



Periodontal Status of Patients Diagnosed with Pancreatic Cancer in Ibn Sina Hospital

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Received Date: January 24, 2022

Published Date: February 02, 2022

Abstract

Background: *The oral cavity is a large reservoir of bacteria composed of more than 700 species or phylotypes, of which approximately 35% have not been cultured. Periodontal diseases are a group of bacterial inflammatory diseases of the supporting tissues of the teeth (gingiva, periodontal ligament, cementum and alveolar bone); these diseases are produced by certain bacteria encountered in subgingival plaque. Pancreatic cancer develops when cells in the pancreas grow out of control, forming a lump (tumour). This can happen in the head, body or tail of the pancreas. Several hypotheses are of interest in the potential etiology of a link between, periodontal disease and cancer.*

Patients and methods: A total of 50 participants with pancreatic cancer cases were included during an average 6 months. Data was collected by the researcher using the following tools: CPITN probe, Day light (ordinary light), Normal chair, Mouth mirror, Data entry sheet. Examination of periodontal status done by the researcher for each participant in the study.

Results: As a result of the clinical study, in patients diagnosed with pancreatic cancer, using CPI the most frequently diagnosed with periodontitis score 3 (at least one mm 4-5 PD) was 42%. The less frequent was diagnosed with no periodontitis score 0 (healthy tissue) was 23%. The least frequent diagnosis with periodontitis score 4 (at least one mm 6 PD of < or) was 21.30%, and another least frequency was diagnosed with periodontitis score X (missing) was 12.7%. Periodontitis of score 2 (calculus) was only 1.0% in pancreatic cancer patients. The bleeding was not found among patients with pancreatic cancer.

Conclusions: In this cross sectional –descriptive hospital-based study, our findings support the linking between the periodontitis and pancreatic cancer in “Ibn Sina” hospital. The bleeding was not found among patients with pancreatic cancer. The calculus index was only 1.0% in pancreatic cancer patients. The pocket measured within CPI (score 3) represented 42% which was the higher frequency.

Key words: periodontal disease, periodontitis, poor oral hygiene, pancreas cancer.

Abbreviations

PD: Periodontal diseases.

AAP: American Academy of Periodontology.

CPITN: Community Periodontal Index of treatment needs.

CPI: Community Periodontal Index.

PSR: Periodontal Screening and Recording System

Introduction

The oral cavity is a large reservoir of bacteria composed of more than 700 species or phylotypes, of which approximately 35% have not been cultured. (i) Periodontitis is an inflammatory disease of the oral cavity due to bacteria. Several prospective studies have shown positive associations between oral inflammation (periodontitis) and an increased risk of pancreatic cancer. (ii) Additional studies have also illustrated the potential role of periodontal disease as a risk factor for cardiovascular and cerebrovascular diseases,iii preterm birth iv and certain cancers.v In addition, bacteria have been implicated in the pathogenesis of pancreatic diseases including autoimmune pancreatitis and pancreatic ductal adenocarcinoma. (vi)

Periodontal diseases are a group of bacterial inflammatory diseases of the supporting tissues of the teeth (gingiva, periodontal ligament, cementum and alveolar bone); these diseases are produced by certain bacteria encountered in subgingival plaque. The most important and most prevalent anaerobic gram-negative bacteria in the subgingival area are *Aggregatibacter actinomycetemcomitans* (Aa), *Porphyromonas gingivalis* (Pg), *Prevotella intermedia* (Pi), and *Tannerella forsythensis* (Tf). These bacteria play an important role in the onset and subsequent development of periodontitis, participating in the formation of the periodontal pocket, connective tissue destruction, and alveolar bone resorption by means of an immunopathogenic mechanism. Once periodontitis has been established, an inflammatory infiltrate is formed consisting of different kinds of cells, such as macrophages and lymphocytes that will produce different cytokine subtypes, biological mediators responsible for the immunopathology of different illnesses. (vii)

Periodontal diseases range from simple gingival inflammation to serious disease. Those results in major damage to the soft tissue and bone that support the teeth. Periodontitis is an inflammation of the periodontium caused by a microbial biofilm that adheres to the tooth's surface. It is characterized by a progressive loss of alveolar bone around the teeth, and, if untreated can lead to tooth loss. PD is a common chronic disease and a major health problem worldwide, affecting about half of adult populations. (viii)

