CASE STUDY 2: RISK OF CARDIOVASCULAR DISEASE AMONG OSTEOARTHRITIS PATIENTS

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INTRODUCTION

- Osteoarthritis (OA) is a common musculoskeletal disorder that greatly influence people's life physically and mentally.
- Although the association between cardiovascular disease (CVD) and OA are well documented among older adults (> 65 years), this evidence is limited among younger adult population.
- In addition, current literature has mostly ignored the interactions of the risk factors.

OBJECTIVES

- This study AIMS to determine the relationship between OA and CVD among young and middle aged adults (20-64 years).
- Does the relationship between OA and CVD vary (a) between participants living in the northern parts of Canada versus those living in the southern parts, (b) between men and women, (c) by marital status, or (d) by recency of immigration?
- Does the results change when missing values for the 'household income' are imputed? Which assumptions do you have to make to perform such an analysis?

DATA MANAGEMENT AND TOOLS

- Data was from the Canadian Community Health Survey (CCHS) 1.1 (2000/2001), 2.1 (2002/2003) and 3.1 (2004/2005). CCHS provides nationally representative data on health determinants, health status and health system utilization.
- Age, gender, marital status, race, length of time since immigration, province, body mass index (BMI), education, household income, diabetes, high blood pressure (HBP), lifestyle factors (alcohol usage, smoke, and physical activity), self-perceived stress, and access to a regular medical doctor were risk factors considered for analysis.
- Adults were included if they had information on CVD and OA.
- Self-reported CVD and OA were the outcome and primary exposure respectively.

METHODOLOGY

RESULTS/ANALYSIS

TABLE 1: Weighted Summary Statistics from CCHS dataset.

Variables	Prevalence CI (95%)	Variables	Prevalence CI (95%)
BMI		Drinker habit	
Under weight	4.37%[0.042-0.045]	Regular	66.86% [0.665-0.671]
Normal weight	46.98% [0.466-0.473]	Occasional	17.22% [0.169-0.174]
Obese	48.64% [0.483-0.489]	Former	9.93% [0.097-0.101]
		Never	5.99% [0.058-0.061]
Gender		Province	
Female	49.61% [0.493-0.499]	North	0.30% [0.002-0.003]
Male	50.39% [0.500-0.507]	South	99.70% [0.996-0.997]
Age		Smoking Status	
20 – 34yrs	34.21% [0.339-0.345]	Non-smoker	33.65% [0.333-0.339]
35 – 49yrs	39.76% [0.394-0.400]	Current-smoker	26.98% [0.267-0.272]
50 – 64yrs	26.04% [0.257-0.263]	Past smoker	39.37% [0.390-0.396]
Osteoarthritis	6.80% [0.066-0.069]	Cardiovascular disease	2.46% [0.023-0.025]
High blood pressure	9.99% [0.098-0.101]	-	-
	Crude OR		
Osteoarthritis	2.82 (2.63-3.03)		

TABLE 2: Odds ratio's of the interactions of Osteoarthritis and Drinking status/ High blood pressure before imputation.

Interactions	ORs CI (95%)
No OA & regular	ref
No OA & occasional	1.30 (1.19-1.43)
No OA & former	1.48 (1.34-1.63)
No OA& never	1.27 (1.05-1.53)
OA & occasional	1.83 (1.52-2.19)
OA& never	2.08 (1.73-2.50
OA &former	1.78 (1.40-2.27)
No OA & No HBP	ref
No OA & HBP	4.68 (3.44-6.26)
OA & No HBP	1.40 (1.21-1.62)
OA & HBP	6.51 (4.65-9.11)

TABLE 3: Odds ratio's of the interactions of Osteoarthritis and Drinking status/ High blood pressure after imputation.

