



Dairy Product Consumption and Chronic Obstructive Pulmonary Disease (COPD) in Moroccan population: Evidence from BOLD study

A. BENSLIMANE- laboratoire d'épidémiologie, recherche clinique et santé communautaire. Faculté de médecine et de pharmacie. Fès. Faculté des sciences Techniques. Fès.

B AMARA- Service de Pneumophtisiologie, CHU Hassan II de Fès

MC BENJELLOUN- Service de Pneumophtisiologie, CHU Hassan II de Fès

M. ELBIAZE- Service de Pneumophtisiologie, CHU Hassan II de Fès

C. NEJJARI- laboratoire d'épidémiologie, recherche clinique et santé communautaire. Faculté de médecine et de pharmacie Fès.

K. ELRHAZI- laboratoire d'épidémiologie, recherche clinique et santé communautaire. Faculté de médecine et de pharmacie Fès.

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Background:

Evidence suggested that dairy products have an important role in either the development or prevention of Chronic Obstructive Pulmonary Disease (COPD). But No study has been done in the Moroccan context. The objective of this study is to investigate the association between the consumption of dairy products and COPD in Moroccan population.

Methods:

A cross sectional study carried in Fez city, seven hundred sixty Moroccan Adults with acceptable spirometry were included in this study. the dietary habits and food intakes were

collected using an adaptation of the Moroccan Food Frequency Questionnaire (FFQ). The data were evaluated by binary logistic regression analysis, Student's t, and Chi-square tests.

Results :

Among 760 people with acceptable spirometry, 53.9% were women. The average age was 55.2 ± 10.20 years. 18,7% were Smokers and 8.6 % ex-smokers. The whole prevalence of COPD was 14.1%, The inverse association with the COPD risk were observed between the consumption of whole milk the adjusted odds ratio (OR) = 0.36, 95% CI [0.27 - 0.48], Unskimmed milk OR = 0.62, 95% CI [0.37 - 0.89], Soy Milk OR = 0.56, 95% CI [0.34 - 0.78], probiotic-rich yogurt OR = 0.4, 95% CI [0.20 - 0.73]. In addition, the risk of COPD increases with the consumption of skimmed milk, OR = 2.8, 95% CI [1.37 - 3.16].

Conclusion: The study provided evidence of an inverse association between dairy product consumption and the risk of COPD for Moroccan adults.

Introduction

COPD is a major public health issue and related to inflammatory conditions(1), The major risk factor for COPD recognized as cigarette smoking(2), but more than half of smokers do not develop COPD, (3)underling the involved of other risk factors. The modifiable risk factors such as diet have been paid little interest, moreover, there is little information about how their modification might contribute to the risk of developing COPD(4,5). although, most of the diet–lung research has interested on inflammatory dietary factors suggesting that nutrition interventions could offer potential alternatives to mediate the inflammation associated with these diseases. Dairy product was one of the relevant nutrients on inflammation and respiratory outcomes(6). Dairy products are stapling foods in most diets in Morocco, providing a major proportion of dietary energy and nutrients. They are composed of carbohydrates, mainly protein, and contributing to global terms of energy supply(7). Recent studies(6,8,9) have suggested that processed dairy product intake may adversely affect lung function and increase the risk of developing COPD. However, the role of dairy products in the pathogenesis of COPD is largely unknown. The aim of this study was to investigate Dairy products as risk factors, of chronic obstructive pulmonary disease (COPD) in the Moroccan population.

Methods:

The data come from BOLD study, a cross sectional study of risk factors prevalence of COPD which methodology has been described elsewhere(10). A sample of 767 persons aged 40 and over with acceptable spirometry were selected. A structured questionnaire was administered

