

Analysis of the Influence of Social Networks on Human Health

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Abstract. Health issues are of critical importance in the global context, as they directly affect the quality of human life, economic prosperity and social stability. Health is not only the concern of individuals and societies, but also the shared responsibility of the international community. Maintaining and improving global health is one of the priorities of the global community. This paper uses literature analysis to analyze obesity and overweight, smoking and smoking cessation, and mental health status respectively, and studies the impact of social network on human health. At the same time, based on the social network theory, the intervention principle and related strategies are proposed. The results show that: There are three different social processes that connect the underground network with weight and its effect on behavior. They are social contagion, a sense of belonging, and homophily. Studying the phenomenon of youth smoking can help us understand adult smoking. Social homophily, peer and parental effects are crucial when considering smoking behavior. Focusing on social support, social influence, self-esteem, and belongingness forms the understanding regarding mental health. In addition, to achieve better health conditions, interventions should be carried out through the most influential person in a certain social network.

Keywords: Social networks, health issues, obesity and overweight, smoking, mental health.

1. Introduction

Health is of paramount importance as it affects virtually every aspect of our lives. Good health is the foundation of physical well-being. It allows us to carry out daily activities with ease, whether it's going to work, enjoying hobbies, or spending time with loved ones. Mental well-being enables us to manage stress, stay emotionally resilient, and maintain a positive outlook on life. Mental health issues can significantly impact our quality of life, making the maintenance of both physical and mental health crucial. Quality of life, productivity, medical expenses, and resilience are all based on good health. However, many people, especially young people, are increasingly ignoring the importance of health in recent years. They tend to trade off their own health to achieve some short-term returns. Irregular eating habits, often eating fast food, irregular work and rest, staying up late, and working overtime. These phenomena have resulted in increasingly serious health problems that cannot be ignored, forcing us to pay more attention to health issues.

In addition to some common health factors, such as genetic problems, lifestyle, eating habits, climate issues, etc., social networks can also greatly affect a person's health. Social network refers to an interconnected web of individuals, groups, or organizations who interact, communicate, and share information or experiences with each other through various means.

This paper will go through both physical and mental (two examples: obesity and smoking) health to illustrate how social networks influence people's health issues.

2. Obesity and overweight

Obesity rates have risen rapidly over the past few decades and have become a worldwide epidemic. This is not just a problem in one particular region or country but involves health challenges across the globe. Obesity is closely associated with multiple chronic diseases that not only pose a threat to patients' quality of life but also place a heavy burden on healthcare systems and economies. Obesity has huge social and economic costs. It increases healthcare spending, reduces labor productivity, leads to higher rates of absenteeism, and increases in mental health problems. Obesity is a global challenge that knows no borders because it affects the health of people in all countries and regions.

2.1. Social network and obesity

In addition to genetic causes, eating habits, and lack of exercise, social network is also an important factor in the problem of obesity and overweight. Interpersonal transmission of obesity may occur, for example, if a child lives with a recently divorced mother or with a single parent for more than 2 years, the risk of being overweight or obese increases. When parents re-form a family, their children tend to have healthier BMIs [1].

Powell et al. have studied forty-five relative papers about how social network influences obesity and overweight. In their final report, they divided and concluded all the social networks studied in the paper into six types. They are a couple of networks (people are spouses or partners); family members and friends (this includes co-workers); geographical neighbors; peers (including classmates, coworkers, people meeting in the same diet group, and so forth); people share the same public area; and ethnicity [2]. Normally, a person belongs to more than one social network group, thanks to the complexity and richness of people's lives. This means that a person can be described by many groups at the same time. There may be overlap between different groups. For example, the relationship between colleagues in the company can be either peers or friends. Powell et al. believe that there are three interrelated processes between social networks and weight change, namely social contagion [2]. The social network relationships in which people live will constantly affect their own body quality, or body quality will, in turn, affect their own behavior. Social capital (which is also known as the sense of belonging. The sense of belonging and support from the social network will affect one's body quality or body quality will affect one's behavior); and social selection (That is, the development of an individual's social network may be limited by an individual's weight status. At the same time, an individual's physical quality may be shaped by the social networks to which he or she belongs, as is often the case with networks of friends and family, peer networks, and groups that share a common culture) [2]. Figure 1 shows the relationship between these three processes.

