answered that they felt uncomfortable during the procedure, and 42.0% had not received sufficient explanation about sedation prior to undergoing procedure. Of the 79 respondents who experienced sedation-related adverse events, 51.9% experienced awakening or inadequate sedation, 11.4% experienced dyspnea, 8.9% experienced hypotension and 31.6% experienced delayed emergence. Of the 79 respondents who experienced sedation-related adverse events, 19.2% answered that they had sequelae in their daily life. Total of 70% and 69.1% of respondents had family members and friends with sedation experience, respectively. Among them, 5.9% of the family members and 7.3% of the friends had experienced adverse events during sedation.

Among 649 doctor respondents, 67.8% were age <40 years,

and 58.9% were male. The subspecialties of the doctor respondents were diverse, and 9.4% of them were from Anesthesiology and Pain Medicine. Among the doctor respondents, 36.1% answered that they had incidents where their assigned patients had adverse events during they were administering sedation. Among entire group of doctors 70.4% answered that they had sufficiently explained all the details about the sedation to their patients before the procedure.

2. The anxiety about sedation by the ordinary workers and the characteristics of the ordinary workers associated with the anxiety about sedation

The Table 2 presents the number and percentage of people who answered "very often anxious" (score of 4) or "always anxious" (score of 5).

Among 1,738 ordinary worker respondents, 13.8% were very often/always anxious about sedation.

In model I analysis, participants with age <40 years (OR, 1.69; $p=0.002$) compared with age ≥ 40 years, female (OR, 1.53; $p=0.004$) compared with male, married status (OR, 1.45; $p=0.021$) compared with unmarried status were more likely to be anxious about the sedation. Though they were aware of propofol being used in sedation, the results showed that they did not think it to be especially more anxious. Prior experiences of general anesthesia or hospitalization that indicated past state of health did not significantly influence the anxiety about sedation. Participants who responded that they currently had a chronic disease (OR, 1.69; $p=0.035$) compared to those who did not and respondents who thought they were not healthy (OR, 1.51; $p=0.008$) compared to those who thought they were healthy more likely to be anxious about the sedation. There was a lower likelihood to be anxious when there had been sedation experience without adverse event (OR, 0.68; $p=0.011$) than when the respondent had no experience of sedation. There was a higher likelihood to be anxious when there had been sedation experience with adverse event (OR, 1.94; $p=0.018$) than when the respondent had no experience of sedation. The sedation experiences of respondent's family members and friends showed to have an insignificant influence on the results, except for when friends have had sedation experience without adverse events. It was more likely for the respondent whose friends had experienced sedation with no sedation-related events to be anxious as being lower than compared with the respondents whose friends had no sedation experience (OR, 0.52; $p<0.001$).

In model II (multivariate) analysis, the likelihood to be anxious about sedation was higher for respondents with age <40 years (OR, 2.27; $p<0.001$) compared with age ≥ 40 years, female (OR, 1.62; $p=0.002$) compared with male, married status (OR, 1.62; $p=0.004$) compared with unmarried status, self-reported unhealthy (OR, 1.47; $p=0.019$) compared with self-reported healthy. When compared to respondents without sedation experience, the likelihood to have anxiety was lower for respondents

Table 2. Sedation Anxiety Scores and Adjusted Odds Ratios Based on Individual Characteristics of Ordinary Workers