Diagnosis is the recognition of the presence of a disease. (ix) Clinical diagnosis of periodontal disease is made by the recognition of various signs and symptoms in the periodontal tissues which herald a departure from health. The diagnosis of periodontal disease demands a firm knowledge of what constitutes periodontal health. The healthy periodontium, (x) of which only the gingival tissues may be directly observed, is described as being stippled, pale pink or coral pink, in the Caucasian, with various degrees of pigmentation in other races. It is tightly adapted to the underlying tissues, with a knife edge margin where it abuts the tooth; the gingival margin is located, in the absence of pathology, at the cemento-enamel junction. It displays a scalloped edge configuration highest interdentally, where it constitutes the interdental papilla and lowest buccally and lingually. There is a gingival crevice where it

abuts the tooth which in health is 1–3 mm deep. There is an absence of bleeding from the crevice on gentle probing. The crevice in health will show a small amount of interstitial fluid, gingival crevicular fluid. (xi) The lateral wall of the crevice constitutes the free gingival margin. From the most apical extent of the free gingival to the mucogingival junction is the attached gingival which varies in width from 1 to 9 mm and has a stippled surface. It is an immobile tissue tightly bound down to the bone as a mucoperiostium and is a keratinized mucosa well suited to resist injury. Apical from the mucogingival junction and continuous with the lining mucosa of the mouth is the alveolar mucosa, which is freely mobile and surmounted by a non-keratinized epithelium. It is generally thought that alveolar mucosa functions poorly as a marginal tissue and areas where there is lack of attached gingival may constitute mucogingival problems. Departures from this concept of the healthy periodontium may suggest the presence of disease. (xii)

Appropriate Headings

Literature Review

There are many studies indicating that cancer patients are manifested with poor oral health:

Dominique S. Michaud, et al “A Prospective Study of Periodontal Disease and Pancreatic Cancer in US Male Health Professionals “Two previous cohort studies reported positive associations between tooth loss or periodontitis and pancreatic cancer risk. Data on periodontal disease were obtained at baseline and every other year thereafter in a cohort of 51 529 male health professionals aged 40 – 75 years. A total of 216 patients were diagnosed with incident pancreatic cancer during 16 years of follow-up. Multivariable relative risks (RRs) and 95% confidence intervals (CIs) were estimated using Cox proportional hazards models controlling for potential confounders, including detailed smoking history. All statistical tests were two-sided. Compared with no periodontal disease, history of periodontal disease was associated with increased pancreatic cancer risk (overall, multivariable RR = 1.64, 95% CI = 1.19 to 2.26; P = .002; crude incidence rates: 61 versus 25 per 100 000 person-years; among never smokers, multivariable RR = 2.09, 95% CI = 1.18 to 3.71; P = .01; crude incidence rates: 61 versus 19 per 100 000 person-years). In contrast, baseline number of natural teeth and cumulative tooth loss during follow-up were not strongly associated with pancreatic cancer. The association between periodontal disease and increased risk of pancreatic cancer may occur through plausible biologic mechanisms, but confirmation of this association is necessary. (XV)

In January 2007, a group of Harvard investigators published some research suggesting that periodontal disease as a marker of a susceptible immune system may increase the risk for pancreatic cancer. Investigation of this possible association is in its infancy but preliminarily it appears that periodontal disease and pancreatic cancer may be linked by an underlying mechanism that is inflammatory driven.

An understanding of this potential relationship may help dental practitioners to better educate their patients on the potential ramifications of systemic inflammation in the oral cavity relative to diseases of the digestive tract. While many unknowns still exist related to the etiology, diagnosis, and treatment of pancreatic cancer, this challenging disease may be prevented through aggressive changes in behavior and lifestyle. Greater awareness among dental practitioners regarding the various risk factors associated with this lethal type of cancer and preventive measures may provide an additional, albeit nontraditional, opportunity for identifying those at risk for pancreatic cancer.

The first hypothesis¹ is that periodontal disease may promote pancreatic carcinogenesis through inflammation. The investigators cite earlier reports that plasma C-reactive protein (CRP) levels an important biomarker of systemic inflammation were consistently higher in subjects with a history of periodontal disease than those with no history. An alternative hypothesis is that periodontal disease may influence pancreatic carcinogenesis through increased generation of carcinogens, specifically nitrosamines. Nitro - samines are known to induce pancreatic cancer in animals and are considered potential carcinogens in human pancreatic cancer. Approximately 45% to 75% of nitrosamine formation is endogenously formed by salivary and gastrointestinal bacteria. The formation of nitrosamines in the oral cavity of individuals with poor oral hygiene is eight times higher than in individuals with good oral hygiene. Also, periodontal disease and poor oral hygiene are associated with higher levels of oral bacteria and elevated nitrosamine levels within the oral cavity. As such, this relationship may place certain individuals at greater risk because nitrosamines and gastric acidity may play important roles in pancreatic cancer. (xvi)

