Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

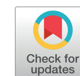
Social Sciences & Humanities Open 4 (2021) 100139

Contents lists available at ScienceDirect

Social Sciences & Humanities Open

journal homepage: www.elsevier.com/locate/ssaho

Social distanciation through COVID-19: A narrative analysis of Indian Peri-Urban Elderly



Moumita Das, Asmita Bhattacharyya *

Dept. of Sociology, Vidyasagar University, Midnapore, 721102, India

ARTICLE INFO

Keywords:
Social distancing
Elderly
Social relationships
Narrative analysis

ABSTRACT

The world encountered an emergent issue of great concern, regarding the new pandemic virus termed as 'Novel Coronavirus (COVID-19)'. This pandemic situation has disconcerted the socio-economic and psychological situations of people and their livelihoods, thus, disturbing societal equilibrium. Social distancing is considered to be an influential weapon to restrict this virus transmission. Like many others, especifically, the elderly people, face pressing difficulties in their daily life-world. Thus, a qualitative study is being considered among the Indian peri-urban elderly (N = 15, >60 years) to identify the experiences of social distancing on their lives and their situation in an everyday living context. The dominant themes are being identified in this study reveal that social relationships are in 'paradox' as it binds the proximate familial relations and distantiate the relations with their significant others that is the bonding between their friends and neighbours along with the coping strategies that have been recorded to overcome their immense psychological stress. Moreover, their preparedness to get back to the normal routines of their daily lives in post-COVID-19 is certainly a matter of concern to them. Thus, the study proposes to develop plans and policies towards awareness, counseling, and volunteering services based on local or remote area approach to make coping strategies for them more viable to combat this unforeseen crisis.

1. Introduction

Social distancing performs as a recommended weapon to fight against the spread of the Novel Coronavirus (COVID-19). To date, this has been the key method to protect oneself from the pandemic situation. While vaccines are beginning to be approved, their availability and accessibility are varied and unequal between and within nations. However, this study was carried during the month of April 2020 and reflects the-then context, when the virus set in threatening the individual lives and thus, lockdown was imposed, worldwide, including India. This mechanism of social and physical distancing is known to have slowed down the spread of this disease and shall break the chain of human transmission. Alternately, measures are suggested to stay connected socially with family members/peers and acquaintances and to the societies at large from a distance through virtual means to maintain stable socio-psychological health besides taking care of the physical health of the people. World Health Organization advocated myriad measures for the general public, namely, flexible work arrangements, teleworking, distance learning, shielding and protection of the vulnerable groups, reorganization of health care, and social services networks (WHO, 2020a). Elderly people are at a higher risk of infection due to their decreased immunity and associated multiple comorbidities like diabetes, hypertension, chronic kidney diseases, and pulmonary diseases that make them more susceptible to high mortality risks out of this present pandemic situation (Ministry of Health and Family Welfare, India, 2020; Morley & Vellas, 2020). According to the reports of the Chinese Centre for Disease Control and Prevention, the mortality rate among the age group from 60 to 69 years is 3.6 percent and is expected to reach 18 percent for the age group of 80 years and above (Banerjee, 2020). Therefore, the primary prevention for the elderly associated with comorbidities is social distancing with possible social isolation (Morley & Vellas, 2020). However, social isolation brings with it loneliness that in turn may lead to depression, cognitive dysfunction, disability, cardiovascular disease, and increased mortality (Morley & Vellas, 2020; Steptoe, Shankar, Demakakos, & Wardle, 2013).