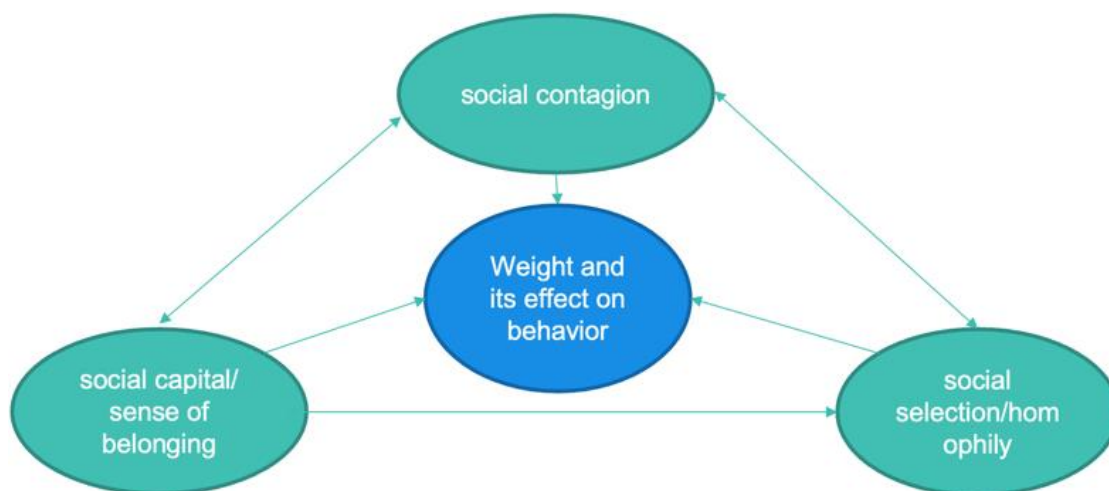


Figure 1. Processes linking social network and weight change

2.2. Social contagion

Social contagion can be regarded as a process in which some norms or aspirations spread in the social network and change the behavior of other people who also live in this network. People may have the desire to change themselves because of the behavior of others living in the same social network, and thus make the decision to change their current eating habits. For example, Befort et al. observed that women living in African Americans tend to follow their dominant food choices strictly. Anyone who differentiates the food practices suffers from tremendous pressure from their family members [3]. It is worth mentioning that an experiment in the USA done by Lemon et al. suggested that co-workers tend to imitate food habits from each other. This happens particularly in hospitals, where workers there are likely to follow those colleagues who maintain a healthy diet and exercise regularly [4].

2.3. Social capital

Sense of belonging especially in some specific parties' shapes people's weight to some extent. And weight would in turn affect people's behavior which also depends on culture. A survey in Canada illustrates that neighbors who have a strong sense of togetherness tend to work together to engage in behaviors that might change their weight [2]. Without sufficient social capital or the support that comes with a sense of belonging, obese and overweight people are more likely to struggle to lose weight.

2.4. Social selection

A survey found that obese undergraduates were more likely to choose partners among obese people [2]. Homophily, as a process, was only mentioned in a few previous papers. It is not common to see obese people are more likely to be isolated. But not as much as colored people.

3. Smoking

Smoking is a nonnegligible issue. On the one hand, it is closely linked to a range of serious health problems, including lung cancer, cardiovascular disease, and many types of cancer. In fact, smoking is considered one of the leading preventable causes of death worldwide. On the other hand, the smoking problem also leads to significant economic costs, including medical expenses, lost job productivity, and treatment costs for smoking-related diseases. This places a significant burden on the country's healthcare system and social economy. Nicotine, one of the ingredients in tobacco, is an extremely addictive substance that makes it difficult for many smokers to quit. The problem of smoking not only poses a risk to the health of individuals but also creates a great psychological and physical dependence. Smoking contributes to health inequalities and, at the same time, non-smokers may also be affected by the negative externality of smoking, particularly exposure to second-hand smoke from family members and the workplace. This leaves many smokers trapped in a state of unrecognized.

