Loneliness, Lifestyles, and Lockdowns: Effects on Health

The scientific evidence is convincing. Strong social ties are good for one's health.

Lubben (2017)

Abstract

Mother Teresa said: "the greatest disease in the West today is not TB or leprosy; it is being unwanted, unloved, and uncared for. We can cure physical diseases with medicine, but the only cure for loneliness, despair, and hopelessness is love..." Loneliness is a global phenomenon. Although more prevalent in the elderly, it is seen in all age groups. Contrary to logic, social media appears to have increased loneliness. Loneliness has several detrimental effects on human health. It is associated with a wide array of chronic diseases, contributing to their development, and often worsening their prognosis. Although there are several mechanisms involved in this harmful association, lower adherence to five healthy lifestyles is a major factor. These lifestyles include not smoking, not drinking alcohol in excess, maintaining adequate body weight, prudent diet, and regular physical activity. Unfortunately, unhealthy lifestyles have been aggravated by the recent COVID-19 pandemic. These relationships are reviewed in this manuscript.

Keywords: loneliness, social isolation, lockdown, smoking, obesity, alcohol intake, physical activity, diet

Introduction

Loneliness and social isolation are generating increasing attention, primarily because of the significant harm they inflict on human health[1,2]. Loneliness is a feeling that one's own social network is smaller than desired while social isolation is more representative of a feeling that one does not belong to or is being avoided by society[3,4]. In other words, one may feel lonely despite having good social relationships, while one may not feel lonely despite being socially isolated. In this manuscript, loneliness and social isolation are lumped together and referred to as 'loneliness'. Loneliness, a usually silent but distressful feeling, is ubiquitous in our world[5]. Its prevalence is on the rise[6]. It has been noted in all population groups and all age groups[7-9]. Periods of loneliness may affect as many as 80% of those under 18 years of age. Further, about one-third of those aged 60 years and over experience loneliness in later life[10,11]. A recent study in the United States of America (US) by Cigna, an insurance company. of adults aged 18 and older found that 46 percent reported "sometimes or always feeling alone"[12]. Loneliness is associated with poor health[13,14]. Loneliness is closely linked to cardiovascular diseases (CVDs)[15]. Cardiovascular disease remains the number one cause of mortality in the world[16]. Data from 16 longitudinal studies indicate that the relative risk for incident coronary heart disease and stroke in individuals with high versus low levels of loneliness was 1.29[17]**.** It has also been linked with obesity[18], several cancers[19,20], chronic obstructive pulmonary disease (COPD)[21], arthritis[22],

depression[23], dementia[24], and a host of other chronic diseases. Lonely individuals are also more susceptible to infectious diseases[26]. They usually report poor self-rated health[27] and a poor quality of life[28]. Their overall mortality is often premature[29,30]. In 2010, a meta-analysis revealed that the odds ratio for increased mortality for loneliness was 1.45, which is approximately double the odds ratio for increased mortality for obesity and quadruple the odds ratio for mortality related to air pollution[31]. Other studies have shown that loneliness confers a mortality risk that is greater or equivalent to that seen with smoking or alcohol abuse disorder[32]. Studies have also found loneliness-related rates of mortality like that from lack of physical activity[33]. Loneliness is also associated with a host of psychiatric disorders which include depression[34], anxiety[35], alcoholism[36], suicidal ideation[37], and aggressive behavior and impulsivity[38].

Diagnosis of loneliness is easy. The University of California, Los Angeles, Loneliness Scale-Version 3 (UCLA 3-item) is the most frequently used questionnaire to diagnose loneliness[39.] Results are also considered reliable with a single question, 'Do you feel lonely?" [40]. The negative effects of this global scourge have prompted several international associations to recommend remedial actions[41-44]. These include the Monalisa initiative in France[41], the RISE campaign in Canada[42], and the Australian coalition to end loneliness[43]. In the US, the American Association of Retired Persons (AARP) has launched a campaign called Connect2Affect[44] while the Institute on Aging offers a 24-hour toll-free Friendship Line (1-800-971-0016) for adults 60 and older to call when they're feeling lonely. Individuals that are socially integrated are healthier, happier, and live longer than those who are isolated[45].