The literature portrays that 'social distancing' remains an effective measure to protect from the pandemic spread of the influenza virus during 1918 (Yu et al., 2017). In the recent era, due to COVID-19, the strategy of social distancing is readopted as a tool to prevent human transmission. However, social distancing has some inbuilt challenges for society and especifically for the elderly, who are already suffering from a higher rate of social isolation leading to serious psychological distress (Gupta, 2020), (Khan, 2020). Moreover, the pattern of medical

* Corresponding author.
E-mail address: asmita.bhattacharyya@mail.vidyasagar.ac.in (A. Bhattacharyya).

https://doi.org/10.1016/j.ssaho.2021.100139
Received 25 July 2020; Received in revised form 5 March 2021; Accepted 5 March 2021
Available online 11 March 2021
2590-2911/© 2021 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

consciousness differs in developed countries from that of developing ones (Gavazzi et al., 2004) as well as the associated changes in the social structure such as changes in familial relationships and social support in the elderly life (Mane, 2016). Thus, this study adopts twofold strategies. Firstly, to find the situational framework of the elderly getting affected by social distancing. Secondly, to understand how they are dealing with and coping themselves in these lockdown situations. It is assumed that if the pivotal factors are unveiled that will help to frame effective policies for them and rescue them in hours of crisis.

1.1. A review of pandemic history and social distancing

Although COVID-19 is a new pandemic, it is not the first in the world history, there are significant numbers of pandemics that have been recorded in history such as smallpox, cholera, plague, dengue, AIDS, influenza, severe acute respiratory syndrome (SARS), West Nile disease, and tuberculosis. However, influenza pandemics had several recurring events with severe consequences on societies. In the 20th century, three influenza pandemic struck, namely, Spanish flu in 1918–1919, Asian flu in 1957–1958, Hong Kong flu in 1968–1969. Each pandemic had worsened the living condition of individuals and wiped out many lives. Out of all, the most devastating in world history was the influenza pandemic of 1918 (Qiu et al., 2017). It was found that the estimated worldwide death counts from the influenza pandemic of 1918 were 50–100 million people. This pandemic took place in three distinctive waves: the first wave was in summer 1918, the second wave was in autumn 1918 and the third wave was in spring in 1919. Since then, "reactive social distancing" was an influential strategy that involved the behavioral response of an individual to avoid potential infectious contact towards the information of an ongoing epidemic or pandemic. The behavioral alterations included were avoiding mass gathering, wearing a protective mask, actively maintaining personal hygiene, and getting vaccinated, but the nature of behavioral modification types may vary with that of disease category amongst the people (Yu et al., 2017).

Moreover, the pandemic highlights another powerful influence of fear and stigma in the management of infectious diseases. The historical model of the 1918 influenza pandemic represents similar traits across nations and localities. The social consequence of stigma may result in adverse health effects in general as well as in exacerbation of the effect of epidemiology and pathology of certain diseases. Stigma is usually observed as a biosocial phenomenon with 4 essential elements: firstly, stigma acts as a major obstruction against health care seeking, thereby delaying early detection and treatments and furthering the spreading of the diseases. Secondly, social marginalization may lead to poverty and negligence, thus increase in the susceptibility of the population for the inception and amplification of infectious diseases. Thirdly, a potentially stigmatized population may refuse to accept health care from the authorities and resist cooperation during the public health emergency. Finally, social stigma may distort public perception of risks, thus resulting in mass panic among the citizens and unequal allocation of health care resources by the health professionals and politicians (Barrett & Brown, 2008).