Omer Dizdar, et al , “Increased cancer risk in patients with periodontitis Patients” diagnosed with moderate to severe periodontitis by a periodontist between 2001 and 2010 were identified from the hospital registry. Patients younger than 35 years of age or with a prior cancer diagnosis were excluded. The age- and gender-standardized incidence rates (SIR) were calculated by dividing the number of observed cases by the number of expected cases from Turkish National Cancer Registry 2013 data. The main findings are: A total of 280 patients were included (median age 49.6, 54% female). Median follow-up was 12 years. Twenty-five new cancer cases were observed. Patients with periodontitis had 77% increased risk of cancer (SIR 1.77, 95% CI 1.17–2.58, p = .004). Women with periodontitis had significantly higher risk of breast cancer (SIR 2.40, 95% CI 0.88–5.33) and men with periodontitis had significantly higher risk of prostate cancer (SIR 3.75, 95% CI 0.95–10.21) and hematological cancers (SIR 6.97, 95% CI 1.77–18.98). (xvii)

Velly et al. (1998), examined the relationship between dental health variables and the risk of upper aerodigestive tract (UADT) cancers. The study population included 717 cases (cancers of mouth, pharynx, and larynx) and 1434 controls, matched for age, gender, period of admission, and study site. Tobacco and alcohol consumption, diet, and sociodemographic variables were taken into consideration. It was concluded that poor oral hygiene due to infrequent tooth brushing and sores caused by dentures

are risk factors for cancer of the mouth and these associations are unlikely to be due to the insufficient control of confounding factors. (xviii)

Stolzenberg-Solomon et al (2003), investigated prospectively, the relation between dentition history and pancreatic cancer and the association between dentition history and H. pylori seropositivity, in a cross-sectional sample of subjects without cancer (n = 475) from the same cohort. It was seen from this study that tooth loss was associated with pancreatic cancer, but not associated with H. pylori seropositivity. (xix)

Chang et al., in 2006 studied a total of 139,805 subjects with PD and 75,085 subjects without PD were identified from the National Health Insurance Research Database of Taiwan. Cox proportional hazards regression was performed to compare the incidence of pancreatic cancer between the 2 groups. Their results indicated a significantly positive association between PD and risk of pancreatic cancer. The underlying biological mechanisms for the positive association between PD and pancreatic cancer require further investigation. (xx)

In 2015; study by Mesut Öğrendik hypothesizes that the peptidyl arginine deaminase (PAD) enzymes found in oral bacteria may be responsible for the p53 point mutations that occur in patients with pancreatic cancer, based on evidence that the prevalence of pancreatic cancer is very high in patients with chronic pancreatitis, with an incidence that is 160% greater than what is seen in healthy individuals. (ii)

P. Maisonneuve et al., 2017 from an initial review of 327 references they selected eight studies concerning periodontitis or edentulism with sufficient quantitative information to allow us to examine the risk of PC. We used relative risks (RRs), hazard ratios, or odds ratios to measure the association between periodontitis, edentulism, and PC. They employed random effects models to obtain summary risks, and they also provide measures of study differences and possible biases. Using meta-analysis, both periodontitis and edentulism appear to be associated with PC, even after adjusting for common risk factors. As yet, the mechanisms linking oral disease and PC are uncertain, but could be related to changes in the oral microbiome—an area of current research (Italy). (xxi)

Fitzpatrick et al., concluded that the most consistent increased risk was noted in studies of oral and esophageal cancers and periodontal disease. Gastric and pancreatic cancers had an association in most but not all studies. Lung, prostate, hematologic and other cancers were less consistently associated or did not have sufficient studies to determine a predictable pattern. Studies to date indicate a positive correlation between several forms of cancer and periodontal disease.xxii By Comlan Missih in 2013, there were strong evidence linking periodontal disease or missing teeth with oral cancer, with some studies showing an increased risk with more missing teeth. Pancreatic cancer also showed strong association with periodontal disease. However, in the Michaud et al. 2007 study, the sample was limited to health professional males, which might not be a good generalization. Regarding the risk association

with overall cancer, Cabrera et al. and Tu et al. have found no significant association between cancer mortality and increased number of missing teeth, while Hujoel et al. and Michaud et al. have depicted a significantly increased risk overall of cancer for patients with a history of periodontal disease after controlling for smoking. It is important to point out the possible confounding factors affecting the association between periodontal disease and various cancer risks. Smoking, socioeconomic status, diabetes, age, gender, and ethnicity along with genetics constitute the most common potential confounding factors affecting cancer risk. Dietary factors have been also mentioned in some studies, because patients who have lost many teeth may be less able to include these foods in their diets, therefore eliminating their advantageous effects against cancer risk.