Lifestyles play an important role in the morbidity and mortality of chronic diseases. These include smoking, alcohol consumption, physical activity, excess body weight, and diet. Loneliness negatively affects these lifestyles, thereby further harming both the physical and mental health. Loneliness-induced increase in unhealthy choices has been well documented by Shankar et al[46] (in the English Longitudinal Study of Ageing (ELSA) study), Hawkley et al[47], and more recently, by Malcolm et al[48]. Lonely individuals are also less compliant with selfcare[49], in seeking healthcare, and more likely to have poor adherence to prescribed medications[50]. They also face the risk of getting inferior healthcare due to provider bias (lonely individuals take too much time)[51]. The overall result is that lonely individuals cost more in healthcare to society[52].

The pandemic related to COVID-19 has brought mobility restrictions, quarantines/isolation, and social distancing. These have worsened the prevalence and severity of loneliness. In a recent study by Emerson, adults aged 40+ were significantly affected, with approximately, 30.9% of individuals stating that they were lonelier than before the pandemic[53]. This social isolation has imparted a significant harmful effect on the physical and mental health of individuals[54,55].

The aim of this manuscript is to provide a narrative review of the inter-relationships between loneliness, lifestyle behaviors, and COVID-19 related lockdown.

Discussion

Five healthy lifestyle factors are: never smoking, a body mass index 18.5-24.9, participating in moderate to vigorous physical activity (≥30 minutes/day), a moderate intake of alcohol (women: 5-15 g/day; men 5-30 g/day), and a higher quality of diet[56]. Healthy lifestyles are important for

good health[57-59.] They help increase disease-free lifespan[60-62]. Stenholm et al. noted that a disease-free life (without chronic diseases cardiovascular disease, cancer, respiratory disease, and diabetes) was increased in individuals with zero unhealthy lifestyles when compared to those with at least two unhealthy behaviors[60]. The CHANCES study also demonstrated an increase in disease-free life[60] in people following a healthy lifestyle[61]. This longer life expectancy free of major chronic diseases at midlife in these individuals was recently confirmed by Li and colleagues[62]. Lifestyles also impact mortality. Studies have shown that smoking, inactivity, poor diet quality, and heavy alcohol consumption contribute up to 60% of all premature deaths[63-68]. A recent study that looked at the data from the Nurses' Health Study (1980-2014; n=73,196) and the Health Professionals Follow-Up Study (1986-2014; n=38,366), confirmed that poor lifestyles accounted for a significant number of deaths[69]. In this study, 70% of cardiovascular mortality, and 50% of cancer mortality resulted from an unhealthy lifestyle. Since many of these deaths are premature, healthy lifestyles also increase longevity[56]. Li et al. estimated that the life expectancy at age 50 years was 79.0 years for women and 75.5 years for men with unhealthy lives. Adopting all five healthy lifestyles changed this to 93.1 years for women and 87.6 years for men[56] – a major increase in longevity.

To date, several psychological, biological, and behavioral pathways leading to poor health and increased mortality from loneliness have been identified[70,71]. Lonely individuals are under chronic stress[22]. They are often depressed[73] and demonstrate high anxiety levels[73]. This triggers several neuroendocrine responses that culminate in harm. These include HPA activation[74], sympathetic system hyperactivity[75], parasympathetic system dysfunction[76], increased blood levels of catecholamines[77], decreased glucocorticoid receptor sensitivity with higher cortisol levels[78], an alteration in the vascular resistance[79], and a proinflammatory immune response[80]. In some cases, there may be a genetic contribution[81]. These changes contribute towards the development or worsening of several chronic diseases[18-24].

Lonely individuals often have diminished self-regulation - an incapacity to adequately control their feelings, emotions, and behavior[82]. This enhances their noncompliance with healthy lifestyles[83-86]. Lacking support from social networks, family members, and neighbors, they also tend to underutilize/overutilize health care services[87] and often fail to follow health recommendations adequately[88]. On the flip side, lonely individuals that maintain good lifestyle behaviors demonstrate lower morbidity and mortality[89-91]. The worldwide lockdowns associated with COVID-19 have also impacted healthy behaviors. It has not only enhanced loneliness but also decreased compliance with a healthy lifestyle[92].

Smoking

Tobacco smoking, either with cigars, cigarettes, water pipes, electronic cigarettes, bidis, or via other methods[93-95] is associated with considerable harm[96]. Smoking increases the risk of a wide range of chronic diseases, including coronary artery disease[97], stroke[98], type 2 diabetes mellitus (T2DM)[99], cancer[100], chronic kidney disease (CKD)[101], and COPD[102]. Besides this increase in morbidity, smokers also face higher disability[103] and premature death[104]. It has been estimated that the smokers' life expectancy is on average is 10 years shorter than that of non-smokers[105]. Smoking exposes the smoker and others (second-hand and third-hand smoke inhalers) to several

thousand chemicals such as carbon monoxide, gaseous aldehydes, nicotine, polycyclic aromatic compounds, nitrosamines, and heavy metals[106]. Many of these are toxic and carcinogenic[107,108]. The estimated economic cost associated with smoking is almost 1.8% of global gross domestic product[109].