Furthermore, elderly patients have high risks of infection susceptibility that are of major concern for the medical communities. However, after many years of their negligence, now the issue of elderly care is getting deserved attention. There are major differences in medical consciousness between the industrialized and the developing countries. In developing countries, the inception of several pathogens is a result of poverty and malnutrition that amplifies the severity of commonly encountered infections. The transmission of pathogens has increased due to a lack of infrastructure and resources to treat the medical needs of elderly patients (Gavazzi et al., 2004). Therefore, in India, the chances of a rapid outbreak of pandemics and epidemics occur due to these conditions of malnutrition, lack of sanitization, and lack of proper public infrastructural system. So far, in Indian history, two major pandemics took place such as cholera in the 19th century and influenza pandemic in the 20th century. Other epidemics occurred so long, in the 19th century *viz.*, Bombay plague in 1896, polio epidemic in 1970–1990, smallpox epidemic in1974, and Surat plague epidemic in 1994. In recent past, in the 21st century, there was an outbreak of Plague in Northern India in 2002, Dengue epidemic in 2003, Severe acute respiratory syndrome (SARS) epidemic in 2003, Meningococcal Meningitis epidemic in 2005, Chikungunya outbreak in 2006, Dengue outbreak in 2006, Gujrat Jaundice epidemic 2009, N1H1 flu pandemic in 2009, Odisha Jaundice epidemic in 2014, Indian swine flu outbreak in 2015, and Nipah outbreak in 2018. All through these times, some infections were eradicated and others were controlled. However, only a few vector-borne infections spread widely due to lack of sanitization, crowded environment, and climatic change (Swetha et al., 2019). A similar view was proposed by Sekher in his book chapter 'Plague administration in Princely Mysore: Resistance, riots, and reconciliation, In Health and Medicine in the Indian princely states: 1850–1950' that plague was one of the fearful and deadliest diseases. Its first appearance was observed in Bombay in 1896, leading to the colossal deaths of about 12 million people. The population pressure, crowding, malnutrition, and lack of infrastructures led to the spread of the diseases. This epidemic had forced to evacuate many people from their homes, led them to stay in the temporary sheds, and was detained for observation. The myriad precautionary measures include the examination of passengers arriving from rail and roads, the establishment of hospitals, segregation of populations, setting up of health camps, and destruction of microorganisms (Sekher et al., 2018). However, the present global threat from Coronavirus disease 2019 (COVID-19) largely dependent on the age-structure and immune systems. Evidently, the first wave of deaths occurred in China due to this virus had impacted the elderly age groups of 60 years and above (Banerjee, 2020). In India, a higher rate of confirmed cases was reported in Maharastra (15 percent), Tamil Nadu (14 percent), Delhi (13 percent), and Kerela (10 percent), whereas some states fare better like Mizoram, Manipur, and Arunachal Pradesh. It is assumed that this scenario is the result of higher occupancy of the elderly populations (above 65 years) in the states like Kerela (12.6 percent), Goa (11.2 percent), and Tamil Nadu (10.4 percent) (Gautam & Hens, 2020). In this regard, social distancing proves to be instrumental in controlling the spread of the deadly virus. For example, Hubei province in China, which had 90 percent of the total infection rate in the country was successfully controlled through the implementation of the social distancing process (Selvam & Vignesh, 2020). Similarly, the effects of a lockdown or social distancing in Spain and Italy were measured through the time series that showed a considerable declining trend of confirmed cases and death rates in the countries (Thu et al., 2020). Conspicuously, this social distancing and lockdown helped India to prepare itself for the upcoming challenges due to this pandemic. It calls for the development of new modes of treatment strategies that include transforming the mobile hospitals containing ventilators that can reach every remote and urban place in India and also, offering free-foods, financial help through various programs and policies (Dey & Dey, 2020).

1.2. Impact of social distancing on elderly

The far-reaching consequence of COVID-19 is no longer just an epidemiological problem rather it has impacted every sphere of life and aspect of society to encounter the mitigation strategies (Murray, 2020). In this regard, to disaccelerate the pandemic situation from COVID-19, many nation states across the globe have banned non-essential activities and confined the residents to their homes (Gupta, 2020). The economic consequences of this physical distancing are noticed but the cultural ramifications are largely unknown. The isolation and loneliness from the physical restriction may affect the larger population and their well-being. The shared experience of social distancing may result in loneliness, but it has a major effect on an individual having preexisting traumatic experiences or unresolved grief that make them particularly vulnerable ones (Saltzman, 2020). Thus, social distancing has a severe psychological impact on elderly people, who are ill and already suffering

from the social isolation that leads to loneliness, depression, and even Alzheimer's disease (Khan, 2020). The social isolation due to this pandemic has restricted their mobility and their socialization with friends as their support system networks shall be at risk. They, also, suffer from death anxieties in their families (Gupta, 2020). In this regard, the use of technology may help in buffering the loneliness and isolation that can lessen mental health problems (Saltzman, 2020). However, Gerontologist Verena Menec suggests that the use of modern technologies to get connected such as phone calls, text messages, or joining an online community could be influential to some extent but not a solution in the long-run. Technology is not a substitute for human touches, such as holding hands, hugging, or massage which is effective in lowering blood pressure and reducing the severity of symptoms of any diseases (Gupta, 2020). Nevertheless, the perceived feeling of usefulness, being productive, having control over one's life, and the presence of positive social connections are important determinants of one's health (MacKinnon et al., 2001). Several studies do mention that social engagements and active community participation promote many salutary outcomes including better health, well-being, increased recovery chances from illness, and delay the institutionalization process for them (Graham, Scharlach, & Wolf, 2014; Matt & Dean, 1993; Temkin-Greener et al., 2004).