face-to-face to obtain information on demographics, lifestyle and habitual food consumption. All participant underwent spirometry tests before 200 µg of salbutamol and after 15 minutes following the first use. Each spirogram had to meet the ATS and ERS criteria (11). The dietary habits and food intakes were collected using an adaptation of the Moroccan Food Frequency Questionnaire (FFQ)(12). all meals and drinks consumed were recorded in a 12-month period preceding the investigation. The quantities were evaluated from a book of photographs. A table gave the correspondence between the portion size and the weight of the food. Photographs of dishes and glasses with the corresponding volume were also available. Dairy product was derived from the Moroccan food composition tables(13). Sociodemographic data included age, gender, Smoking behaviors, and COPD classes. All statistical analyses were performed with SPSS (Version 20). Participants were classified in two categories according to the Global Initiative for Obstructive Lung Disease (GOLD 2017 Guidelines)(1) A post-bronchodilator FEV1/FVC ratio of < 70% for GOLD stage 1 or higher, unless the refers population. Demographic and clinical characteristics were compared between the two groups, we than explored association between different classes of dairy products. And, according to COPD status, Separate binary regression analyses were performed for each classes of dairy products.

Results:

Among 760 people with acceptable spirometry, 53.9% were women. The average age was 55.2 ± 10.20 years. Two third were aged less than 60. More than 72,8% were non-Smokers, and 18,7% were Smokers and 8.6 % ex-smokers. The whole prevalence of COPD was 14.1%, (6,6% for COPD Stage 1; 6,4% COPD Stage 2 and 1,1% COPD Stage 3 and 4) (Table 1).

Table 1: Demographic and clinical characteristics of Study population from BOLD Study, Fez N= 760

		N	%
Gender	Men	350	46,1
	Women	410	53,9
Age	40-50	241	31,7
	50-60	301	39,6
	60-70	139	18,3
	> 70	79	10,4

Smoking status	Smokers	65	8,6
	Ex-Smokers	142	18,7
	Non Smokers	553	72,8
COPD Status	Non-COPD	653	85,9
	COPD Stage 1	50	6,6
	COPD Stage 2	49	6,4
	COPD Stage 3	6	0,8
	COPD Stage 4	2	0,3

The mean intakes of whole milk, Skimmed milk, Unskimmed milk, Raib, Soy milk, yogurt and probiotic-rich yogurt were higher, in persons without COPD, Whereas Saykok and Semi skimmed milk,, were more consumed by COPD patient, in addition No association was observed between jben, lben and Soy yogurt (Table 2).

Table 2 : Association of Averages weekly consumption of dairy products with COPD status; BOLD Study Fez Morocco N=760

	Total		COPD -		COPD +		<i>P</i>
	Means	SD	Means	SD	Means	SD	
whole milk	25,32	18,78	25,62	18,68	23,45	19,39	0,04
Lben	6,20	9,23	6,23	9,48	6,02	7,54	0,08
skimmed milk	22,26	19,01	22,55	18,90	20,43	19,68	0,03
Semi skimmed milk	1,04	7,15	0,30	2,90	1,16	7,62	0,04
Unskimmed milk	1,02	6,70	1,09	7,04	0,56	4,08	0,02
Raib	2,43	4,23	2,51	4,37	1,94	3,20	0,04
Soy Milk	0,11	1,08	0,12	1,15	0,07	0,38	0,01
Saykok	2,72	4,04	2,67	4,09	3,05	3,70	0,03
Yogurt	5,50	8,38	5,85	8,8	3,35	4,55	0,01
probiotic-rich yogurt	2,26	5,33	2,39	5,65	1,46	2,57	0,04
Soy yogurt	0,67	2,38	0,67	2,41	0,65	2,19	0,3

The inverse association with the risk of COPD were observed between the consumption of whole milk the adjusted odds ratio being (OR) = 0.36, 95% CI [0.27 - 0.48], Unskimmed milk OR = 0.62, 95% CI [0.37 - 0.89], Soy Milk OR = 0.56, 95% CI [0.34 - 0.78], probiotic-rich yogurt OR = 0.4, 95% CI [0.20 - 0.73]. In addition, the risk of COPD increases with the

consumption of skimmed milk, OR = 2.8, 95% CI [1.37 - 3.16]. No association was observed between lben, Skimmed milk, Skimmed milk, raib, saykok, and Soy yogurt, and the risk of COPD (Table 3).

