ORIGINAL ARTICLE

Impact of Opium Use on the Conventional Coronary Artery Risk Factors among Outpatients in Afghanistan: A Case-Control Study In Andkhoy City

MOHAMMAD SHOAIB HAMRAH[1], MOHAMMAD HASSAN HAMRAH[1,2], MOHAMMAD HUSSAIN HAMRAH[1], TOBA DAHI [3], AHAMAD TAREQ HAMRAH[4], FATEMEH ZARGHAMI[5], ABDURRAHMAN CHARKAZI[6], MOHAMMAD HASHEM HAMRAH[1]
[1]Dr.Mohammad Hashem Hamah's Curative Clinic, Andkhoy, Afghanistan
[2]Department of Pediatric Dentistry, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran
[3]Faculty of Dentistry, AbantIzzet Baysal University, Bolu, Turkey
[4]Tehran University of Medical Sciences, School of Medicine, Tehran, Iran
[5]Department of Health Education and Promotion, Faculty of Health, Tabriz University of Medical Sciences, Tabriz, Iran.
[6]Health Education and Promotion, Environmental Health Research Center, Faculty of Health, Golestan University of Medical Sciences, Golestan, Iran.
[6]Department of Biostatistics and Epidemiology, Department of Health Education and Health
Correspondence to Professor Mohammad Hashem Hamrah, Email: hashemsahab@gmail.com, TEL:+93789323000

ABSTRACT

Background: According to a recent study, opium use like other risk factors, is considered an independent risk factor for Coronary Artery Disease (CAD). Its association with other risk factors increases the risk of CAD. However, debate continues about this association.
Aim: To explore the association between the conventional CAD risk factors and opium use among patients visiting an outpatient clinic in Andkhoy, Afghanistan.
Methods: The case-control study was performed on 574 patients aged 18 years and above including 161 opium addicts and (case group) and 413 non-addicts (control group) from October 2017 to April 2018.
Results: There were 277 males (48.3%) and 297 females (51.7%). The mean age was 53.2 (±13.1) for opium users and 53.9 (±13.5) for non-opium users. Opium use was associated with male gender (OR=8.2, 95% CI: 4.2-16.0), smoking (OR=9.0, 95% CI: 4.7-17.3), decreased Fasting Blood Sugar (FBS) levels (OR=1.0, 95% CI: 1.0-1.1), decreased total cholesterol levels (OR=3.4, 95% CI:1.8-6.2), physical inactivity (OR=3.9, 95% CI: 2.1-7.2), and hypertension (OR=15.1 95% CI: 6.7-33.8).
Conclusions: We found that the opium use was associated with male gender, smoking, hypertension, decreased total serum cholesterol levels and decreased FBS levels. However, the association between opium use and the decreased total serum cholesterol levels and decreased FBS levels may be due to short-term hormonal and neural effects. Therefore, it should be advised not use opium as a cardioprotective agent.
Keywords: CAD, opium use, risk factors, Andkhoy, Afghanistan

INTRODUCTION

The World Health Organization estimated that noncommunicable disease (NCDs) caused 41 million deaths per year worldwide (71% of global deaths). In 2016, cardiovascular disease (CVD) was a leading cause of NCDs deaths causing 44% of related deaths (17.9 million) in the world[1]. More than 7 million CVD deaths were the result of coronary artery disease (CAD), 75% of which happened in low-and middle income countries [1,2].

The conventional risk factors for CAD include systemic arterial hypertension, smoking, dyslipidaemias, obesity, sedentary lifestyle, diabetes mellitus, and family history of CAD[3]. However, prevalence of these risk factors varies among different parts of the world[4]. Differences in the prevalence of these risk factors among various populations resulted in different population attributable risks [5]. However, some researchers have reported that more than 50% of CAD patients have not recorded any of these conventional risk factors for CAD. Other risk factors such as inflammatory, hormonal, genetic, and other potentially modifiable risk factors for CAD could be evaluated[6-8].