1.3. Impact of social support network on elderly lives

Social support theory implies certain psychosocial supplies that are provided by the primary supportive relationships are essential among the elderly (Matt & Dean, 1993). In a study in Thailand, it was mentioned that provision of support to the elderly was not only provided by the family members but from friends and neighbours from the community, as well. However, the family network and friendship network are differently associated with the healthy ageing of the elderly. Family networks positively influence improving the chronic diseases related health condition or specific diseases management activities and effecting long-term care. On the other hand, friendship network does influence the life-style related health promoting activities particularly in the middle-class families and areas with high social cohesions (Thanakwang & Soonthorndhada, 2011). Similarly, another study depicts that support from friends is distinct from other sources of support system. The voluntary nature of friendship distinguishes it from other social support relationships such as relatives, neighbours, and co-workers. The fewer structural and normative constraints among peer circles allow them to be flexible and adjustable support providers. These networks foster a feeling of attachment, provide equalitarianism, consensus, and sharing good times amongst themselves (Matt & Dean, 1993). On the other hand, an individual, who lacks social connections is reported to perceive loneliness and tends to suffer from a high rate of mortality and morbidity. The indicators *viz*. small social networks, low participation in social activities, lack of social support, and loneliness reflect social isolation of an individual (Cornwell & Waite, 2009). According to the report of National Academics of Science, Engineering and Medicine of the United States have depicted that social isolation is associated with a 50 percent increased risk of dementia, 29 percent of heart diseases, and 32 percent of strokes amongst the people, (Brody, 2020). Moreover, 75 percent of the American elderly people have their living children, who stay away from them, 80 percent of the elderly have the possibility of meeting their children once in a week. The notion of independent living and individualism was found to have a negative impact at their old age. It reduces the chances of social connection that is required in old age, thus, increasing their isolation (Nahemow, 1979).

Meanwhile, lockdown procedure for a long time, probably for several months or beyond adversely affects the elderly population, who are receiving long-term care facilities. In long-term care settings, they are at a higher risk of disease contamination due to their improper isolation facilities and lack of ventilators. Those, who are cohabiting in a confined setting undergoing long-term care facilities, share communal meals and group activities thus, are susceptible to vulnerabilities. Besides, many residents who are providing long-term care are not capable of maintaining personal hygiene to stop infection transmission. Similarly, those who are living in isolated places, they need frequent visits from their family and their friends for socializing purpose. Otherwise, they are likely to become lonely, abandoned, and despondent that may result in serious psychological consequences (Gardner et al., 2020).