Table 3: Adjusted binary regression for Dairy products and the COPD risk N=760

	OR	95% CI
whole milk	0,36	(0,27 ; 0,48)
Lben	0,86	(0,56 ; 2,54)
skimmed milk	2,8	(1,37 ; 3,16)
Semi skimmed milk	0,79	(0,43 ; 2,23)
Unskimmed milk	0,62	(0,37 ; 0,89)
Raib	0,87	(0,71 ; 1,21)
Soy Milk	0,56	(0,34 ; 0,78)
saykok	0,95	(0,77 ; 2,67)
yogurt	1,45	(1,18 ; 5,85)
probiotic-rich yogurt	0,4	(0,20 ; 0,73)
Soy yogurt	0,98	(0,86 ; 4,57)

Discussion

In the BOLD cross sectional carried in Fez Morocco, The COPD risk were inversely associated of the consumption of whole milk the adjusted odds ratio being (OR) = 0.36, 95% CI [0.27 - 0.48], Unskimmed milk OR = 0.62, 95% CI [0.37 - 0.89], Soy Milk OR = 0.56, 95% CI [0.34 - 0.78], probiotic-rich yogurt OR = 0.4, 95% CI [0.20 - 0.73]. In addition, the risk of COPD increases with the consumption of skimmed milk, OR = 2.8, 95% CI [1.37 - 3.16].

Dietary patterns that include regular intake of high-quality foods(14), with high-protein food, are important for balancing muscle protein breakdown and synthesis. dairy products contain multiple nutrients and contribute significantly to meet the nutritional requirements for protein, calcium, magnesium, phosphorus, potassium, zinc, selenium, vitamin A, riboflavin, vitamin B-12, and pantothenic acid(15,16). dairy is still an important part of many western diets. However, The Mediterranean diet pyramid(17) establishes dietary daily, weekly and occasional guidelines in order to follow a healthy and balanced diet. A daily intake of Dairy products was Preferred in the form of low-fat yoghurt, cheese and other fermented dairy products. They contribute to bone health but can also be an important source of saturated fat(17). Despite these recommendations, >60% of the Moroccan population does not meet the dairy intake recommendation(18). However, due to nutrition transition(19) during the past

two decades, major alteration of the traditional MD pattern of the original diet in Morocco ; this transition is associated with an increased burden of non-communicable diseases.

The results of our study support the conclusion of several studies(8,14,15) suggesting a beneficial effect of some dairy products for human health, in a cohort study(8) Zhang et al suggest that dairy intake was related to a lower risk of cardiovascular disease, stroke, hypertension, colorectal cancer, metabolic syndrome, obesity and osteoporosis. Otherwise the results of a meta-analysis of prospective cohort studies(7,20), dairy consumption may be associated with reduced risks of Cardiovascular disease, In view of the consistent findings reported in the literature, little is known regarding the links of dairy products and the COPD risk. in fact, the lungs function consists in Gaz exchange, oxygen from incoming air enters the blood, and carbon dioxide, a waste gas from the metabolism, leaves the blood. A lung function disability means that the ability of lungs to exchange gases is reduced due to local inflammation(21). The balance between these potentially toxic substances and protective antioxidant defenses, including those derived from diet, may play a role in the progressive loss of lung function and the eventual development of COPD(21). Otherwise experimental studies(9) suggest that dairy products are good sources of high-quality protein uses during weight loss and subsequent weight maintenance due to the high satiating effect which helps to prevent over-consumption of energy and thereby reduces body fat stores(6)

Conclusion

Consumption of dairy products is associated with an overall reduced risk of COPD, whereas only very few components have the adverse effect. Dairy products may therefore have the potential to reduce the burden of the COPD. although prospective cohort studies are limited, growing evidence suggests a deleterious role of Dairy product on the risk of COPD. Mechanistic studies (e.g., prospective studies with biomarkers) are lacking, and researchers have not yet been able to determine the key factor linking Dairy product intake and COPD. Potential interactions between processed meat consumption with healthy diet and smoking have been reported, suggesting a potential role of Dairy intake in the pulmonary oxidant/antioxidant balance and inflammation.

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