It has been suggested that carcinogenic metabolic by-products of periodontal disease might account for the relationship between the two diseases. Nitrosamines have been linked to cancers of the stomach, pancreas, and esophagus. Furthermore, the presence of inflammatory cells and mediators such as chemokines, cytokines, and prostaglandins associated with tumors represent the main indicators. (xxiii)

In a review by Haladyj et al., (2016) recent studies suggest that there is a plausible correlation between periodontitis and its influence on general health. By increasing systemic inflammatory response, which does not expire as long as inflammation of periodontal tissue endures, periodontal diseases may induce the increased risk of systemic diseases. Studies found a positive correlation between periodontitis and its impact on development of pancreatic cancer. The relationship between inflammatory periodontal disease and an increased risk of pancreatic cancer is not yet fully understood; therefore, further researches are warranted. The paper discusses the potential mechanisms that combine both entities and affect each other. It also presents results of recent studies showing a link between periodontitis and an increased risk of pancreatic cancer. (xxiv)

Materials and Methods

The cross-sectional descriptive hospital-based study was conducted in Khartoum state, Sudan within the period from December 2017 to October 2018 among pancreatic cancer patient, Ibn Sina teaching Hospital who has been diagnosed with pancreatic cancer and included both genders. The study sample size full coverage due to very small study population (50 patients). The aim was to determine the highest score applicable to each sextant with the least number of measurements. First the sextant which can be validly scored or measured was decided. The requirement was that more than one functional tooth is present. If _no', then it was scored _X'and moved to next sextant. If _yes', Index teeth were examined (in epidemiological procedure), or all teeth were examined (for clinical screening procedure), for presence of 6 mm or deeper pockets, 4 or 5 mm deep pockets, calculus or other plaque retentive factor, bleeding only, in that order.

Data entered, cleaned, and analyzed using SPSS version 25.0. Descriptive statistics in term of frequency tables with percentages and graphs. Means and standard deviations presented with relevant graphical representation for quantitative data. Bi-variable analysis to determine the associations between the main outcome variable (prevalence of work-related musculoskeletal problems) with Chi square test (for categorical variables) and t- test (quantitative variables) statistical tests. P value of 0.05 or less is considered statistically significant. Data represented after analysis in form of univariable tables, cross tabulation (bi variable tables), figures and narrative illustration.

Results

As a result of the clinical study, in patients diagnosed with pancreatic cancer, using CPI the most frequently diagnosed with periodontitis score 3 (at least one mm 4-5 PD) was 42%. The less frequent was diagnosed with no periodontitis score 0 (healthy tissue) was 23%. The least frequent diagnosis with periodontitis score 4 (at least one mm 6 PD of < or) was 21.30%, and another least frequency was diagnosed with periodontitis score X (missing) was 12.7%. Periodontitis of score 2 (calculus) was only 1.0% in pancreatic cancer patients. The bleeding was not found among patients with pancreatic cancer. (Table 1)

Chi-square=20.560 and P-value=0.001 is less than significant level =0.05 this means that there is significant association between CPI and the age group ,but there is no association between CPI and gender Chi-square=1.20 and P-value=0.945 is greater than significant level =0.05 ,also there is no association between CPI and marital status; Chi-square=3.821 and P-value=0. 576 is greater than significant level =0.05.

Results show there is no significant relation between CPI and frequency of tooth brushing Chi-square=9.850 and P-value=0.454 is greater than significant level =0.05. Chi-square=7.852 and P-value=0.797 is greater than significant level =0.05 this means that there is no association between CPI and the Occupation. Chi-square=4.837 and P-value=0.436 is greater than significant level =0.05 this means that there is no association between CPI and the pre-operative and post-operative (table 2).