The phenomenon of smoking tends to be younger and younger in recent years, and young people have become one of the main smoking groups. Many smokers have been exposed to and addicted to tobacco since adolescence. This suggests that understanding adolescent smoking can go a long way toward understanding adult smoking behavior [5].

3.1. Social homophily

The social tie is worth mentioning when thinking about school smoking behavior. An investigation done by V. Lorant et al. showed that social ties were homophilous in terms of parental education. Children of higher-educated fathers display a lower likelihood of smoking than those whose fathers complete a lower level of education. Apart from that, lower socioeconomic status is often in line with a great chance of taking cigarettes. Suggesting the strong correlation between social status and homophily [5]. People of high social status are more likely to befriend people who are similar to them, and they are less likely to initiate contact with people of low social status. There are indications that young people of lower socioeconomic status are more likely to be heavy smokers than those of higher socioeconomic status. The difference was mainly related to having more friends who smoked. And homophily in a sense reduces and prevents the wider spread of smoking behavior.

3.2. Peer effect and Parental effect

The peer effect reflects different kinds of social connections. Teenagers are often influenced by the actions and choices of their peers. If someone in their friends or social circle smokes, they are more likely to mimic the behavior. It is worth noting that the popular individuals in a group often exert a great influence on other individuals. Young people tend to be more likely to smoke if they have a smoker partner who is popular on average. Conversely, smoking with an unpopular companion may have some negative effects. Besides, adolescents may feel excluded or seen as a loner if they do

not smoke in social situations. Therefore, in order to maintain social relationships, they may start smoking. Smokers always tend to be friends with smokers [5]. Smoking behaviors among peers can lead to the formation of smoking groups or circles. These smoking circles may provide opportunities to smoke, as well as positive identification with smoking behavior. Furthermore, when teenagers emerge at some less dense network, they are more likely to take cigarettes. Especially those isolated school-aged children, who show a significantly higher chance of smoking.

Parental effects have an effect on their offspring's choice of smoking as well. Teenagers tend to see their parents as important role models. If parents smoke, the next generation is more likely to imitate their behavior. Conversely, non-smoking parents can reduce the risk of their children starting to smoke. All these reasons play an important role in worsening health inequalities.

3.3. Smoking cessation

There is evidence that in the past few decades, many people have been aware of the adverse consequences of smoking and choose to quit smoking. Christakis and Fowler's study has proved that the prevalence of smoking cessation is profiting from social network connections. Through the continuous emergence of smoking quitters in the social network and the spread of radiation through the network connections, the original smokers are gradually marginalized, and then lose their influence. Their data suggested that a spouse who quits smoking makes a person 67% less likely to smoke, and a sibling who quits reduces the chance by 25%. The reduction in the chance of smoking by a friend was 36% and 34% by co-workers [6].

4. Mental health

There is a complex and profound relationship between social networks and mental health. The relationship includes both positive and negative aspects, depending on the context. On a positive note, social networking can be a platform for self-expression and emotional release. Some social networking sites like Facebook, allow users to share their emotions and experiences, which for some people helps with emotional management and mental health. On the other hand, social networks may also exacerbate social comparisons and group stress, which can lead to lower self-esteem and increased anxiety, with negative effects on mental health. Mental health problems are becoming one of the most severe and common public health problems in the world. It is closely related to every aspect of people's life. Obesity issues stated above can be an example here, overweight children or adolescents not only have difficulty getting support from their peers but are also more likely to be negatively evaluated by them. This can have a vital impact on the psychological state of obese individuals. Especially in the case of their young age, when their psychological bearing capacity is not complete. The data showed that compared with 1961, the difference between children and adolescents' liking for healthy and obese peers increased by 40.8%, indicating that the degree of discrimination towards obese peers increased remarkably [1].

Some scholars have summarized the mechanism of social network's influence on mental health into the following aspects: social support, including perceived social support and actual social support; social influence, including the pre-conscious sense of purpose and behavioral guidance provided by the internalized social role, the conscious behavioral adjustment made by the actor through comparison with the reference group, and the constraints imposed by other social members on the actor's behavior through direct social control; a sense of self-esteem, a positive evaluation of one's own worth, ability, and performance; a sense of belonging, the feeling of being accepted and recognized by a particular social group or circle [7].

