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PROTECTIVE EFFECT OF SILICONE PAD ON PRESSURE ULCER AMONG PATIENTS UNDERGOING CORONARY ARTERY BYPASS GRAFT

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ABSTRACT

Background: Pressure ulcer incidence is common in coronary artery bypass graft (CABG) patients. Pressure-reducing surfaces are prominent intervention to prevent of pressure ulcers during surgery. This study aimed to investigate the effectiveness of a silicon protective pad on pressure ulcer among patients undergoing CABG surgery.

Methods: Using a randomized controlled trial, 164 patients with coronary artery diseases and candidate for CABG surgery were randomly assigned either to an experimental group (82) to apply a silicon protective pad on the operating room table or to a standard mattress group (82). Data were collected on patient demographics, and pressure ulcer was assessed by the Torrance skin assessment scale at baseline, 24 hours and 48 hours after the surgery as well as during discharge period from the hospital. The collected data were analysed by using descriptive and inferential statistics. The logistic regression analysis for ordinal variables was used to predict the factors affecting the incidence of pressure ulcers and for analysing confounding variables covariance.

Results: The silicon protective pad significantly diminished the incidence rates of sacral pressure ulcers on compare to standard mattress (p=0.01, effect size=0.23-0.34). According to the logistic regression analysis for ordinal variables, the pressure ulcer incidence, 24 hours after the surgery was predicted by cigarette smoking (OR=0.16, 95% CI=0.03- 0.76), history of taking opioid drugs (OR=11.12, 95% CI: 1.19-103.92) and the obtained data among high and moderate economical conditions were (OR=0.04, 95% CI=0.003-0.67) and (OR=0.25, 95% CI=0.07-0.81) respectively. Similarly the pressure ulcer incidence after 48 hours of surgery was predicted in high and moderate economical conditions (OR=0.08, 95% CI=0.01-0.75) and (OR=0.16, 95%=0.04-0.65) respectively.

Conclusions: After CABG the silicon protective pad had significant effect in prevention of pressure ulcer. It is recommended for the first few days after surgery, the health care providers should focus on addicted, smoking habitual and economic condition of patients.

Trial registration: The study protocol was assigned in Iranian centre of clinical trial registration web site (No. IRCT2015110619919N3).

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Introduction

In Iran, heart diseases are the major causes of disability and death and approximately 150000 people lose their lives annually due to cardiovascular diseases (CVD), out of which 42 percent belong to the coronary artery diseases (CAD) [1]. The goals of medical therapy for CVD patients are to protect or minimize myocardial injuries, maintain myocardial function and prevent related complications, the purpose of such treatments are to achieve myocardial revascularization by using urgent pharmacological and non-pharmacological treatments, the most important non-pharmacological intervention are angioplasty, stenting and CABG [2]. Since these patients often suffer from severe impairments of the left ventricular function and acute obstruction in more than one main coronary artery, they are prone to the complications of angioplasty and need to go under CABG with the goal of increasing their survival and quality of life [3].

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The CABG treatment modality has been performed in Iran for several years and annually, 35 to 50 thousand open-heart surgeries are conducted that of CABG accounts for 60% [1]. Although CABG is a highly effective, efficient and reliable surgical procedure but it's important complication is pressure ulcer which mainly occurs in the lower back and occiput [4, 5]. When the blood vessels in the skin and subcutaneous tissue are under pressure, blood perfusion is gradually is slowed down or stopped, which eventually leads to hypoxia so that pressure ulcers can progress within 2 to 6 hours after pressure. In those patients with CAD and hemodynamic instability, the mean capillary pressure is less than 32 mm Hg; therefore, the least amount of external pressure leads to tissue damage [6].

In addition to the nature of CAD as a risk factor, Intrinsic and extrinsic risk factor, as well as surgical risk factor affects the pressure ulcer incidence in CABG patients [7]. Surgical risk factors play important roles in the development of pressure ulcers that are classified as Preoperative, intraoperative and postoperative risk factors. Preoperative risk factors include advanced age, malnutrition, comorbidities, diabetes mellitus, episodic hypotension, lower haemoglobin, haematocrits, serum albumin level and emergent admission for surgery. Intraoperative risk factors include the type of surgery, extended operative time, and rapid return to preoperative body temperature, extracorporeal circulation, vasopressor drug, intraoperative hypotension and blood loss. Postoperative risk factors are high temperature differences, humidity, change position, activity and mobility [8, 9, 10].