1.3.1. Indian scenario

The social networks comprising multiple ties such as family, friends, and links to more formal and informal social institutions that play an influential role in providing supports and opportunities to the elderly around the world. In India family is the cherished institution that often provides informal social security for them. The family continued to be the central organizing unit to provide economic support and care for those who are physically unable to take care of themselves. However, in recent decades the demographic and health transition has challenged the core institution to adapt and develop innovative approaches to run the family life. As the families are in transition, intergenerational relationships, and the role of women in the family have dramatically changed and it impacted the care and welfare of the elderly (Berkman et al., 2012). Also, an alteration is observed in their socio-economic spheres that have led to changes in their living arrangements. The cultural shifts towards individualistic lifestyles lead people to prefer living in their independent houses resulting in the rise of one-person household (OPH) in India. However, there is enormous variation in the trend of independent living in developed countries from that of developing ones. It is much more common for the developed countries to provide a stronger safety net and public support system for the elderly (Dommaraju, 2015). However, in India, there is an upward trend in the living arrangement patterns of living alone or with spouse only, which rose from 9.0 percent in 1992 to 18.7 percent in 2006 (Mane, 2016). Further, in a study by Help Age India, it is estimated that in India, there is about 6 percent of the elderly, who are living alone and about 10–20 percent of the elderly are suffering from loneliness (Aravind, 2020). The elderly in India are much more vulnerable as the government is investing less in their social security systems. The urban elderly are primarily relied on the hired domestic help to meet the basic needs. Social isolation and loneliness are in common. There is hardly any insurance coverage for them. Only a small fraction of the elderly are covered under the retirement pension schemes, who retired from the organized sectors whereas the majority of them are largely neglected and dependent on their families, thus treated as a burden to the family (Mane, 2016). In this context, the public health crisis of COVID-19 has its devasting measure in India due to the poor health and socio-economic condition that widen the spread and susceptibility of diseases. Additionally, the public medical facilities are getting overcrowded, and are failing to meet the massive demand for intensive care (Chanda & Sekher, 2020). Thus, this era of the pandemic has triggered the ill-effects on mental health triggering to post-traumatic stress disorder (PTSD) that is frequently encountered with anxiety, depression, behavioral and psychological disorders. In this regard, social media is aiding the people by getting connected in the pandemic lockdowns through news but it also acts as a source of rumors and false information. The rising death tolls and confirmed cases are affecting the mental health of the Individuals. The suspected cases and confirmed patients have to suffer from stigmatization by the community (Sood, 2020). In India, more than 300 suicide cases had been reported in lockdowns due to mental torment which is "Non-Coronavirus death". Out of these elderly, who had committed suicide, 80 elderly killed themselves out of fear of being infected and from suffering from loneliness. This issue has a great impact on their lives, as they are already suffering from melancholy and disquietude (Rana, 2020). Thus, in the era of social distancing, the problem of the elderly gets exacerbated.

Although the social distancing and lockdown in the states have helped in preparing oneself for the challenges of COVID- 19, this elderly segment of the population is suffering from psycho-social aspects as

suggested by the above literature. There is hardly any study on social impact on the elderly's lives out of this crisis in the context of a peri-urban region in the Indian context. Thus, the objectives of the study are as follows:

1. To identify the ramification of social distancing on the social connectedness in elder peoples' lives.
2. To explore the coping strategies and future preparedness of this segment in response to the existential crisis.

2. Method

2.1. Participant and procedure

In this lockdown period, 15 residential participants (≥60 years) in the Kharagpur township of Paschim Medinipur district in West Bengal (India) are been selected for the study. The participants are selected purposively for telephonic conversations as it is the only mode of interaction that is possible at this time by following the social distance rule. The participants were contacted prior to the interview for their consent. All the ethical rules have been followed during the interviews. Thereafter, the in-depth interviews were conducted by using an interview guide to explore their understanding of the pandemic situation, how their lives are been affected by these social distancing rules, the experience of spending time with family members, the kind of difficulties faced by them and their future concern are discussed to fulfill the above objectives of this study. The interviews continued for about a week starting from April 7th, 2020 to April 14th, 2020 for approximately 30 mins for each individual. The telephonic interviews are recorded using a phone recorder.

2.1.1. Sample characteristics

The elderly participant includes six males and nine females. Among them, all participants are literate who can answer the questions through telephonic conversation. The educational profile of these participants includes five at secondary education, seven in higher secondary education, and three at graduate levels. They are all Hindus by religion and their native language is Bengali. The six of them are retired pensioners, five are homemakers, and the rest four of them are engaged in miscellaneous activities in social works.

2.2. Data analysis

The data are recorded in the Bengali language in the phone recorder, thus the researchers have translated the native language into English, and then the data are entered in the MS-Excel tabular sheet. A coding memo is framed to reflect the code and patterns to enable us to identify the pre-themes. The relevant responses and coding of those responses, identifying those predominant word repetitions, extrapolating the direct and emotional statements, and then finding the discourse indicators like intensifier, connectives, and evaluative clauses led to the final coding. On the other hand, the narratives of the responses are highlighted to increase the in-depth understanding of the underlying factors of the phenomena. Thus, drawing from the themes and issues in the study, three themes are identified to have resonated with the situation that includes identifying the paradoxes in social relationships, their coping strategies, and preparedness for the future. The names of the participants are changed to protect their anonymity. Here, both *emic* and *etic* perspectives are analyzed.