Variable	Sedation anxiety score		Model I (sex and age adjusted*)			Model II (multivariate [†])		
	Total no. [‡]	No. (%) [§]	OR	95% CI	p-value	OR	95% CI	p-value
Total	1,738	240 (13.8)						
Age, yr								
≥40	584	54 (9.2)	1.00			1.00		
<40	1,153	186 (16.1)	1.69	(1.22–2.35)	0.002	2.27	(1.56–3.45)	<0.001
Sex								
Male	811	85 (10.5)	1.00			1.00		
Female	927	155 (16.7)	1.53	(1.15–2.05)	0.004	1.62	(1.20–2.20)	0.002
Marital status								
Unmarried	841	118 (14.0)	1.00			1.00		
Married	896	121 (13.5)	1.45	(1.06–1.98)	0.021	1.62	(1.17–2.24)	0.004
Recognition of sedation drug								
Other drug	1,079	149 (13.8)	1.00			-	-	-
Propofol	659	91 (13.8)	0.99	(0.74–1.31)	0.926	-	-	-
Experience of general anesthesia								
No	1,221	171 (14.0)	1.00					
Yes	517	69 (13.3)	1.01	(0.74–1.38)	0.944	-	-	-
Experience of admission								
No	741	107 (14.4)	1.00					
Yes	996	133 (13.4)	0.99	(0.75–1.31)	0.933	-	-	-
Chronic disease								
No	1,580	216 (13.7)	1.00			1.00		
Yes	158	24 (15.2)	1.69	(1.04–2.76)	0.035	1.49	(0.89–2.50)	0.126
Confidence of health								
Self-reported healthy	1,321	168 (12.7)	1.00			1.00		
Self-reported unhealthy	417	72 (17.3)	1.51	(1.11–2.05)	0.008	1.47	(1.07–2.02)	0.019
Prior sedation experience-myself								
No	721	116 (16.1)		Reference			Reference	
Yes								
No adverse event	931	100 (10.7)	0.68	(0.51–0.92)	0.011	0.71	(0.52–0.97)	0.033
Adverse event	79	21 (26.6)	1.94	(1.12–3.35)	0.018	1.79	(1.00–3.18)	0.049
Prior sedation experience-family								
No	521	78 (15.0)		Reference			Reference	
Yes								
No adverse event	1,113	141 (12.7)	0.83	(0.62–1.12)	0.230	-	-	-
Adverse event	102	20 (19.6)	1.41	(0.81–2.45)	0.222	-	-	-
Prior sedation experience-friends								
No	536	101 (18.8)		Reference			Reference	
Yes								
No adverse event	1,074	115 (10.7)	0.52	(0.39–0.70)	<0.001	0.54	(0.39–0.75)	<0.001
Adverse event	126	24 (19.0)	0.98	(0.59–1.61)	0.928	0.83	(0.48–1.45)	0.519

OR, odds ratio; CI, confidence interval.

*OR adjusted for sex and age; [†]OR adjusted for variables with p<0.2 from model I; [‡]Includes non-responses; [§]Number of ordinary workers who reported an overall sedation anxiety score of 4 or 5; ^{||} CI for reported point estimate.

who experienced sedation without sedation-related adverse events (OR, 0.71; $p=0.033$), while it was higher for the respondents who had a sedation experience with adverse events (OR, 1.79; $p=0.049$). Besides this, compared with respondents whose friends without any sedation experience, the likelihood to be anxious about sedation was lower for the respondents who experienced sedation without sedation-related adverse events (OR, 0.54; $p<0.001$).

3. The anxiety about sedation in association to prior sedation experiences of the ordinary workers

The Table 3 shows the number and percentage of people who answered "very often anxious" (score of 4) or "always anxious" (score of 5).

Of the 1,012 respondents from ordinary workers, 58.4% have had received sedation before. Of them, 12.1% were very often/always anxious about sedation.

In model I analysis, it was more likely to be anxious about sedation for the respondents who received sedation for MRI or plastic surgery (OR, 1.65; $p=0.023$), compared with respondents for endoscopy. People who answered that they felt uncomfortable during sedation for procedures were more likely to be anxious about sedation (OR, 2.80; $p<0.001$), than people who answered that they felt comfortable. Respondents who answered that they had not received sufficient explanation about sedation prior to procedure were more likely to be anxious about sedation (OR, 2.23; $p<0.001$) than respondents who answered that they had received sufficient explanation. People who experienced adverse events during the sedation were more likely to be anxious about sedation (OR, 2.91; $p<0.001$), compared with

respondents without any experience of adverse events.

In model II analysis, people who answered that they felt uncomfortable during the sedation were more likely to be anxious about sedation (OR, 2.08; $p=0.008$) than people who answered that they felt comfortable. Respondents who answered that they had not received sufficient explanation about sedation prior to procedure were more likely to be anxious about sedation (OR, 2.05; $p<0.001$) than respondents who answered that they had received sufficient explanation. People who experienced adverse events during the sedation were more likely to be anxious about sedation (OR, 1.90; $p=0.040$), compared with respondents without any experience of adverse events.

4. The anxiety about sedation by doctors and the characteristics of doctors associated with the anxiety about sedation

The Table 4 presents the number and percentage of people who answered "very often anxious" (score of 4) or "always anxious" (score of 5). Of the 649 doctors, 12.6% were very often/always anxious about sedation.