Pressure ulcers associated with surgical procedures are critical issues [11]. Annually, 3.1 million patients suffer from pressure ulcers over the world and in the developed countries the prevalence rate are up to 30 percent [12, 13]. According to Karadag and Gumuskaya [10], grade 1 pressure ulcer, defined as 'redness to the skin- blanching area' was created in 54.8 percent of surgeries extended more than two hours. Also, in 97.9 percent of the surgeries, these lesions were observed in the first three days after surgery. A study by Schoonoven et al., [14] showed that pressure ulcers were observed in 17.1% of patients undergoing cardiac surgery on the same day of surgery, and 51.4 to 31.4 percent a day after and on second day of surgery respectively. The information of pressure ulcers during the surgery varied from 12 to 66 percent based on the severity and duration of pressure [15]. Pressure ulcers are painful and lead to increased length hospitalization, costs, healthcare professional's workload and the prevalence of nosocomial infections [16].

Despite the wide complications of pressure ulcer, however, in 95% of cases it is preventable. So it must be the main priorities of nursing interventions [17]. Frequent change position and skin care have essential effects on the reduction of pressure among patients [18]. Since the application of nursing interventions are impossible during the surgery, other measures for adjusting pressure on underlying tissue over a bony prominence reduce the incidence of pressure ulcers [19]. There are two types of pressure-reducing surfaces as static and dynamic. Static surface are motionless and redistributes a patient's weight so as to relieve pressure points. Foam mattresses, specialized sheepskin overlays and silicon pads are examples of static equipment that prevent the incidence of pressure ulcers. The dynamic air mattress type contains air cells that are continually inflated and deflated, which relieves pressure points and promotes better circulation [20, 21].

Therefore the purpose of this study was to investigate the effectiveness an intra-operative pressure reducing surface. The Silicone protective pads was chosen on the basis of previous studies suggesting reduced pressure sore [22, 23, 24, 25], ease of clinical setting application, accessible and cost. These pads in comparison with lingerie and plastic types inhibit raise of the temperature as well as do not produce humidity [19]. Also silicon pads absorb moisture, distribute pressure equally to different parts of the body, and reduce wear tensile and compressive forces. Therefore, in overall these types of pads reduce the incidence of pressure ulcers in hospitalized patients and those undergoing surgery [20, 21].

Methods

Consecutive patients admitted to a cardiac hospital in the north-west of Iran (Tabriz) from September 2016 to February 2017, were invited to participate in the study and underwent screening for inclusion criteria. The inclusion criteria included: age between 30 and 75 years, undergoing CABG for the first time, body mass index (BMI) between 18.5 and 38 square millimetre and connected to the extracorporeal perfusion pump during the surgery. The exclusion criteria included: bypass time more than 5 hours, hematologic diseases, skin problems such as swelling, redness and allergy, emergent surgery, sensory-motor disability, and history of pressure ulcers. The study protocol received approval from the Human Research Ethics Committee of Tabriz University of Medical Sciences. Participants received information about the study and signed the consent form. The study protocol was assigned in Iranian centre of clinical trial registration web site (No. IRCT2015110619919N3), also This study was performed in accordance with the WMA Declaration of Helsinki - Ethical Principles for Medical Research Involving Human Subjects.

Using a random number table, 164 patients with coronary artery diseases and candidate for CABG surgery were randomly assigned either to an experimental group (82) to apply a silicon protective pad on the operating room table or to a standard mattress group (82). The Allocation concealment was determined by using sequentially numbered sealed envelopes to reduce the risk of allocation bias. Baseline data were obtained within a first day of admission to hospital and before CABG.

Based on the study of Salsali [25], incidence rates of pressure ulcers in the intervention and control groups were 13.3 and 36.7 respectively, with consideration of 80% power at the 5% significance level, the sample size was determined 82 patients for each group. The information was incorporated into the following sampling formula to determine the sample size.

$$n = \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2 \left[P_1(1-P_1) + P_2(1-P_2)\right]}{(P_1 - P_2)^2}$$

Included patients were randomly enrolled to the control group (OR table with standard mattress) and experimental group (OR table with standard mattress and silicon protective pad overlay). OR table with standard mattress were consisted of three pieces and flexible enough to give appropriate positions to the patient's head, waist and knee. The standard mattresses placed on the OR table included a firm mattress with a thickness of 15 cm covered by a thick leather and a thin gel mattress with a thickness

of 3 cm. in the experimental group, on the OR table were additionally applied a silicon protective pad with the dimensions of 90 × 60 and the thickness of 3.5 cm was applied to the sacral and hip area and maintained through the surgery. Following the surgery, co-researcher who was assessed the skin condition was unaware of the random allocation process. Data on pressure ulcer were assessed on the first day of hospitalization and before the surgery, 24 and 48 hours after the surgery as well as during discharge from the hospital.