3. Results

3.1. Social connectedness and paradoxes: emic view

The primary sources of social networks include families, friends, and neighbours that remain instrumental in providing reciprocal, emotional, and instrumental support. Social support helps to buffer stress and depression, and promotes well-being amongst the elderly. Moreover, it is noticed that a lack of support from the kin groups is replaced by the non-kin groups (friends and neighbours). Thus, there are task-specific characteristics amongst these networks. It implies each member in the social network provides support to fulfill different needs; hence, their presence is important (Iecovich et al., 2004). The leading support groups for the elderly are their family and relatives, who assist directly in *Activities of Daily Living* (ADL) and *Instrumental Activities of Daily Living* (IADL) that lead to delay in functional degradation among them (Choi & Wodarski, 1996). Simultaneously, friends foster a feeling of attachment during one's lone times (Matt & Dean, 1993) and promote social interaction and engagements (Thanakwang & Soonthorndhada, 2011). But the emergence of the *Lockdown* procedure leading to social distancing had a great impact on their lives. The confinement to one's home during this lockdown has increased the social bonding amongst the family members to a certain extent but at the same time, personalized relations with significant others (including friends and neighbour) are getting distanced. Thus, the participants articulate a paradox in their social relationships that are encapsulated in this articulation underneath.

Mrs. Shibani Chanda, 70 years, homemaker, depicts

> *"I love to cook delicious food for the family along with my daughter-in-law. Since, my family members used to go away to their respective jobs, thus, eating lunch with them was a distant possibility during normal times. But nowadays, this wish of mine is fulfilled".*

On the contrary, Mr. Biplap Das, 70 years, a pensioner, narrates the ways he is debarred from doing his daily activities because of the security measures by the family members.

> *"My normal activities of daily living are getting disrupted, these days. I am dependents on my children for shopping and even for buying my medicines. My adult children are not letting me go out".*

The Indian family members played an instrumental role in safeguarding the emotional, economic, and security measures for decades (Panda, 1998; Rajan & Kumar, 2003). Additionally, social support provided by the family members impacts their psychological well-being (Mui & Kang, 2006). But with advancing time, the supportive joint family structure disrupted with nuclearism (Paslithil, 2010) leading to an increase in stress levels for them (Rajan & Kumar, 2003). In this context, where the entire nation had gone into a stage of lockdown, the family relationships are found to be rejuvenated to some extent. The lonely elderly, who are spending their time alone are getting attached to their family members. However, these scenarios, are mainly noticed amongst the joint family structured household or extended type of families. On the other hand, contrary pictures are revealed by those elderlies, who lived in their nuclear families, or another few, who are from the joint family households but lost their spouses narrated here as Santi Barui, 82 years, widow homemaker, depicts

> *"I cannot walk far due to my physical disabilities. I am confined to my house for the last couple of years, but my neighbours used to come and visit me, ask about my state of health and chat with me. But, now they cannot come to my home. I see, my family members are engaged in their household works, they come to offer the food only, so I feel bored, these days".*

Similarly, Bholanath Sen, 80 years, pensioner, depicts

> *"I am restricted to my house these days. I am a widower, after the death of my spouse my friends are the only support system with whom I feel an emotional attachment. It is difficult for me to interact with my son and daughter-in-law for a long time. Moreover, I am not apt to use modern technologies such as smart phones, and social sites to get connected to my friends, during this crisis period. Sometimes, I do interact with friends from my son's mobile phone as I do not have it, but that is not very gratifying. Therefore, I am suffering from mental distress, these days".*

The above narratives reveal how they are facing emotional detachments from their proximate friend's networks that used to booster their well-being other than their family members. This detachment from proximal members reported having caused mental distress leading to loneliness and depression amongst them.