In model I analysis, respondents with age ≥ 40 years (OR, 1.77; $p=0.026$) compared with who were <40 years, and respondents who were female (OR, 1.76; $p=0.023$) compared with male were more likely to be anxious about sedation. Doctors who were anesthesiologist (OR, 5.78; $p<0.001$) compared with all other subspecialties, and doctors whose patients experienced adverse events (OR, 2.24; $p=0.001$) compared with doctors whose patients did not were more likely to be anxious about sedation.

In model II (multivariate) analysis, doctors who were anesthesiologist (OR, 4.90; $p<0.001$) compared with all other subspe-

Table 3. Sedation Anxiety Scores and Adjusted Odds Ratios Based on Individual Sedation Experience of Ordinary Workers

Variable	Sedation anxiety score		Model I (sex and age adjusted*)			Model II (multivariate ¹)		
	Total no. [†]	No. (%) [§]	OR	95% CI	p-value	OR	95% CI	p-value
Total	1,012	122 (12.1)						
Target procedure of sedation								
Only endoscopy	793	82 (10.3)	1.00			1.00		
Medical imaging/surgery	215	39 (18.1)	1.65	(1.07–2.55)	0.023	1.42	(0.91–2.23)	0.121
Comfortability of target procedure								
Yes	905	94 (10.4)	1.00			1.00		
No	106	27 (25.5)	2.80	(1.72–4.57)	<0.001	2.08	(1.21–3.59)	0.008
Sufficient explanation of sedation								
Yes	586	47 (8.0)	1.00			1.00		
No	425	74 (17.4)	2.23	(1.50–3.32)	<0.001	2.05	(1.37–3.07)	<0.001
Adverse event								
No	931	100 (10.7)	1.00			1.00		
Yes	79	21 (26.6)	2.91	(1.69–5.03)	<0.001	1.90	(1.03–3.49)	0.040

OR, odds ratio; CI, confidence interval.

*OR adjusted for sex and age; [†]OR adjusted for variables with $p<0.2$ from model I; [‡]Includes non-responses; [§]Number of ordinary workers who reported an overall sedation anxiety score of 4 or 5; ^{||} CI for reported point estimates.

Table 4. Sedation Anxiety Scores and Adjusted Odds Ratios Based on Individual Characteristics and Sedation Experience of Doctors

	Sedation anxiety score		Model I (sex and age adjusted*)			Model II (multivaried ¹)		
	Total no. [†]	No. (%) [§]	OR	95% CI	p-value	OR	95% CI	p-value
Total	649	82 (12.6)						
Age, yr								
<40	440	49 (11.1)	1.00			1.00		
≥40	209	33 (15.8)	1.77	(1.07–2.92)	0.026	1.65	(0.98–2.77)	0.060
Sex								
Male	382	41 (10.7)	1.00			1.00		
Female	267	41 (15.4)	1.76	(1.08–2.88)	0.023	1.59	(0.96–2.65)	0.072
Subspecialty								
All excluding Anesthesiology and Pain Medicine	588	58 (9.9)	1.00			1.00		
Anesthesia and Pain Medicine	61	24 (39.3)	5.78	(3.20–10.46)	<0.001	4.90	(2.66–9.02)	<0.001
Experience of adverse event								
No	415	38 (9.2)	1.00			1.00		
Yes	234	44 (18.8)	2.24	(1.39–3.59)	0.001	1.73	(1.05–2.85)	0.031
Sufficient explanation of sedation								
Yes	457	51 (11.2)	1.00			1.00		
No	192	31 (16.1)	1.58	(0.97–2.57)	0.068	1.42	(0.85–2.37)	0.181

OR, odds ratio; CI, confidence interval.

*OR adjusted for sex and age; [†]OR adjusted for variables with $p < 0.2$ from model I; [‡]Includes non-responses; [§]Number of ordinary workers who reported an overall sedation anxiety score of 4 or 5; ^{||}CI for reported point estimate.