Sex, age, body mass index, left ventricular ejection fraction, additional diseases (hypertension, diabetes mellitus), preoperative haemoglobin and haematocrit level, serum albumin levels, hyperlipidemia, length of operation, economic condition, smoking habitual and addiction were documented to assess Predictors of pressure ulcer.

Data collection

The validated Persian version of the skin assessment scale adopted by Torrance was used to grade pressure ulcer of the sacral and hips area in the patients undergoing CABG surgery. The scale is composed of 5 grade description of skin: grade 0: no skin discolouration, Grade 1: redness to the skin-blanching occurs, Grade 2a: redness to the skin non-blanching area, Grade 2b: superficial damage to epidermis, Grade 3: ulceration progressed through the dermis, Grade 4: ulceration progressed in to the subcutaneous fat, Grade 5: necrosis penetrating the deep fascia and extending to muscle.[26] The Cohen's kappa coefficient was calculated to determine the reliability of the scale. The scale was filled out by two researchers independently for ten patients 24 hours, 48 hours and during the discharge from the hospital. The Cohen's kappa coefficients by the researchers were reported 0.89 and 1, which indicated the agreement between the researchers. Therefore, the reliability of the scale was confirmed at the $p< 0.01$ significance level.

SPSS, version 21 for windows, software was used for data analysis. The collected data was analysed using descriptive and inferential statistics. Chi-square and Fisher's exact were used to test the proportional difference in pressure ulcers incidence in the experimental and control groups. The Friedman test was used to compare the differences between the groups in terms of the different degrees of pressure ulcers. The logistic regression analysis of ordinal variables was used to predict the factors affecting the incidence of pressure ulcers and the analysis of confounding variables covariance.

Results

A total of 164 patients were enrolled to the study. Eighty-two patients were randomized to the experimental group and 82 patients to the control groups. One patient was excluded from the experimental group due to death for the CABG's complications. The demographic and disease-related characteristics of the study participants are summarized in table 1.

The first 24 hours after the surgery, the incidence rates of pressure ulcers, in the experimental groups were 9.8% (8.6% grade one and 1.2% grade 2a), At this time, 28.1% (22% grade one and 6.1% grade 2a) of the patients in the control group developed pressure ulcers that were found statistically significant ($P < 0.01$). 48 hours after CABG, the incidence rates of pressure ulcers were reported 3.7% (1.2% grade zero and 2.5% grade 2a) in the experimental group and 29.2% (12.2% grade one and 14.6% grade 2a and 2.4% grade 2b) in the control group ($P < 0.01$). At the discharge period, pressure ulcers grade one was observed in 1.2% and 6.1% of the experimental and control groups, respectively that were not statistically significant ($P > 0.05$) (Table 2).

The Friedman test for the comparison of the groups in terms of the differences in pressure ulcers showed an improved condition in the intervention group that was statistically significant ($P < 0.01$). Given the differences in the grade of pressure ulcers in both groups over time after CABG, the time periods were compered together. It was found that in the control group, the times periods of 24 and 48 hours after CABG ($P = 0.01$), 24 hours after the surgery and discharge period ($P = 0.000$), and 48 hours after CABG and the discharge period ($P = 0.000$) had statistically significance differences. In the experimental group was reported 24 and 48 hours after CABG ($P = 0.000$), 24 hours after the surgery and the discharge period (P 0.008) and 48 hours after CABG and the discharge period ($P = 0.000$), which were statistically significant (Table 2).