Lonely individuals were more likely to be smokers[110,111]. In a study of older English individuals, Kobayashi and Steptoe found that lonely individuals were more likely to smoke[112]. In this study of 3,392 men and women aged ≥52 years (English Longitudinal Study of Ageing from 2004/2005 to 2014/2015), they found that when compared to non-lonely individuals, the risk ratio for smoking in lonely individuals at any time was high (RR=1.46). And the higher the level of loneliness, the more the likelihood of them being smokers[113]. Once addicted, lonely individuals also have a harder time giving up smoking[112]. The relationship between loneliness and smoking appears to be bidirectional[114-116]. Smokers tend to suffer more loneliness than non-smokers[114]. This was also reported recently by Zhang et al, in a study of 1,452 freshmen university students in Wuhan, China[115]. The COVID-19 related lockdown has increased both loneliness and smoking. A study involving 6,003 Italian adults aged 18-74 years, revealed that the lockdown increased cigarette consumption by 9.1%[116].

Obesity

Bodyweight is generally classified according to the body mass index (BMI)[117]. This is calculated in individuals by dividing their weight in Kg by the square of their height in meters. A body mass index should ideally be 18.5 kg/m² to 24.9 kg/m². A BMI of 25 kg/m² to 29,9 kg/m² is considered overweight, while at or >30 kg/m² is considered obese[118]. The Centers for Disease Control and Prevention of USA further subdivides obesity into several categories: Class 1: BMI of 30 to < 35, Class 2: BMI of 35 to < 40, and Class 3: BMI of 40 or higher[119]. According to the World Health Organization (WHO) Asians are categorized as follows: <18.5 (underweight), 18.5–22.9 (normal weight), 23–24.9 (overweight), 25–29.9 (moderately obese), and ≥30 kg/m^2 (severely obese). The World Health Organization estimates that there were 1.9 billion overweight adults and 650 million obese adults globally in 2016[120]. Central or visceral obesity may exist even if the BMI is normal and is typically more harmful[121]. Being overweight or obese results in more deaths than being underweight[122]. Chronic diseases resulting from excess body weight include CVDs[123], metabolic syndrome[124], T2DM[125], CKD[126], nonalcoholic fatty liver disease[127], several cancers[128], obstructive sleep apnea[129], osteoarthritis[130], dementia[131], and depression[132]. Obesity also worsens the course of many of these diseases and results in premature mortality[133]. For example, in heart failure patients it increases emergency room visits by 57%, hospitalization by 68%, and the risk of death by almost 4 times[134.] Negative attitudes towards obese people also result in significant socio-cultural harm[135]. Obese individuals appear to have a 30% higher medical cost than those with a normal BMI, inflicting a major financial burden on society[136].

The relationship between loneliness and obesity is complex[137]. Loneliness enhances obesity[138]. Lonely people eat more energy-dense foods, have decreased physical activity[139], and have poor daytime functioning[140]. Lonely people tend to sleep poorly, which further increases their tendency to get obese[141]. In 2006, Morse et al. studied 714 patients and found that 63.8% of those

who reported being lonely (40.2%), had obesity inducing nighttime-eating behaviors[142]. A 2010 study found that each 1-unit increase in loneliness was associated with a 10% increase in the odds of a person meeting the criteria for metabolic syndrome[143]. Obesity in turn is associated with higher levels of loneliness in the general population[144]. Obese individuals face isolation due to several factors including not being non-compliant with societal norms[145]. Obesity-related stigma enhancing loneliness includes lower rates of hire and promotion and higher rates of wrongful dismissal[146]. Stigmatization is especially evident in children with obesity or in young adults[147]. Furthermore, a higher BMI may also decrease participation in religious activities/church services[148]. Internalizing the stigma decreases self-esteem and further worsens loneliness[149]. And finally, the increase in loneliness and added stress during COVID-19 lockdown has negatively affected weight-related behaviors among adults with higher BMI and eating disorders[150].

