

## Commentary

### **Title: Is obesity *actually* non-communicable?**

Author name and affiliation: Cain C. T. Clark <sup>1,2</sup>.

<sup>1</sup> University Centre Hartpury, HE Sport, Gloucestershire, UK.

<sup>2</sup> Sport, Exercise and Well-being Arena, University Centre Hartpury, Gloucestershire, UK.

Correspondence to: Dr. Cain Craig Truman Clark, Higher Education Sport, University Centre Hartpury, Gloucestershire, United Kingdom. Contact email address: [cain.clark@hartpury.ac.uk](mailto:cain.clark@hartpury.ac.uk)

## **Commentary**

### **Is obesity *actually* non-communicable?**

#### **Structured Abstract**

##### *Objectives*

Obesity, broadly speaking, is characterised by having a body-mass index above 30 kg.m<sup>2</sup>, and described as a non-communicable risk factor. Obesity levels in the UK (and worldwide) are consistently acknowledged as, and accepted to be an epidemic. Moreover, when defining an epidemic, its' severity and initial rate of increase depend upon the value of the Basic Reproduction Number ( $R_0$ ), and given the consistent rise in weight status over recent decades, obesity could be considered to be highly communicable. The objective was therefore to question the non-communicability of obesity.

##### *Methods*

A review of literature was conducted using online databases; Web of Science, PubMed and Google Scholar. A narrative short-communication was subsequently prepared on the topic of obesity and its potential communicability.

##### *Results*

Both familial and social transmission of obesity is apparent, and network phenomena are evidently relevant to the physiological and behavioural tenets of obesity.

##### *Conclusion*

A reclassification of obesity to being socially-communicable should be considered and adopted by clinicians, scientists and key-stakeholders, further considering this communicability during treatment and intervention.

#### **Keywords**

Obesity; epidemiology; infection; public health; risk factor

## **Manuscript**

### **Introduction**

Obesity, broadly speaking, is characterised by having a body-mass index above 30 kg·m<sup>2</sup>, and described as a non-communicable risk factor. The proportion of adults in the United Kingdom (UK) that are overweight or obese has risen from 57.6% to 68% in men, and from 48.6% to 58% in women between 1993 and the present day. This represents an estimated economic burden of £27 billion, with government predictions stating that almost half of the UK population could be obese by 2050, with an associated cost of £50 billion a year.<sup>1</sup> Obesity levels in the UK (and worldwide) are consistently acknowledged as, and accepted to be an epidemic. Moreover, when defining an epidemic, its' severity and initial rate of increase depend upon the value of the Basic Reproduction Number ( $R_0$ ), defined as the average number of new 'infections' generated.<sup>2</sup> If  $R_0 > 1$  an epidemic will occur and if  $R_0 < 1$  it will die out.<sup>2</sup> Therefore, given the consistent rise in weight status over recent decades, obesity could be considered to be highly communicable.<sup>2</sup>

### **Methods**

A narrative review of literature was conducted using online databases; Web of Science, PubMed and Google Scholar. Key search terms included; obesity; overweight; communicable; social interaction; family; familial; social. Key texts identified from the literature search were discussed accordingly.

### **Familial and Social Transmission**

Although literature is equivocal on the heritability of obesity, Whitaker, et al.<sup>3</sup> demonstrated that parental obesity more than doubles risk of adult obesity in under 10's, whilst children without obese parents represent a very low risk. In a seminal investigation, Christakis, et al.<sup>4</sup> highlighted the potential of familial transmission of obesity. For instance, should one sibling become obese, they are at a 40% higher risk of becoming obese.

In addition to familial transmission of obesity, societal ties are asserted to impact on the spread of an obesogenic environment. Overweight youth have been shown twice as likely to have overweight friends, supporting the network theory of homophily, in addition to weak associations between social position and weight status.<sup>5</sup> Christakis, et al.<sup>4</sup> examined person-to-person infection of obesity in 12, 067 people over three decades of follow up analyses, and highlighted discernible clusters of obese persons at every time-point. Furthermore, a person's

chance of becoming obese increases 57% if a friend becomes obese at any given interval. Notwithstanding, the veracity of Christakis, et al. <sup>4</sup> assertions have been questioned by Cohen-Cole, et al. <sup>6</sup>, although the datasets used for interpretation had “several important differences...” (Cohen-Cole, et al. <sup>6</sup>, pp 1383). Further evidence to support the notion of the communicability of obesity has been assimilated. Bagrowicz, et al. <sup>7</sup> noted that indices of body image and self-perception measured pre- and post-altering their social environment resulted in dissatisfaction with body size and self-image in less than two months. Verbatim reports suggest the influence of a highly obesogenic population was the cause. Further, Trogon, et al. <sup>8</sup> indicate that friends’ weight is significantly and strongly correlated with an adolescent’s own weight, even after controlling for factors such as; demographics, smoking status, birth weight, and own parental and household characteristics including parental obesity, with females being more susceptible to transmission.

## **Conclusion**

*The Good*: the communicability appears to operate in an omnidirectional fashion, with exercise and health conceivably conferring the same level of infection or spread. *The Bad*: the feasibility of controlling an epidemic critically depends on the value of the Basic Reproduction Number and the timeframe in which a person is contagious. We face an unprecedented truth that a person may be ‘contagious’ through the entire life course. *The Ugly*: network phenomena are evidently relevant to the physiological and behavioural tenets of obesity. We therefore hope to raise the ‘ugly’ question that, should a reclassification of obesity to being socially-communicable be considered and adopted by clinicians, scientists and key-stakeholders, further taking this communicability into account during treatment and intervention alike?

## **Conflict of Interest**

The author hereby declares that they have no competing nor conflict of interests to disclose.

## **References**

1. Baker C. *Obesity Statistics: House of Commons Briefing Paper*. 20<sup>th</sup> January 2017.
2. Kermack WO, McKendrick AG. A Contribution to the Mathematical Theory of Epidemics. *Proc R Soc Lond*. 1927;115(700-721).
3. Whitaker RC, Wright JA, Pepe MS, Seidel KD, Dietz WH. Predicting obesity in young adulthood from childhood and parental obesity. *The New England journal of medicine*. 1997;337(13):869-873.

4. Christakis NA, Fowler JH. The spread of obesity in a large social network over 32 years. *The New England journal of medicine*. 2007;357(4):370-379.
5. Valente TW, Fujimoto K, Chou CP, Spruijt-Metz D. Adolescent affiliations and adiposity: a social network analysis of friendships and obesity. *The Journal of adolescent health : official publication of the Society for Adolescent Medicine*. 2009;45(2):202-204.
6. Cohen-Cole E, Fletcher JM. Is obesity contagious? Social networks vs. environmental factors in the obesity epidemic. *Journal of health economics*. 2008;27(5):1382-1387.
7. Bagrowicz R, Watanabe C, Umezaki M. Is obesity contagious by way of body image? A study on Japanese female students in the United States. *Journal of community health*. 2013;38(5):834-837.
8. Trogdon JG, Nonnemaker J, Pais J. Peer effects in adolescent overweight. *Journal of health economics*. 2008;27(5):1388-1399.