

Question 3

Example 1:

Let C = central obesity (co), Y = hyperlipidemia (hl), and A = gender (gd).

By VE of of Medical BN, we have:

$$P(C = \text{yes} \mid Y = \text{yes}) = 0.788 = P(C = \text{yes} \mid Y = \text{yes}, A = \text{female}).$$

So separation is here. However,

$$P(Y = \text{yes} \mid C = \text{yes}) = 0.479 \neq P(Y = \text{yes} \mid C = \text{yes}, A = \text{female}) = 0.438$$

Example 2:

Let Y = gender (gd), C = hyperlipidemia (hl), and A = vegetable (vg).

By VE of Medical BN, we have:

$$P(Y = \text{female} \mid C = \text{yes}) = 0.571 = P(Y = \text{female} \mid C = \text{yes}, A = >500\text{g/d}).$$

So sufficiency is here. However,

$$P(C = \text{yes} \mid Y = \text{female}) \neq P(C = \text{yes} \mid Y = \text{female}, A = >500\text{g/d}).$$