Alcohol Intake

Alcohol is a popular psychoactive substance that may result in dependence[151]. According to WHO, in 2016, the total alcohol per capita consumption in the world (age 15 years and older) was 6.4 liters annually[152]. This approximates to 13.9 grams of pure alcohol per person per day. To put this amount in perspective, in the UK, a 'unit' of alcohol is classified as 8 g of pure alcohol, while a standard drink in other countries may contain as much as 20 g of alcohol[153]. In the United States, a 'standard drink' contains 14 g of pure alcohol[154]. Several studies have shown a consistent relationship between low/moderate alcohol consumption and several health benefits, including a reduced risk of T2DM[155], coronary heart disease[156], ischemic stroke[157], chronic renal disease[158], and all-cause mortality[159]. However, excessive alcohol consumption increases all-cause and cause-specific morbidity and mortality[160]. Excess alcohol intake has been associated with harm to literally every bodily system[161-175]. It has repeatedly been shown to cause/aggravate cardiovascular diseases[161], obesity[162], cancer[163], T2DM[164], chronic respiratory diseases[165], CKD[166], depression[167], dementia[168], GI tract disorders[169], liver diseases[170], sleep disorders[171], congenital heart disease[172], sexual disorders[173], trauma/violence[174], and even infections[175]. Its association with cancer is especially alarming. The International Agency for Research on Cancer classifies both alcohol and its acetaldehyde metabolite as type 1 carcinogens[176]. The World Heart Association recently opined that despite the recommendations of several organizations that low to moderate intake may be beneficial for certain conditions, even a single drink of alcohol is not safe for overall health[177].

Lonely people are more likely to drink[178]. This has been noted in all age groups. In a study of school children, lonely females were 2.9 times as likely to engage in alcohol consumption when compared to their male peers[179]. A positive relationship between loneliness and alcoholism has also been noted in adolecents[180,181] and adults[182]. Loneliness not only contributes to alcohol abuse but also helps in maintaining it[183]. It confers a poor prognosis in these individuals[183]. Many people reported that they were experiencing more social isolation and loneliness due to COVID restrictions[184] and this was accompanied by a 54% surge in alcohol purchase[185] and consumption[186]. Lonely people often lack social support, and this may aggravate the tendency for addiction[187]. The relationship has also been noted the other way around. Alcoholics tend to

experience more loneliness[183]. They often have a more negative attitude towards themselves and their social interactions[183]. They have a feeling of being dissatisfied with life and are overall more lonely[188].

Physical Activity

Physical activity refers to any activity performed that expends energy more than I metabolic equivalent (MET)[189]. Sedentary behavior is typically referred to as an energy expenditure of fewer than 1.5 METs[190]. Exercise, on the other hand, is a planned, repetitive, and purposive workout, resulting in an energy expenditure of more than 1.5 METs[191]. Light-intensity activities expend less than 3 METs, moderate-intensity activities expend 3 to 6 METs, while vigorous activities expend 6 or more METs[192]. Sedentary behaviors and lack of regular physical exercise, on the other hand, is associated with an increased incidence and worse progression of a wide range of diseases[193,194], including cardiovascular diseases[195], type 2 diabetes[196], several cancers[197], including those of the breast and colon, bone, and joint diseases (osteoporosis and osteoarthritis)[198], and depression[199]. Exercise results in a decrease in morbidity from most major non-communicable diseases, including CVDs[200], T2DM[201], and cancer[202]. Further, it helps reduce premature mortality by at least 20%–30% in most major chronic medical conditions[203]. Most professional organizations recommend that adults aged 18 to 65 years perform moderate-intensity aerobic physical activity for a minimum of 30 min on five days each week or vigorous-intensity aerobic physical activity for a minimum of 20 min on three days each week. Muscle and bone-strengthening exercises are recommended for a minimum of two days each week. Balance exercises are also important in the elderly[204,205].

Lonely people are less likely to partake in regular physical exercise[206.207]. In a study of older English individuals, Kobayashi and Steptoe found that socially isolated participants were less likely than non-isolated participants to partake in weekly moderate-to-vigorous physical activity[208]. They found that socially isolated individuals spent more time spent in sedentary behavior and less time in light and moderate/vigorous physical activity, during the day. In another study of 267 community-based men and women aged 50-81 years taking part in the English Longitudinal Study of Ageing, Schrempft et al. also found that lonely individuals spent less time in moderate/vigorous physical activity and more time in sedentary behavior[209]. These studies were done in high-income countries[208,209]. Similar findings were noted in other parts of the world. In a study of 34,129 individuals aged 50 and older in low- and middle-income countries, loneliness was also associated with low physical activity[210]. There are confounding factors that can decrease physical activity in lonely individuals, such as chronically poor health and a low socioeconomic status[211]. Exercise has a multitude of benefits, and it also helps decrease loneliness. In one study involving 382 participants, there was a 6.9% decrease in loneliness and a 3.3% improvement in social connectedness, with exercise[212]. Unfortunately, the COVID-19 lockdown has not helped. A longitudinal study showed that a lockdown period due to COVID-19 decreased physical activity levels in a group of physically active Spanish adults[213].