Table 5. Anxiety Regarding Sedation and Concerns of Sedation-Related Events in Ordinary Workers versus Doctors

	Ordinary worker (n=1,738)	Doctor (n=649)	p-value
How anxious about the sedation as in overall	240 (13.8)	82 (12.6)	0.573
How concern about each adverse event			
Awakening or inadequate sedation	566 (32.6)	131 (20.2)	<0.001
Delayed emergence	639 (36.8)	130 (20.0)	<0.001
Dyspnea	546 (31.4)	223 (34.4)	0.171
Hypotension	420 (24.2)	168 (25.9)	0.385
Hypoxic brain damage	616 (35.4)	126 (19.4)	<0.001
Death	568 (32.7)	126 (19.4)	<0.001
Sedation is more anxious than general anesthesia	200 (11.5)	60 (9.2)	0.114
How often do adverse events occur during sedation	176 (10.1)	39 (6.0)	0.002

Data are presented as number (%). The number of overall sedation anxiety/concern/frequency scores of 4 or 5 (on a 5-point scale).

cialties, and doctors whose patients experienced adverse events (OR, 1.73; $p=0.031$) compared with doctors whose patients did not were more likely to be anxious about sedation.

5. The difference in the anxiety about sedation between ordinary worker group and the doctor group

Table 5 presents ordinary workers' versus doctors' anxiety and concern of the sedation.

There was no difference in the percentage of respondents who answered that sedation is very often/always anxious (raw scores of 4 and 5) between the two groups (13.8% in ordinary workers

vs 12.6% in doctors).

In the part of the survey dealing with concerns about adverse events, more respondents from the ordinary workers were answered concerned/very concerned (raw scores of 4 and 5) about for awakening or inadequate sedation (32.6% vs 20.2%), delayed emergence (36.8% vs 20.0%), hypoxic brain damage (35.4% vs 19.4%), and death (32.7% vs 19.4%) than those from doctors ($p < 0.001$).

There was no difference in the ratio of respondents who answered that sedation is more anxious than general anesthesia between the two groups. (11.5% in ordinary workers vs 9.2% in

doctors).

In regards to frequency of adverse events, 10.1% of the ordinary workers answered that they happen very often/happen every time (raw scores of 4 and 5), placing them noticeably higher than doctors (6.0%) statistically ($p=0.002$).

DISCUSSION

Based on the results of a survey on the ordinary workers, sedation is a relatively common procedure that over the half of adult Korean population has received. The most common reason for receiving sedation is for endoscopic procedure. Such results are likely to demonstrate that health screening is becoming more common as we can see that recently 72.9% of the registered for National Health Insurance are receiving medical examinations.¹⁴ Most of the people who had received sedation perceived sedation as comfortable. Some answered that they experienced adverse events, and seeing that a great many of them pinpointed awakening or inadequate sedation and delayed emergence, it was shown that there was a sensitive reaction to the problem of the procedure of falling asleep and then waking up in sedation.

In the case of the ordinary workers, females and married people perceived sedation as more risky. Since concerns about health differed depending on genetic and environmental factors, it is suggested that this group has most concerns in their state of health ordinarily.¹⁵ Having a previous poor state of health, as shown by hospitalization experience or prior general anesthesia experience did not have any influence on the anxiety about sedation. However, in the cases where the respondents currently had a chronic disease or was currently in a state of bad health that gave to poor confidence in their health, the anxiety about sedation tended to be higher. In case of respondents who had previously received sedation without any adverse events, the sedation experience had a positive effect, and the anxiety about sedation was low in such cases. In case of respondents who had experienced adverse events during previous sedation, the sedation experience had a negative effect and thus the anxiety about sedation was high. As Brody *et al.*¹⁶ and Martin *et al.*,¹⁷ have reported that the previous medical experience influenced the level of perception of the effect, it can be seen that the previous experience of sedation can also influence how anxious about the sedation. How anxious about the sedation also differed depending on the target procedure. While only little anxiety was perceived when receiving sedation for an endoscopy for medical checkup without any specific symptoms, the tendency for sedation to be perceived as more anxious occurred when getting an MRI in the presence of a symptom or while undergoing plastic surgery. This shows how anxiety regarding one's current state of health is reflected in the anxiety about the sedation. As Thanvi *et al.*¹⁸ proved, since patients demonstrate a higher level of pain during the endoscopy without sedation than doctors

assume they do, it appears that there is a tendency to view the sedation that diminishes pain during endoscopy as less anxious.

In the case of doctors, anesthesiology and pain medicine specialists were more anxious about sedation. Doctors are heterogeneous in their subspecialties from general practitioner to gastroenterologist. In Korea, almost over 90% of doctors have subspecialties and knowledge about sedation must diverse according to their subspecialties. This is assumed to be because anesthesiology and pain medicine specialists have a lot of general anesthesia experience that is likely to occur too many respiratory and hemodynamic events. So, they were more likely to worry about the sedation because these experiences were reflected the sedation. Because of this, they have good knowledge of the possible side effects.¹⁶ And regardless of their subspecialty, doctors were more likely to be anxious about sedation when adverse events occur to their patients. Similar to the results among ordinary workers, this result suggests that this finding is also attributed to doctor's personal negative experiences.