Scp Frequencies				
		Responses		Percent of Cases
		N	Percent	
Scp ^a	Healthy tissue	69	23.0%	138.0%
	calculus	3	1.0%	6.0%
	At least one PD 4-5 mm	126	42.0%	252.0%

	At least one PD of 6 mm or >	64	21.3%	128.0%
	missing	38	12.7%	76.0%
	Total	300	100.0%	600.0%
a. Group				

Table 1

\$cp*marital Crosstabulation					
			material status		Total
			Married	not married	
CPI	Healthy tissue	Count	52	17	69
		% within \$cp	75.4%	24.6%	
		% within material	130.0%	170.0%	
		% of Total	104.0%	34.0%	138.0%
	calculus	Count	2	1	3
		% within \$cp	66.7%	33.3%	
		% within material	5.0%	10.0%	
		% of Total	4.0%	2.0%	6.0%
	At least one PD 4-5 mm	Count	97	29	126
		% within \$cp	77.0%	23.0%	
		% within material	242.5%	290.0%	
		% of Total	194.0%	58.0%	252.0%
	At least one PD of 6 mm or >	Count	55	9	64
		% within \$cp	85.9%	14.1%	
		% within material	137.5%	90.0%	
		% of Total	110.0%	18.0%	128.0%
missing	Count	34	4	38	
	% within \$cp	89.5%	10.5%		
	% within material	85.0%	40.0%		
	% of Total	68.0%	8.0%	76.0%	

Total	Count	40	10	50
	% of Total	80.0%	20.0%	100.0%
Percentages and totals are based on respondents.				
a. Group				

Table 2

\$cp*Occupation Crosstabulation^a								
			Occupation					Total
			Farmer	Free bussines	worker	no work	empl oye e	
Healthy tissue	Count	16	5	12	30	6	69	
	% within \$cp	23.2%	7.2%	17.4%	43.5%	8.7%		
	% within Occupation	24.2%	27.8%	33.3%	18.5%	33.3%		
	% of Total	5.3%	1.7%	4.0%	10.0%	2.0%	23.0%	
calculus	Count	0	0	0	3	0	3	
	% within \$cp	0.0%	0.0%	0.0%	100.0%	0.0%		
	% within Occupation	0.0%	0.0%	0.0%	1.9%	0.0%		
	% of Total	0.0%	0.0%	0.0%	1.0%	0.0%	1.0%	
At least one PD 4-5 mm	Count	36	7	20	59	4	126	
	% within \$cp	28.6%	5.6%	15.9%	46.8%	3.2%		
	% within Occupation	54.5%	38.9%	55.6%	36.4%	22.2%		
	% of Total	12.0%	2.3%	6.7%	19.7%	1.3%	42.0%	
At least one PD of 6 mm or >	Count	12	3	3	42	4	64	
	% within \$cp	18.8%	4.7%	4.7%	65.6%	6.3%		
	% within Occupation	18.2%	16.7%	8.3%	25.9%	22.2%		

		% of Total	4.0%	1.0%	1.0%	14.0%	1.3%	21.3%
	missing	Count	2	3	1	28	4	38
		% within \$cp	5.3%	7.9%	2.6%	73.7%	10.5%	
		% within Occupation	3.0%	16.7%	2.8%	17.3%	22.2%	
		% of Total	0.7%	1.0%	0.3%	9.3%	1.3%	12.7%
Total		Count	66	18	36	162	18	300
		% of Total	22.0%	6.0%	12.0%	54.0%	6.0%	100.0%
Percentages and totals are based on responses.								
a. There are not enough (less than 2) multiple response groups for pairing. Percentages are based on responses, but no pairing is performed.								
b. Paired group								

Table 3

\$cp*operative Crosstabulation^a					
			Operative		Total
			post-operative	pre-operative	
\$cp^b	Healthy tissue	Count	33	36	69
		% within \$cp	47.8%	52.2%	
		% within operative	27.5%	20.0%	
		% of Total	11.0%	12.0%	23.0%
	calculus	Count	0	3	3
		% within \$cp	0.0%	100.0%	
		% within operative	0.0%	1.7%	
		% of Total	0.0%	1.0%	1.0%
	At least one PD 4-5 mm	Count	52	74	126
		% within \$cp	41.3%	58.7%	
		% within operative	43.3%	41.1%	
		% of Total	17.3%	24.7%	42.0%

At least one PD of 6 mm or >	Count	18	46	64
	% within \$cp	28.1%	71.9%	
	% within operative	15.0%	25.6%	
	% of Total	6.0%	15.3%	21.3%
X	Count	17	21	38
	% within \$cp	44.7%	55.3%	
	% within operative	14.2%	11.7%	
	% of Total	5.7%	7.0%	12.7%
Total	Count	120	180	300
	% of Total	40.0%	60.0%	100.0%
Percentages and totals are based on responses.				
a. There are not enough (less than 2) multiple response groups for pairing. Percentages are based on responses, but no pairing is performed.				
b. Paired group				

Table 4

Discussion

This cross sectional – analytic study was carried out on the population of patients diagnosed with pancreatic diseases which showed a strong correlation between the clinically observed periodontitis (measured with CPI index) and pancreatic cancer.