After excluding confounding variables, the logistic regression analysis of ordinal variables was used to determine the effect of silicone protective pad on the prevention of pressure ulcers. For the data analysis, pressure ulcers status was considered the dependent variable, age, body mass index, length of operation, systolic and diastolic blood pressure, left ventricular ejection fraction, preoperative haemoglobin and haematocrit level, serum albumin levels were considered covariates, and sex, smoking, addiction, income situation, diabetes mellitus, hyperlipidaemia and silicon pads were included as factors. According to the logistic regression analysis for ordinal variables, the incidence rate of pressure ulcer, 24 hours after the surgery was predicted by cigarette smoking (OR=0.16, 95% CI=0.03- 0.76), history of taking opioid drugs (OR=11.12, 95% CI: 1.19-103.92), and those whom had not used silicon pad (OR=10.76, 95% CI: 3.29-35.16), the obtained data among high and moderate economical conditions were (OR=0.04, 95% CI=0.003-0.67) and (OR=0.25, 95% CI=0.07-0.81) respectively. Similarly the pressure ulcer incidence after 48 hours of surgery was predicted in case of those whom had not used silicon pad (OR=40.42, 95% CI=7.72-211.63), in high and moderate economical conditions (OR=0.08, 95% CI=0.01-0.75) and (OR=0.16, 95%=0.04-0.65) respectively. In the discharge period, none of the demographic and diseases-related variables had statistically significance effects on pressure ulcers (Table 3).

Discussion

In the present study, 24 and 48 hours after GABG, statistically significance differences on pressure ulcers incidence was observed among intervention and control groups. However, it was not significant during the discharge period. After CABG (24 and 48 hours) the patients from control group showed 28.1% and 29.2% of pressure ulcers respectively. So the possible reason for the increased incident rate of pressure ulcers may be due to sensory-motor dysfunction and low level of conscientiousness which patients may be unable to feel pain and change their positions. Similarly, Schoonoven et al. [13] reported that 17% of patients at the same day of surgery, 51.4% one day after and 31.4% in the second day after surgery developed pressure ulcers (16). Also, Cox et al., [24] found that the pressure ulcers incidence of 32% during the 48 hours after the surgery. Accordingly we found that the pressure ulcers incidence, 24 and 48 hours after CABG in the intervention group was lower compared with the control group (9.8 % and 3.7%). Nikson et al., [26] Sanamaria et al., [23] and Russel et al., [27] reported similar findings. Also According to the Salsali et al., [25] the observed data on hydrocolloid dressing, the pressure ulcers incidence, were 13.3% and 36.7% in the intervention and control groups, respectively.

The study of Cubit et al., [28] showed that the patients in the control group were at the risk of developing pressure ulcers 5.4 times more as compared to the intervention group; even then it concluded insignificant. Sewchuk et al., [9] found that the use of pressure reducing mattresses containing liquid along with nursing care was more effective in the reduction of pressure ulcers in comparison with standard mattresses, but it was not statistically significant. Feuchtinger et al., [29] tested a viscoelastic foam pad against the standard operating table for patients who underwent cardiac surgery which were not effective in the prevention of pressure ulcers. The conflicting findings of the studies of Cubit, Sewchuk, and Feuchtinger can be attributed to the limitations such as low sample size, lack of blinding and random assignments of samples to intervention and control groups and the skin assessment by nurses in daily routine. According to our present study we conclude that the above-mentioned limitations were addressed for making reliable results of the intervention.

So in the present study we show that by adjusting of the confounding variables, silicon pad on pressure ulcers was effective and patients whom had not received silicon pad and just had a routine care were 10.76 times more at risk of developing pressure ulcers. Therefore, the reduction of the risk of pressure ulcers in patients undergoing CABG requires the use of protective pads for the reduction of pressure by nurses. The development of pressure ulcers is directly associated with the number of specialist nurses in the field of pressure ulcer and nurses' workload. It has been reported that the earlier identification of risk factors, reduction of pressure through the use of protective pads and change position are the interventions conducted by nurses are preventable [19, 30, 31]. In our study, the use of silicon pads had the most effect in the prevention of pressure ulcers 24 and 48 hours after CABG and their effects were reduced from the second day after the surgery due to the improvement of the patients' mobility and reduction of anaesthetic drugs' effects.

According to our findings, those patients with intermediate and high levels of economic status were low risk for the development of pressure ulcers. Gelis et al., [32] found that patients' economic conditions influenced the risk of pressure ulcers, and low educational level, unemployment and low income increased the risk of pressure ulcers. Also we found that those patients who did not smoke were more at the risk for developing pressure ulcers. The findings of Shaw et al. [33], Sanada et al., [34] confirmed the presence of a pressure ulcers and the history of cigarette smoking, which were against our study's findings. It is believed that cognitive issues such as confusion, cigarette smoking, and the use of hypnotic drugs, depression and personal disorders are the risk factors for developing pressure ulcers [32]. One possible reason for the development of pressure ulcers in non-smokers can be the high prevalence of hookah smoking by the patients. While the harmful effects of smoking hookah is much more than smoking cigarette, smoking hookah is more acceptable in the Iranian context and culture, and also many people are not informed of its consequences on their health. As a limitation of our study, no question was asked about smoking hookah by the patients that could give us some data about the pattern of smoking.

