Money Handling influences BMI: a survey of cashiers

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Money is a recent phenomenon in the evolutionary history of man and therefore no separate brain centre to handle money is likely to have evolved. The brain areas activated by food reward and money reward are extensively overlapping. Four brain centers namely striatum, amygdala, dopaminergic midbrain and premotor cortex, respond to both financial reward and food reward. Among the four brain centers, the first three respond to the presence of the reward regardless of its value, while the premoter cortex shows a linear response to the value of the reward [1]. In an experimental set-up, hunger was demonstrated to influence money related decisions and money related thoughts to influence hunger [2]. This suggests that the brain areas evolved for handling food related emotions are exapted to handle money and therefore there could be a neuronal cross-talk between food and money. If this is true then attitude and behavior related to money and wealth could influence obesity. We test here whether physical and mental act of handling money has any association with obesity.

Methods:

- a survey of 211 full time cashiers from Pune, Mumbai and Nagpur, India.
- Three potential influencing factors tested namely
  (i) ownership over the cash
  (ii) the amount of cash handled per day
  (iii) the total duration of cash handling job.
- Body mass index (BMI) and waist to hip ratio (W/H) as the obesity parameters.
- Medical history of hypertension, diabetes

Results:

- Among males, salaried cashiers had significantly lower mean BMI than owner cashiers (n1 = 79, n2 = 84, t = 3.9902, p = 0.0001) (Fig 1).
- Within salaried cashiers those who handled more cash per day (>INR 50,000/-) was significantly greater (males: n1 = 30, n2 = 49, t = 1.7341, p, one tailed = 0.0435; females: n1 = 21, n2 = 15, t = 3.8476, p = 0.0005).
- When corrected for age, BMI still showed a positive correlation with duration of cashiers job but when corrected for duration, age did not show significant effect (Fig 2). After correcting for total duration of sedentary service the BMI still significantly correlated with years of service as cashiers but correction for duration of service as cashier resulted in loss of significance of the correlation between duration of sedentary job and BMI (Fig 3).This suggests that duration of cashier job had specific effects not explained by age or sedentary nature of the job.

ANCOVA: BMI was significantly affected by sex and ownership. Females had a significantly greater mean BMI (25.12) than males (24.45 p = 0.027) and owners' mean BMI (25.78) was greater than salaried cashiers (23.7, p = 0.002). The amount of money handled marginally significant (high turnover 25.26, low turnover 24.35, p = 0.084) and so the duration of cash handling service (β = 0.057, p =0.065).

W/H was significantly affected by sex, amount of money handled and exercise. High turnover cashiers had significantly greater W/H (0.942 versus 0.905, p < 0.001). W/H was positively associated with exercise possibly owing reverse causation i.e. people with greater W/H have greater motivation or social pressure to volunteer for exercise. Owners had higher W/H (0.921) than salaried cashiers (0.912) but significance was marginal (p = 0.09). The model explained 18% of variance in BMI and 25% in W/H.

Conclusions:

All the three parameters related to money have detectable association with BMI and W/H. This supports the exaptation hypothesis [2,3]. The variance explained is small but not negligible for obesity which is affected by a large number of genetic and environmental factors. This raises a possibility that the neuronal effects of changing global economic structure is likely to be a contributor to the current obesity epidemic.

References:

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