There is a disparity concerning the impact of opium on blood glucose and CAD risk factors[9-12]. Results of a study performed on opium addicts, indicated that insulin response may be impaired due to abnormalities of peripheral insulin action or failure of β cells[13]. The authors of this study concluded that glycated haemoglobin (Hb A1c) was significantly higher among opium users[14] and a decreased FBS (Fasting Blood Sugar) was temporary among opium users[12]. The impact of opium on blood pressure is related to the dosage and duration of opium use. In short term, low dose opium use, often reduces blood pressure through peripheral vasodilatation and impairs sympathetic vascular reflexes[15], while long-term opium use results in hypertension. These data indicated that hypertensive effects of opium were mediated through its long-term impact on cardiovascular system, including microvascular coronary dysfunction, elevated plasma levels of homocysteine and fibrinogen, atheroma formation and related vascular stenosis[16,17]. Several studies have shown that opium does not have an unfavourable impact on the serum lipids[18]. The potential pathophysiological mechanisms of effect of opium on blood glucose, serum lipids, and blood pressure are shown in Figure 1[18].

Afghanistan is the world's largest producer of opium[19]. Opium is commonly used in Afghanistan, Iran, Pakistan and India[20], where there is a misconception that opium use has protective role in CVD, hypertension, and diabetes mellitus [21]. Also, a prior research has shown there was an increase in the prevalence of opium consumption among

patients with chronic diseases, especially patients with less awareness of side effects and addictive properties of opium use[22]. Previous studies conducted in Iran have shown an association between opium addiction and some conventional CAD risk factors[23,24]. However, other authors didn't show such an association [25,26]. Considering this identified research gap, we conducted this study to investigate the association between conventional CAD risk factors and opium addiction among adult patients visiting an outpatient clinic in Andkhoy, Afghanistan.

METHODS

This case-control study was performed on 574 patients aged ≥18 years including 161 opium addicts (case group) and 413 non-addicts (control group) in the outpatient clinic in Andkhoy, Afghanistan from October 2017 to April 2018. Curative Clinic is an outpatient service for people who need to see a specialist, which provides patients with care, ongoing management and referrals to other services, if needed. The Curative Clinic is also a referral centre in Faryab province in norther part of Afghanistan. Exclusion criteria for selecting case group and control group included the presence of any physical and neurocognitive disorders and age 80 years or over.

Data were collected based on the already validated [27]. Persian version of (WHO) SEPwise approach to Surveillance. Persian and Dari are mutually intelligible varieties of the same language. The questionnaire was modified into Dari language. The language experts conveyed the equivalence of concepts used in the questionnaire in Dari language which included information on sociodemographic variables, behavioural (cigarette smoking and opium use), and clinical characteristics. Information on sociodemographic characteristics contained age, sex, education levels, marital status, occupation, and ethnicity. The participants were recruited uniformly, and participants' residency was not included in the questionnaire.

The cigarette smokers were categorized into three groups: current smokers, past smokers, and non-smokers. Current smokers were defined as patients who have smoked at least 100 cigarettes in their lifetime and also had smoked in the last 30 days. Past smokers were defined as patients who had smoked at least 100 cigarettes in their lifetime but had not smoked in the last 30 days. Non-smokers were defined as patients who have never smoked a cigarette or had smoked fewer than 100 cigarettes in their lifetime. [28].

The interviews were conducted by trained doctors. In Afghan culture, opium use is widely considered to be harmful and is not socially accepted. Therefore, some participants may not disclose their opium consumption. To make the possibility of under-reporting is less in the current the study, participants were given details of what participation in the study entailed, and were advised that their participation was voluntary, that no identifying information would be collected and that their results would therefore be anonymous, and that the right to decide whether or not to participate in the study. Potential participants who confirmed that they understood this information and were willing to participate proceeded to complete the survey at the time of their clinic visit. Informed consent was obtained from all participants. Moreover, a prior research conducted in Iran has shown self-reported opium consumption is a valid and reliable method of opium abuse assessment [29].

Participants were asked to identify type of the opium they use. . There are three types of opium which includes teriak (crude opium), shireh (a refined opium extract), and sukhteh (opium dross left in pipes after smoking opium) [30]. The harmful impact of opium or cigarette use on human body was discussed and participants were encouraged to seek their treatment and quit smoking. Also, participants were encouraged to refer to the drug addiction treatment centre in Andkhoy where they offer free services for their potential treatment of opium addiction

Opium consumption: Opium users reported using any types of opium at least once per week in the last six month period [30]. Opium addiction was defined according to DSM-IV criteria
and all participants were interviewed according to the diagnostic criteria specified in the DSM-IV criteria for opium dependency[31].