In comparison to non-drug-addicted patients we found that the addicted subjects are 11 times more susceptible to develop pressure ulcers. Mookhoek et al., [35] reported the relationship between pressure ulcers and drug addiction (OR=6.4, 95% CI: 1.46-28.00). Also, Krause et al., [30] reported that the history of using pain killers, cigarette smoking, alcoholic agent and drug abuse were the risk factors for the development of pressure ulcers.

Limitations

Although in the present study we focused on the incidences of pressure ulcer on sacral and hips areas. However, the heel and head pressure ulcers development must also be considered. Other limitation of this study was the choose of only hospital for heart surgery in Tabriz/northwest of Iran. Also subjects were not asked about their water pipe smoking patterns.

Conclusions

The use of silicon protective pad during CABG surgery could prevent pressure ulcers. Therefore, in the first few days after the surgery health care providers need to pay more attention to cigarette and hookah smokers, addicted patients and those patients with a low economic condition and use silicon protective pads to prevent pressure ulcers. In addition, silicone pads are suggested to be used in the operating room, orthopaedic wards and intensive care units for those patients who are at high risk of developing pressure ulcers. Nurses need to follow pressure ulcer prevention's protocols, identify risk factors imposing the danger of pressure ulcers to patients, use of pressure-reducing pads, and educate healthcare staffs about how to prevent pressure ulcers. The screening of the patients for the risk of developing pressure ulcers before surgery and taking preventive measure as repositioning patients, skin care and pressure-reducing device by nurses help with the reduction of developing pressure ulcers risk.

Abbreviations

CVD: cardiovascular diseases
CAD: coronary artery diseases
CABG: Coronary Artery Bypass Graft

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Authors' contributions

Davoodi A designed the study and developed the methodology. Aghal M and Alizadeh M collected the data and performed the study. Ghahramanian A analyzed the data and performed the statistical analysis. Rezazadeh H provided critical revision of the manuscript. All authors read and approved the final manuscript.

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The study protocol received approval from the Human Research Ethics Committee of Tabriz University of Medical Sciences.

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Competing interests

The authors declare that they have no competing interests.

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Table 1: Comparison of baseline characteristics in study groups

Variables	Control group		Intervention group		P	X^2	T
	N(%)	Mean (SD)	N(%)	Mean (SD)			
Sex					.79	.07	------
Male	51 (62.2)	--------	52 (64.2)	--------			
Female	31 (37.8)	--------	29 (35.8)	--------			
Smoking					.66	.18	------
Yes	30 (36.6)	--------	27 (33.3)	--------			
No	52 (63.4)	--------	54 (66.7)	--------			
Addict					1	.19	------
Yes	3 (3.7)	--------	2 (2.5)	--------			
No	79 (96.3)	--------	79 (97.5)	--------			
Diabetic					.55	.34	------
Yes	19 (23.2)	--------	22 (27.2)	--------			
No	63 (76.8)	--------	59 (72.8)	--------	.44	.59	------
Hyperlipidem							
Yes	17 (20.7)	--------	13 (16)	--------			
No	65 (79.3)	--------	68 (84)	--------	**.04**	3.98	------
Heart disease							
MI	78 (95.1)	--------	71 (87.7)	--------			
Angina	3 (3.7)	--------	4 (4.9)	--------			
Dysrhythmia	1 (1.2)	--------	**6 (7.4)**	--------	.34	------	-.94
	--------	57.4 (10.61)	--------	58.91 (9.8)	.70	------	-.37
Age	--------	26.31 (4.33)	--------	26.55 (3.62)	.60	------	.51
BMI	--------	3.54 (.68)	--------	3.48 (.62)	.29	------	1.04
Surgery duration	--------	48.41 (7.28)	-------	47.09 (8.69)	.70	------	-.37
EF	--------	13.63 (1.68)	--------	13.73 (1.76)	.78	------	.27
Hb	--------	4.03 (.76)	-------	4 (.68)			
Alb							