4.1. Social support

There are two basic models that explain how social support affects mental health: the stress buffer model and the main effect model. The stress buffer model emphasizes the protective effect of social support on mental health, which is mainly reflected in the "extraordinary environment" where stress

is significantly increased. whereas the main effect model contradicts this constraint, it suggests that social support has a positive effect on mental health both in a "normal environment" with an average level of stress and in an "extraordinary environment" with a sudden increase in stress. In the context of given environmental stress, higher levels of social support always lead to higher levels of mental health. The research shows that both models can be supported by empirical material and can work together [7].

4.2. Social influence

The influence a person has in their social environment also affects mental health. In the case of college students, school is the ecosystem that has the greatest impact on them. The interpersonal relationships in school may directly contribute to the psychological state of college students. Studies have shown that if a student achieves a higher degree of centrality and influence in the school social process, and often plays the role of a medium in interpersonal communication, then he will get more information and resources and more social support in communication with others. A healthier mental state can be created with additional social support [8].

4.3. A sense of self-esteem

A study by Li about social networks and depression among Chinese aged over 50 displayed that people with low cognitive function or cognitive impairment are at higher risk for depression [9]. The decline in social networking can lead to a decline in cognitive function in the elderly, suggesting that the less frequently the elderly participate in social activities, the more likely they are to experience cognitive impairment. With the increase in age, the physical function of middle-aged and elderly people declines, and their participation in social activities will also decrease. In addition, the inability to live independently and the lack of social support also affect their self-judgment and self-esteem, which increases the likelihood of elderly people suffering from depression.

4.4. A sense of belonging

Social networks allow people to join groups with the same interests, which helps build a sense of belonging and provides emotional support and a sense of identity for individuals. A sense of belonging helps to enhance individual self-esteem and self-confidence. Knowing that you are part of a community, recognized and respected by others, helps to build a positive sense of self-identity. As mentioned earlier, more social support and self-identification can lead to a more positive mindset

5. Interventions

Over the past few decades, there have been some reports on population-based interventions and the promotion of physical activity and healthy eating, but few studies have been designed or analyzed from a social network perspective [1]. Using the relevant ideas of social networks can help people develop effective interventions dealing with health issues. This paper will provide two relevant principles. First, the target of the intervention will be more effective in groups than the individuals. Take adolescents as an example, school is where they spend the most time and energy in their daily lives. The vast majority of teenager's social networks are formed at school. This makes school qualifying a perfect place to launch interventions. Thanks to the valuable policy amplification effect brought by the behavioral spillover effect, schools can help teenagers develop good living habits by providing safe and reliable places for physical exercise and designing and developing team sports activities for children and teenagers to participate in with their peers and friends.[10] Second, the intervention should start with the most influential people or groups in the social network. Previous studies suggested that efficient network intervention choices depend on the availability of data, the behavior being studied, and the relevant social context. Some researchers have proposed using online data to develop planned change strategies. First, identify the key nodes in the social network structure. High-impact individuals within a given range are often targeted, such as those best suited to spread

or block a behavior. Next, the social network is segmented into many mutually exclusive sub-social networks based on the location of the nodes found. Finally, small-scale interventions are carried out, that is, to find key figures in these sub-networks and disseminate information. It is worth mentioning that when establishing a sub-network, you can optionally add some new nodes to connect the original loose network members [1].

6. Conclusion

Through the analysis of overweight and obesity, smoking and smoking cessation, and mental health problems, this paper illustrates the importance of social network in influencing human health. Among them, the interaction between the three processes of social contagion, social capital, and social selection jointly affects weight and its effect on behavior. As for smoking, the social network is mainly influenced by social homophily, peer effect, and parental effect. The combination of social support, social influence, self-esteem, and a sense of belonging construct the theory of the influence of social network on mental health. As obesity and smoking populations are getting increasingly younger, society should recognize the urgency of addressing health issues such as obesity and smoking around the world. At the same time, authorities around the world need to actively come up with ways to deal with the rapid aging of the population, the difficult life of the elderly, and the problem of depression.

This paper emphasized the role of social capital in influencing people's obesity, but people are still at a limit of understanding. More research is needed in the future to help people better understand how belonging affects overweight and obesity

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