The second part of the questionnaire included information on clinical variables as follows: Body mass index (BMI), blood pressure pattern, fasting blood sugar, total cholesterol and triglyceride. Blood samples were collected if patients had fasted for at least 8 hours. Questions were explained more in detail if there was any problem observed in understanding the concept of a question.

Definitions of variables:

- ✓ Overweight and obesity were defined as a BMI of 25 to < 30 kg/m^2 and BMI ≥ 30 kg/m^2, respectively [32].
- ✓ Hypertension was defined as systolic blood pressure of ≥140 mm Hg or diastolic blood pressure of ≥90 mm Hg (≥140/90 mm Hg), at separate occasions, in patients already on antihypertensive medications at the time of admission [33].
- ✓ DM (diabetes mellitus):
- ✓ A fasting blood glucose level of ≥126 mg/dL, or a random blood glucose level of ≥ 200 mg/dL, or self-reported use of anti-diabetic medications [34].
- ✓ The cut-offs for abnormal levels were: TG ≥150 mg/dL, total cholesterol ≥200 mg/dL [35].
- ✓ Physical inactivity was defined as not performing physical activity of moderate intensity for more than 30 minutes, at least 4 days per week[36].

The laboratory tests were described in detail elsewhere [37] andthe study was approved by the scientific review committee of Balkh Regional Hospital.

Statistical analysis: Analysis was performed by SPSS V24.0 software. The study has used both descriptive and inferential statistics. Inferential statistics methods include independent sample t-test for continuous data and χ^2-test for categorical data. Logistic regression analysis was used with a 5% level of significance. Explanatory variable was considered significant if P-value was less than 0.05.

RESULTS

Out of 574 participants, 277(48.3%) of them were males and the male-to-female ratio among participants was 0.93.

Males were more likely to use opium compared to females (84.5% vs. 34.1%, P<0.001). The main form of opium use (77%) was inhalation of smoke and 23% was orally. The unemployment rates were significantly higher among opium users than non-users (41.6% vs. 32.4%, P<0.001). DM was significantly associated with opium use (37.3% vs. 18.4%, P<0.001). Smoking was significantly higher among opium users compared to non-user groups (65.2% vs. 11.4%, P<0.001). The mean for FBS levels was significantly lower among opium users than non-users (100.9±13.8 vs. 106.7±19.7, P<0.001). Opium users had significantly lower total cholesterol levels compared to non-users (58.8% vs. 45.4%, P<0.001). Opium users were less likely to participate in physical activity than non-users (57.8% vs. 28.1%, P<0.001) and hypertension was more common among opium users in comparison to non-users (72.0% vs. 20.6%, P<0.001). There were more patients with family history of CAD in the group of opium users than in the non-users group (49.1% vs. 20.0%, P<0.001). (Table 1).

The logistic regression analysis was used to determine the association between opium consumption and gender, smoking, FBS levels, total cholesterol levels, hypertension and physical inactivity. Opium use was considered a dependent variable. The results of logistic regression (Table 2) revealed that males were (odd ratio [OR] = 8.2, 95% CI: 4.2-16.0) more likely to use opium than females. Tendency to be opium users was higher among smokers (OR= 9.0, 95% CI: 4.7-17.3) compared to non-smokers and FBS levels tended to be lower among opium users compared to non-users (OR=1.0, 95% CI:1.0-1.1). Moreover, opium users were more than 3.4 times (95% CI:1.8-6.2) more likely to have a decreased total cholesterol levels than non-users. The odds of opium use among hypertensive patients were 15.1 times (95% CI: 6.75-33.85) higher than patients without hypertension. Those with opium consumption were more likely to be physically inactive compared to non-users (OR= 3.9, 95% CI: 2.1-7.2). Patients with hypertension were more likely to use opium compared to normotensive patients (OR=1.7, 95% CI:1.2–2.4).