In a study carried out by Nwizu et al., exhibited Periodontal disease was not associated with cancers of the pancreas, liver, lower digestive tract organs, or lip, oral cavity, and pharynx combined. Similarly, there was no association with genitourinary, and lymphoid and hematopoietic malignancies.xxx

In this study, our patients were studied as one group; they exhibited higher level of periodontitis score 3 (attachment loss by 4-5 mm= 42%).

A study by observed that the risk of pancreatic cancer was significantly positively correlated with age ≥70 years, lower income, being registered with the angina pectoris, myocardial infarction, heavy smoking, high alcohol consumption, and less exercise. (xx)

In our study Chi-square=20.560 and P-value=0.001 is less than significant level =0.05 this means that there is significant association between CPI and the age group.

PD is the most-common inflammatory disease, and many of its known risk factors – sex, age, smoking, obesity, hypertension, and diabetes mellitus– are also considered to be risk factors for systemic cancer.ⁱⁱ

Data for the new study came from the Health Professionals Follow-Up Study, which began in 1986 and includes 51,529 U.S. men working in the health professions. Participants respond to questionnaires about their health every two years. After analyzing the data, the researchers confirmed 216 cases of pancreatic cancer between 1986 and 2002; of those, 67 reported periodontal disease. The results showed that, after adjusting for age, smoking, diabetes, bod mass index and a number of other factors, men with periodontal disease had a 63% higher risk of developing pancreatic cancer compared to those reporting no periodontal disease. "Most convincing was our finding that never-smokers had a two-fold increase in risk of pancreatic cancer, "said Michaud" ⁱⁱ

In the present study which conducted with 50 patients results that all the participants reported with a periodontitis according to CPI. The results showed that, after adjusting for age, gender, occupation, marital status, smoking, tobacco, diabetes, jaundice, hypertension, heart disease, and a number of other factors, 36 men with pancreatic cancer by 100% they were with a periodontal disease.

Several studies have reported a significant association between periodontitis and pancreatic cancer. Chang et al reported that periodontal disease was positively associated with pancreatic cancer risk among patients aged ≥ 65 years. (xx)

In our study there is significant association between CPI and the age group.

Oral mucosal lesions have multifactorial etiologies, including age, sex, race/ethnicity, tobacco use habits, use of removable dentures and oral mucosal pathologies.^{xxxi}

This present study showing that there is no association between CPI or gender or marital status.

In a study by Huang et al, for oral mucosal lesions, they observed a 70% and 30% excess risk of developing pancreatic cancer among individuals with Candida- related oral mucosal lesions or denture-related oral mucosal lesions, respectively, which were of borderline significance. (xxvii)

In the present study we didn't observed any oral mucosal lesion through patients with pancreatic cancer.

To examine whether the association between poor oral hygiene and pancreatic cancer was modified by sex, we assessed the relative risks separately for men and women and the results indicated no heterogeneity of the associations by out of Sweden, or end of follow-up (December 31, 2012), whichever came first. "Said Huang" (xxvii)

In the present study conducted with 36 males and 14 females the results revealed that Chi-square=1.20 and P-value=0.945 is greater than significant level =0.05 this means that there is no association between CPI and the gender.

Other potential confounding factors in study by Huang et al, were considered if they were risk factors from prior knowledge or appreciably changed the estimated association in the model, including tobacco use (non-tobacco user, pure smoker, pure snus user or mixed type user), alcohol consumption (low vs. moderate or high) and area of residence (rural, small municipality or town). In order to check the effect of residual confounding by tobacco use, we further performed a sensitivity analysis by adjustment of detailed tobacco use in the fully adjusted model. (xxvii)

In this study there were 2 patients reported that they were tobacco users, and they were represented 4% of our all participants.

Conclusion

In this cross sectional –descriptive hospital-based study, our findings support the linking between the periodontitis and pancreatic cancer in “Ibn Sina” hospital. The bleeding was not found among patients with pancreatic cancer. The calculus index was only 1.0% in pancreatic cancer patients. The pocket measured within CPI (score 3) represented 42% which was the higher frequency.

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