Table 2: Comparison of groups and times of ulcer pressure measurement

	Ulcer pressure grade								X^2	P-Value	Eta	Rank mean		X^2		P-Value	
	Intervention group				Control group												
	N(%)				N(%)												
Time	0	1	2b	2b	0	1	2a	2b				Test group	Control group	Test group	Control group	Test group	Control group
Before of CABG	81(100)	-	-	-	82(100)	-	-	-	-	-	-	2.43	2.18	17.35	57.75	0.001	0.000

24 hour post CABG	73(90.1)	7(8.6)	1(1,2)	-	59(72)	18(22)	5(6.1)	-	8.62	0.004	0.23	2.62	2.69				
48 hour post CABG	78(96.3)	1(1.2)	2(2.5)	-	58(70.7)	10(12.2)	12(14.6)	2(2.4)	16.51	0.000	0.34	2.51	2.86				
Discharge day	80(98.8)	1(1.2)	-	-	77(93.9)	5(6.1)	-	-	2.70	0.21	0.12	2.44	2.27				

Table 3: Predictors of ulcer pressure using ordinal logistic regression in different times

Variables	24 hour post CABG					48 hour post CABG					Discharge day				
	Wald	P-value	OR	CI of OR		Wald	P-value	OR	CI of OR		Wald	P-value	OR	CI of OR	
				Lower	Upper				Lower	Upper				Lower	Upper
Age	0.80	0.36	1.02	0.97	1.07	0.00	0.93	1.002	0.95	1.05	2.45	0.11	1.24	0.94	1.62
BMI	1.39	0.23	1.07	0.95	1.19	2.15	0.14	1.103	0.96	1.25	1.17	0.27	1.24	0.83	1.86
Surgery duration	0.34	0.55	1.23	0.60	2.52	0.29	0.59	1.24	0.56	2.72	0.00	0.95	0.96	0.2	4.43
BP(Systolic)	0.35	0.55	0.97	0.90	1.05	0.02	0.87	1.007	0.92	1.09	1.01	0.31	1.12	0.89	4.43
BP(Diastolic)	0.09	0.75	1.01	0.91	1.13	0.06	0.79	1.01	0.90	1.14	1.2	0.27	0.83	0.6	4.43
Ejection fraction	0.14	0.70	1.01	0.94	1.08	3.40	0.06	1.08	0.99	1.17	0.29	0.58	0.95	0.82	4.43
Hemoglobin	0.58	0.44	0.88	0.64	1.21	1.15	0.28	0.82	0.58	1.17	1.38	0.24	1.61	0.72	4.43
Albumin	2.36	0.12	0.57	0.28	1.16	1.16	0.28	0.66	0.31	1.39	0.96	0.32	2.41	0.41	4.43
Intervention with silicon Pad			**Referent**					**Referent**					**Referent**		
Without silicon pad care	15.47	.000*	10.76	3.29	35.16	19.18	.000*	40.42	7.72	211.63	2.24	0.13	13.74	0.44	4.43
Female			**Referent**					**Referent**					**Referent**		
Male	0.27	0.59	0.70	0.19	2.59	0.005	0.94	1.05	0.22	4.91	1.05	0.3	5.13	0.22	117.1
I<O			**Referent**					**Referent**					**Referent**		
I=O	5.34	0.02*	0.25	0.07	0.81	6.59	0.01*	0.16	0.04	0.65	0.05	0.82	1.42	0.06	31.12
I>O	5.06	0.02*	0.04	0.003	0.67	4.91	0.02*	0.08	0.01	0.75	1.17	0.27	9.76	0.15	606.3
No smoking			**Referent**					**Referent**					**Referent**		
Smoking	5.31	0.02*	0.16	0.03	0.76	1.11	0.29	0.43	0.09	2.01	2.17	0.14	0.07	0.003	2.32
No addiction			**Referent**					**Referent**					**Referent**		
Addiction	4.46	0.03*	11.12	1.19	103.92	0.15	0.69	1.70	0.11	24.72	2.11	0.14	23.49	0.33	1654.48
No diabetic			**Referent**					**Referent**					**Referent**		
Diabetic	0.27	0.59	1.39	0.40	4.81	1.40	0.23	2.21	0.59	8.21	1.19	0.27	0.15	0.006	4.308
No Hyperlipidemia			**Referent**					**Referent**					**Referent**		
Hyperlipidemia	0.27	0.60	0.67	0.15	2.92	0.09	0.75	0.78	0.17	3.63	2.09	0.14	10.44	0.43	250.44