Table 1: Sociodemographic and clinical characteristics of study participants

	Opium users	**Non-users**	
	N=161, n (%)	**N=413, n (%)**	**P *value***
Age,	53.2 (±13.1)	53.9 (±13.5)	0.594
Sex,			<0.001
Female	25 (15.5%)	272 (65.9%)	
Male	136 (84.5%)	141 (34.1%)	
Marital status,			0.320
Married	138 (85.7%)	353 (85.5%)	
Single	8 (5.0%)	32 (7.7%)	
Other	15 (9.3%)	28 (6.8%)	
Level of education,			0.028
Illiterate	86 (53.4%)	180 (43.6%)	
Primary/private,	41 (25.5%)	111 (26.9%)	
Secondary	10 (6.2%)	60 (14.5%)	
High school or higher,	24 (14.9%)	62 (15.0%)	
Occupation,			<0.001
Employed	20 (12.4%)	66 (15.9%)	
Unemployed	67 (41.6%)	134 (32.4%)	
Home maker	28 (17.4%)	194 (46.9%)	
Farmer	31 (19.2%)	11 (9.1%)	
Other	15 (9.3%)	8 (2.7%)	
Body mass index, mean (SD)	22.9±2.6	23.1±3.6	0.609
DM, n (%)	60 (37.3%)	77 (18.4%)	<0.001
Smoking status,			<0.001
Yes	56 (34.8%)	366 (88.6%)	
No	105 (65.2%)	47 (11.4%)	
FBS (mean mg/dL±SD)	100.9±13.8	106.7±19.7	0.001
TC (mean mg/dL±SD)	181.1±34.7	202±34.7	<0.001
TG (mean mg/dL±SD)	158.8±36.3	159.6±38.5	0.751
Physical inactivity, n(%)	93 (57.8%)	116 (28.1%)	<0.001
Hypertension			<0.001
Yes	116 (72.0%)	85 (20.6%)	
No	45 (28.0%)	328 (79.4%)	
Family history of CAD	79 (49.1%)	83 (20.0%)	<0.001
Heart failure	16 (9.9%)	58 (14.0%)	0.187
Stroke	9 (5.6%)	22 (5.3%)	0.900

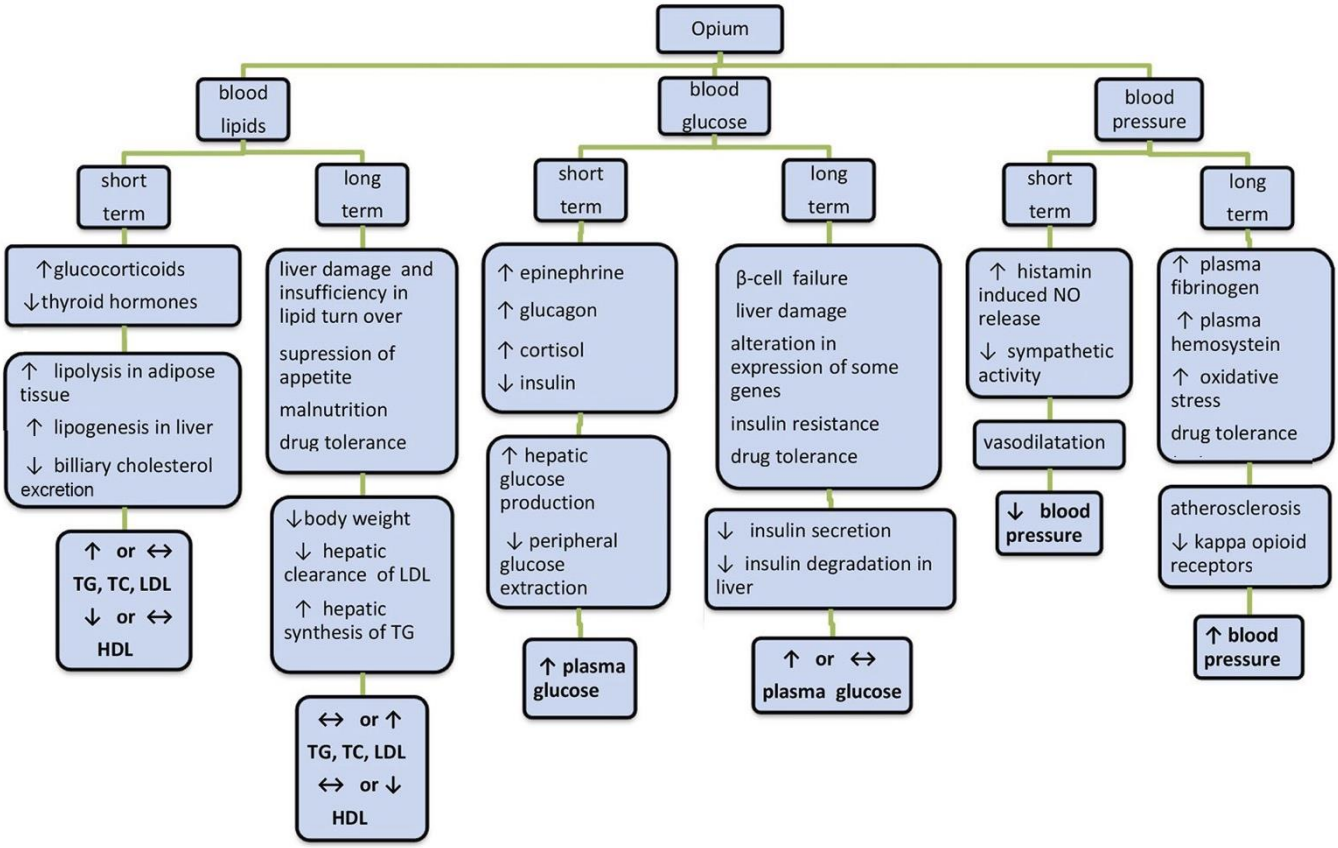
DM= Diabetes Mellites, MI=Myocardial Infarction, SD=Standard Deviation, FBS=Fasting Blood Sugar, TC=Total Cholesterol, TG=Triglyceride, CAD=Coronary Artery Disease

