CONFOUNDING PROJECT(COURSERA)

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A case-control study explored the association between sedentary occupation and coronary heart disease (CHD). 500 individuals diagnosed with CHD and 500 controls without a CHD diagnosis were recruited in the study and were asked about their physical activity in the workplace over the past decade. Those who spent 90% of their working time seating were classified as having a sedentary occupation.

Among those with CHD, 300 were 60 years of age or above and the remaining 200 were younger than 60 years. 45 individuals with CHD who were younger than age 60 and 140 individuals with CHD who were 60 or above were classified as sedentary.

Among those without CHD, 200 were 60 years of age or older and 300 were younger than 60. 45 individuals without CHD who were younger than age 60 and 70 individuals without CHD who were 60 or above were classified as sedentary.

CONFOUNDING CRITERIA

First we will calculate the crude odds ratio of the study, which is as follows:

	Cases(CHD+)	Controls(CHD-)	
Sedentary lifestyle	185	115	300
Non sedentary lifestyle	315	385	700
	500	500	1000 (Grand Total)

The chi-square statistic (X^2) is 23.3333. The p-value is < 0.00001. Significant at $p < .05$.

Crude Odds Ratio is 1.96. This means that people with a sedentary lifestyle are 1.96 times likelier to develop CHD than those with a non-sedentary lifestyle.

No we shall establish the three Confounding criteria:

1) Is the extraneous variable (age), associated with exposure (sedentary lifestyle) in the source population (control group)?

We will construct a 2*2 table for this, which is as follows:

	Age (60 or above)	Age (60 or below)	
Sedentary lifestyle	70	45	115
Non sedentary lifestyle	130	255	385
	200	300	500 (Grand Total)

The chi-square statistic (X^2) is 27.1033. The p-value is < 0.00001. Significant at $p < .05$.

Odd ratio of the above table is 2.69, meaning that people with sedentary lifestyle are likely to be 2.69 times above the age of 60. Hence, the answer is **YES.**

2) Is the extraneous variable (age), associated with the outcome (CHD), in absence of exposure (sedentary lifestyle)?

We will construct a 2*2 table of individuals having a non-sedentary lifestyle, which is as follows:

	CHD present	CHD absent	
Age (60 or above)	160	130	290
Age (60 or below)	155	255	410

	315	385	700 (Grand Total)

The chi-square statistic(X^2) is 20.7007. The *p*-value is < 0.00001. Significant at *p* < .05.

Odds ratio for the above table is 2.02, meaning that non sedentary individuals aged 60 or above are 2.02 times likelier than individuals aged 60 or below to develop CHD. Hence, the answer is **YES.**

3) Is the extraneous variable (age), in the causal path between exposure (sedentary lifestyle), and outcome (CHD)?

NO, we have no reason to believe AGE is in the causal path between sedentary lifestyle and CHD i.e., exposure and outcome. This could have been true if sedentary lifestyle caused ageing and it was the age that caused CHD.

CONCLUSION:

Ageing is the CONFOUNDING FACTOR as it satisfies the three criteria for confounding as per the above mentioned results and explanations.

CHECKING CONFOUNDING VIA STRATIFICATION

In order to establish confounding via Stratification, we will construct two 2*2 tables, one for the age group 60 or above, and the other for the age group 60 or below, analyzing the relationship between sedentary lifestyle and CHD and calculating their respective ODDS RATIO

2*2 TABLE for Age group 60 or above

	CHD present	CHD absent	
Sedentary lifestyle	140	70	210
Non sedentary lifestyle	160	130	290

	300	200	500 (Grand Total)

The chi-square statistic(X^2) is 6.705. The *p*-value is .009614. Significant at *p* < .05.

Odds Ratio is 1.625 for this 2*2 table

2*2 TABLE for Age group 60 or below

	CHD present	CHD absent	
Sedentary lifestyle	45	45	90
Non sedentary lifestyle	155	255	410
	200	300	500 (Grand Total)

The chi-square statistic(X^2) is 4.5732. The *p*-value is .032476. Significant at *p* < .05.

Odds ratio is 1.64 for this 2*2 table.

CONCLUSION:

The odds ratios of the two strata, *'Individuals aged 60 and above'* and *'Individuals aged 60 and below'* are quite similar, and are different compared to the Crude Odds Ratio. Hence, Age is a confounding factor in this study and the confounding and been established by stratification.