Diet

Eating too many calories can result in excess body weight and obesity[214]. The harmful effects of obesity have been discussed earlier in this manuscript. A poor-quality diet is also detrimental to health - it increases the risk for CVDs[215], cancer[216], T2DM[217], obesity[218], OSA[219], CKD[220], GI diseases[221], and many others[222,223]. The western diet is typical of an unhealthy diet[224]. It is usually rich in refined sugars, high in salt, white flour, processed meats, purified animal fats, and food additives[225]. It tends to be low in fruits, vegetables, and whole grains[226]. It is also heavy in processed foods, "fast foods", snacks, and sugary soft drinks[227]. The result is more 'empty calories' that are lacking in the beneficial phytochemicals, fiber, vitamins, and minerals. They are also usually energy-dense and exhibit harmful high glycemic indexes[228]. Besides the marked increase in morbidity[229-234], an unhealthy diet also increases mortlity[235]. Suboptimal diets are estimated to have caused 1 in 5 premature deaths globally from 1990–2016[236]. A healthy diet on the other hand is rich in non-starchy vegetables, fruits, whole grains, and legumes, moderate in consumption of nuts, seafood, lean meats, low-fat dairy products, unsaturated vegetable oil, and limited in or void of trans-fats, saturated fats, sodium, red meat, refined carbohydrates, and sugar-sweetened beverages[237]. It is low in salt (<2,300 mg per day) and limits alcohol to 2 drinks or less in a day for men or 1 drink or less in a day for women. Mediterranean diets and DASH diets are healthy diets. Mediterranean diets, especially with extra virgin olive oil are extremely healthy[238]. Healthy diets are associated with a major reduction in morbidity and mortality[239,240].

There is a link between loneliness higher consumption of unhealthy foods, both in caloric intake (causing obesity) and poor quality[241,242]. As mentioned before, lonely individuals are more likely to be obese. Social isolation and its link with low fruit or vegetable intake have been noted in studies[243]. In a group of older English individuals, Kobayashi and Steptoe found that socially isolated participants were less likely to eat five daily fruit and vegetable servings[244]. Loneliness is also associated with stress and negative emotions, and this may lead to or aggravate several eating disorders-including anorexia nervosa[245] and bulimia nervosa[246]. In the elderly, loneliness is often associated with dietary inadequacies and undernutrition[247]. As noted with other lifestyles, the impact of COVID-19 has not been good on lifestyles. In an Italian study, 67% of people increased consumption of foods containing added sugars, when pre-COVID-19 eating patterns were compared to COVID-19 lockdown eating patterns[248].

Conclusion

Loneliness is detrimentally associated with a wide array of health disorders. It results in frequent emergency room visits and higher hospitalizations. It imparts a poorer prognosis in several chronic diseases, lowers the quality of life, and increases premature mortality. It is associated with equal or more mortality than that due to obesity and smoking. Healthy lifestyles include not smoking, not drinking alcohol, or consuming it in moderation, maintaining a normal BMI, avoiding a sedentary lifestyle, exercising regularly, and following a prudent dietary pattern. Practicing healthy lifestyles not only increases disease-free life but also increases longevity. The actual lifespan at age 50 years, in those compliant with all healthy lifestyles, has been estimated to increase by14.1 years in women and 12.1 years in men. Lonely people have repeatedly been shown to have more unhealthy lifestyle behaviors compared to non-lonely people. They may also not receive the healthcare they need, not only because of their non-compliance with health

checkups and prescribed medications but also, because many health care professionals consider them undesirable patients (‘they take too much office time’). The unforeseen arrival of COVID-19 has intensified loneliness and social isolation. This has further increased unhealthy lifestyles. To conclude, loneliness is extremely harmful to the human body and the COVID-19 pandemic has enhanced its incidence and intensity. Loneliness often leads to unhealthy lifestyles, which in turn lead to a further deterioration of physical and mental health.

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