Table 2: Odd ratio for factors associated with opium use among participants

Variables	Opium users N=161, n (%)	Non-users N=413, n (%)	OR	(95% CI)	P value
Gender					<0.001
Female	25 (15.5%)	272 (65.9%)	1		
Male	136 (84.5%)	141(34.1%)	5.7	2.2-14.8	
Education,					
High school or higher	24 (14.9%)	62 (15.0%)	1		
Secondary	10 (6.2%)	60 (14.5%)	1.04	0.5-2.2	0.927
Primary/private	41 (25.5%)	111 (26.9%)	1.47	0.4-2.2	0.498
Illiterate	86 (53.4%)	180 (43.6 %)	0.91	0.4-2.2	0.843
BMI (mean kg/m^2 ±SD)	22.9±2.6	23.1±3.6			
Smoking status,					
No	56 (34.8%)	366 (88.6%)	1		<0.001
Yes	105 (65.2%)	47 (11.4%)	8.99	4.7-17.3	
FBS (mean mg/dL ± SD)	100.9±13.8	106.7±19.7	1.04	1.0-1.1	<0.001
TC (mean mg/dL ± SD)	181.1±34.7	202±34.7	<0.001	1.0-1.2	<0.001
Hypertension,					<0.001
No	45 (28.0%)	328 (79.4%)	1		
Yes	116 (72.0%)	85 (20.6%)	15.12	6.7-33.8	
DM,					0.172
No	101(62.7%)	336 (81.4%)	1		
Yes	60 (37.3%)	77 (18.4%)	1.72	0.8-3.2	
Physical inactivity,					<0.001
Yes	68 (42.2%)	297(71.9%)	1		
No	93 (57.8%)	116 (28.1%)	3.94	2.1-7.2	
Family history of CAD					0.104
No	82 (50.9%)	330 (80.0%)	1.76	0.9-2.5	
Yes	79 (49.1%)	83 (20.0%)			

FBS= Fasting blood sugar, BMI=Body mass index, DM=Diabetes Mellitus, CAD= Coronary Artery Disease, TC=Total Cholesterol

Figure 1: The potential pathophysiological mechanisms of effect of opium on blood glucose, serum lipids, and blood pressure. The hormonal and neural are short-term effects of opium use whereas structural and functional alterations are often long-term effects. Adapted from Najafipour H, Beik A. The impact of opium consumption on blood glucose, serum lipids and blood pressure, and related mechanisms. *Front Physiol.* 2016;7:436.