Though there were no differences in the overall anxiety about sedation between the ordinary workers and doctors, there was a difference in the concern of adverse events. Only 7.8% of the ordinary workers who had experienced sedation before, answered that they had adverse events. On the other hand, 36.1% of doctors answered that their patients had experienced adverse events. This difference could be due to the fact that ordinary workers can only be aware of such adverse events as awakening during sedation and delayed emergence from sedation, whereas the doctors can also see other events such as hypotension, dyspnea, and desaturation. This contributes to the differences in perceiving concerns about adverse events during sedation. Therefore the ordinary workers have more concerns about awakening during sedation and delayed emergence among other adverse events as compared to doctors' concerns. This study shows that among anything else, the ordinary workers is more concerned about such drastic items as hypoxic brain damage and death than doctors. This result is attributed to frequent media coverage. In addition, 30 cases of deaths related to sedation made legal disputes in Korea between 2009 and 2014.¹² Since ordinary workers also perceives adverse events to be occurring more often as compared to doctors, in order to lower the fear of adverse events a person receiving sedation could feel, there is a need for more detailed explanation about sedation. Among doctors, 70.4% replied that they had given sufficient explanation regarding sedation to their patients, but only 58.0% of patients who experienced sedation replied that they had received sufficient explanation.

The causes of these conflicting results remain uncertain. However, we can think of the two possible reasons. First of all, in Korean hospitals, too many procedures are done a day, due to extremely low cost of endoscopic procedure and sedation reimbursed by government. So, doctors do not spend enough time to explain about procedure and sedation. Doctors may

potentially miss a few adverse events to explain about the sedation, and the patient is likely not fully understand the procedure and sedation. Therefore, to have sufficient time to explain, it should solve the cost problem, in order to overcome these differences. Second, the lack of standard format of explanation and informed consent about sedation may be one of them. As revealed in Whitney *et al.*'s study,¹⁹ this sort of informed consent allows the patient and doctor to share the process of decision making, and this will help to decide on whether to receive sedation or not before undergoing procedures such as an endoscopy.^{20,21} Furthermore, when patients are provided with a sufficient explanation concerning their fears about sedation by signing a systematically organized informed consent, they feel well informed, which reduces their fear of the procedure.²² Doctors can also use this overall sedation anxiety score to create a systematic guideline to efficiently explain and conduct procedures.²³⁻²⁶ Through such measures, it is anticipated that legal disputes between patients and doctors over adverse events will decrease in numbers.

For the limitation of this study, first, the time when the survey was conducted could probably influence the anxiety about sedation. During the early stages of conducting the survey, there were media reports on a Chinese patient falling into brain death during sedation, which provoked an increased public interest in the risks of sedation. This could cause people participating in the survey in the early stages of the study perceive the anxiety as relatively high. Second, there might be a difference in the response rate between the offline respondents and the online respondents. There were actually more cases of offline respondents giving plural answers in the section dealing with adverse events of sedation than online respondents. However, after conducting a chi-square test to see the effect of this difference on the actual results, there were no statistical differences on any of the survey parts. Therefore, it is thought that the response rate problem has been overcome to a certain extent. Third, among other adverse events, the difference in concerns about awakening during sedation as perceived by ordinary workers and doctors was somewhat alarming. This is due to the fact that doctors view awakening during sedation as normal, as compared to their patients who perceive it as an adverse event. So, differences in level of concern about awakening is contributed to original differences in anxiety.

In conclusion, the level of anxiety about sedation significantly differed in the ordinary workers, depending on their age, gender, and the existence of a prior sedation experience. Also, the level of anxiety about sedation significantly differed in the doctors, depending on the prior sedation experience. There was a significant difference between the ordinary worker group and the doctor group in the anxiety about sedation in the frequency and types of adverse events. Ordinary workers demonstrated more concerns about adverse events such as awakening during sedation, delayed emergence, hypoxic brain damage, and death.

Understanding ordinary workers' anxiety about sedation and identifying factors affecting anxiety will help doctors to manage the patients for sedation in accordance with individual patient's characteristics, beliefs and concerns.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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