Interactions	ORs CI (95%)
No OA & regular	ref
No OA & occasional	1.29 (1.19-1.39)
No OA & former	1.48 (1.37-1.60)
No OA& never	1.22 (1.05-1.43)
OA & occasional	2.00 (1.72-2.34)
OA &former	2.31 (1.97-2.70)
OA& never	1.91 (1.56-2.33
No OA & No HBP	ref
No OA & HBP	4.49 (3.51-5.75)
OA & No HBP	1.56 (1.38-1.76)
OA & HBP	7.00 (5.30-9.24)

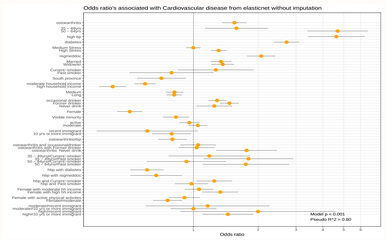
TABLE 4: Gender Specific Odds Ratios (ORs) from the complete case dataset.

Males	ORs CI (95%)	Females	ORs CI (95%)
Drinker habit		Drinker habit	
Occasional	1.33 (1.18-1.51)	Occasional	1.29 (1.12-1.48)
Former	1.43 (1.26-1.61)	Former	1.58 (1.35-1.85)
Never	1.13 (0.85-1.51)	Never	1.41 (1.10-1.80)
Smoking status		Smoking status	
Current smoker	1.33 (0.75-2.35)	Current smoker	1.23 (0.70-2.17)
Past smoker	0.53 (0.26-1.09)	Past smoker	1.06 (0.59 -1.88)
Age		Age	
35 – 49yrs	1.63(1.00-2.64)	35 – 49yrs	1.55 (0.98 -2.43)
50 – 64yrs	5.90 (3.70-9.41)	50 – 64yrs	3.52 (2.27 -5.44)
Osteoarthritis	1.37 (1.14-1.64)	Osteoarthritis	1.92 (1.60-2.30)
Diabetes	2.48 (2.09-2.94)	Diabetes	2.97 (2.39-3.69)

TABLE 5: Gender Specific Odds Ratios from the imputed dataset.

Males	ORs CI (95%)	Females	ORs CI (95%)
Drinker habit		Drinker habit	
Occasional	1.31 (1.18-1.46)	Occasional	1.27 (1.13-1.42)
Former	1.44 (1.29-1.59)	Former	1.54 (1.36-1.75)
Never	1.13 (0.89-1.45)	Never	1.31 (1.07-1.60)
Smoking status		Smoking status	
Current smoker	1.11 (0.79-1.56)	Current smoker	1.08 (0.81-1.43)
Past smoker	0.79 (0.54-1.16)	Past smoker	0.80 (0.58 -1.09)
Age		Age	
35 – 49yrs	1.63 (1.19-2.23)	35 – 49yrs	1.33 (1.03 -1.73)
50 – 64yrs	5.70 (3.27-7.61)	50 – 64yrs	2.65 (2.08 -3.37)
Osteoarthritis	1.45 (1.24-1.70)	Osteoarthritis	1.94 (1.66-2.27)
Diabetes	2.53 (2.19-2.94)	Diabetes	2.91 (2.42-3.51)

FIGURE 1: Odds ratios associated with CVD from elasticnet without imputation.



DISCUSSION & CONCLUSION

- OA presence is statistically associated with higher risk of cardiovascular disease, and this relationship was modified by gender, high blood pressure and drinking types.
- There is evidence of a protective effect for drinking in the study. The inverse association between moderate alcohol consumption and coronary heart disease is well established from previous literature [1-2]. It may be because alcohol was found to potentially help heart health for improving high-density lipoprotein cholesterol.
- It was found out that the interaction of province, recency of immigration and marital status with OA was not significant. Hence after assessing for confounder it was realized that they were not confounders, therefore there was no variation amongst the province, recency of immigration and marital status.
- It was realized that in the complete case, males who are past smokers were protective from CVD as compared to females who were past smokers. However, after imputation it was realized that past smokers were protective from CVD in both male and female.
- Key strengths of this study is using a large and representative sample from the Canadian population.

LIMITATIONS

- This study was limited for its cross-sectional design and self-reported data. Multiple imputation is needed for further investigation
- We assumed the missing values for household income was missing at random (MAR) and performed regression imputation in our analysis.

REFERENCES

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