DISCUSSION

To our knowledge, no study so far has conducted an assessment on the effect of opium on conventional risk factors of CAD in Afghanistan. A recent report has indicated that opium use, like other risk factors, can be considered as an independent risk factor, as well as its association with other risk factors, in increasing the risk of CAD[38]. The current study showed that opium consumption was associated with male gender, smoking, lower total serum cholesterol levels, lower serum FBS levels, physical inactivity, and hypertension. However, neither diabetes nor triglyceride levels was associated with opium use.

In the current study, there was an association between male gender and opium use. The association between male gender and illicit drug use was observed in a previous study [39]. This association can be explained by social and cultural factors which limit drug taking among females. There is also increased stigma for females taking illicit drugs compared to males. Moreover, females are less likely to share information about their illicit drug use with their friends, which creates a limitation for their access to illicit drugs.

We found that opium use is associated with cigarette smoking, which is in line with the results of previous research on the relationship between smoking and illicit drug use. Smoking was one of the strong predictors for illicit drug use [40]. Also, a previous study in France found that there was an increase in the initiation of illicit drug consumption among individuals who started smoking tobacco or cannabis at a young age [41].

In this study, we revealed that opium is associated with lower total serum cholesterol levels. This finding is in agreement with the result of a previous study [42]. However, other reserachers such as Salman et al. have found that the serum total cholesterol levels was significantly higher among opium users[43]. One possible explanation for the association between lower serum total cholesterol levels and opium use may be that opium has a suppression impact on the opium users' appetite which causes a decrease in weight [44]. Another possible explanation for this is that the lower serum total cholesterol might be due nutrient deficiency as a result of poor dietary intake among low socio-economic opium users.

In our study, we revealed that opium use has a positive effect on the levels of FBS. This finding concurs with previous studies found in the scientific literature[10,45,46]. However, there are other studies indicating that opium has no considerable positive impact on FBS levels [17,47,48]. Several hypotheses have proposed to explain the association between opium use and hypoglycaemia. It is likely that lower FBS levels among opium users is due to the anorexia effect of opium which leads to diminished insulin sensitivity and decreased BMI[18]. In addition, there is an increased fasting insulin level among opium users[49]. Karam et al. found that glycated haemoglobin (Hb A1c) was significantly higher among opium users [14], and a decreased FBS was temporary among opium users [12].

The current study discusses that opium use is associated with hypertension. This finding is consistent with that of a prior research conducted by Yousefzadeh G. et al[50]. However, another study conducted by Aghadavoudi O et al. found an inverse relation between opium use and hypertension[46]. It has been hypothesized that the impact of opium on blood pressure is related to the dosage and duration of opium use. In short duration and low dose, opium use often reduces blood pressure through peripheral vasodilatation and impairs sympathetic vascular reflexes[15].

Limitations: The first limitation of this study is collecting data from only one clinic as a data source so the data may not be representative of the whole population. Secondly, it is possible that the reporting of opium use could be underestimated, because data about opium use was collected using an interview-based survey and we did not perform urine codeine or morphine tests for detecting opium use. Moreover, the selection bias precludes any inferences about the direction of the observed and could contribute to underestimates or overestimates of opium consumption among participants. Furthermore, LDL and HDL levels were not measured and the route of opium admiration by patients was not recorded. and we also did not collect data on diet. Moreover, our study was a cross-sectional study and therefore, the casual relationships cannot be established. Finally, the number of opium users was small compared to non-opium users and this can decrease the overall power.

On the other hand, the curative clinic is a referral center in the …….province. In different areas of Afghanistan, the assumption is that morbidity patterns remain similar in practice, therefore it would be beneficial to obtain data in relation to this.

CONCLUSIONS

This study shows that there is an association between opium use and smoking, hypertension, physical inactivity, lower total serum cholesterol levels, and lower FBS levels. However, it is likely that the association between opium use and lower total serum cholesterol levels, and lower FBS levels is due to short term hormonal and neural effects of opium use. Therefore, people should be advised concerning the hazardous impact of opium consumption on CAD risk factors.

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Conflict of Interest: None

Corresponding author

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