3.2. Coping strategies in this pandemic times: emic view

The elderly populations are the most vulnerable group in the world when they live in settings that are concentrated or isolated from a broader population and community services that might support them (Leonard & Gutmann, 2005). Those who are confined to their homestead and other settings, especially, suffer from loneliness and isolation that may lead to mortality risks (Chan et al., 2015). However, the purpose of life for them is to get engaged in various activities such as creative work, welfare activities, and recreational activities that reduces negative thoughts and help in promoting positive survival outcomes (Das & Bhattacharyya, 2020). Therefore, in these lockdown state, maintenance of the rules of social distancing, they are managing their day to day life by involving themselves in certain activities confined in their home, when their social connections from the outer world are cut. The coping strategies for them include reading books, involving themselves in spiritual activities, cooking food for their children, watching television, doing free-hand exercises, a few are learning e-technologies, some donate food and grants-in-aid.

Mr. Pradip Sen, 60 years, a Carpenter, depicts,

"Nowadays I cannot go for work; being in the house, I regularly practice Pranayam, spend time with grandchildren, watch TV, listen to some classical music in my old tape recorder which acts as a companion in this lonely time."

A similar narrative has been drawn from Mrs. Kakuli Sarkar, 79 years, homemaker, narrates,

"I am accustomed to viewing tele-shows of this genre. Nowadays, viewing re-telecasting of the tele-shows of bygone times, have recharged my old memories. Along with my family members, I see these shows and my past memories are getting refreshed."

In another narration, Mrs. Anjali Maity, 63 years, homemaker, tells,

"During this lockdown, I remain involved in my daily spiritual activities such as 'Thakur k niye thaka' (staying with God). It provides me the mental strength and capabilities to overcome the anxieties".

Similarly, Mr. Rajesh Mitra, 71 years, a pensioner, explains,

"Laughing time is being at home with my grandson, as he is tutoring me. I am learning the usage of smart phones, e-technologies from my grandson as he insists me to be updated with these technologies."

These narratives reflect upon the leisure activities engaged by them as coping strategies in this lockdown situation. These strategies of getting into normal life rhythm are by engaging in common activities like spiritual dealings, listening to music, learning modern technologies, watching tele-shows, and recalling old memories with the family members that boost their psychological well-being. Alternately, some of them are conscious of cleanliness and hygiene, consequently, they spend their time overseeing their family members' well-being.

Mrs. Siddheshwari Das, 79 years, homemaker says,

"I am conscious of the deadly virus; so, I create awareness in my house, so I properly clean my house. I cannot perform any heavy task but my family members are all maintaining regular hand washing and sanitization routine. I have almost on the threshold of my life, but I am worried about the new generations. I maintain awareness to protect my family and society at large."

Mrs. Chandrima Dutta, 60 years, social worker, noted

"My sons are involved in distributing grants to needy people. I appreciate these tasks and I, even involve in donating some monetary reliefs to the local clubs, those who are doing charities for those affected by this crisis."

She, further, narrates her anxieties about the young generations as hereunder:

"I am very worried to observe how these young people are so careless to maintain social distancing norms. In front of my house, there is a playground, where some young boys sit and gossip for a long time, that I see them from my balcony, but when they hear/see police arrivals, they want to take shelter in my house, to be safe from the police. If this continues in other places, then no one can protect us from this virus infection".

These narratives reveal that they have both knowledge and experiences for being part of the society for a long and they can contribute to both familial and societal wisdom, significantly. Thus, they may be given priority in society to allow their guiding edge to control the younger generation. More so, it is observed that they are conscious of their well-being by involving themselves in regular sanitization and hand-washing regimes to avert virus infection in them.

3.3. Preparedness for the future: emic view

This study reveals that these people have learned to manage the losses incurred during the lockdown period to regain their psychological and physical well-being, by performing their respective social duties, and they are yearning to get themselves back to their normal life.

Mrs. Rita Bhowmik, 65 years, homemaker, her anecdote

"I have not met my granddaughter and my daughter residing in Kolkata for a long time, especially, during this crisis time, as soon as this period gets over, I will visit them and elevate my mental satisfaction ".

Similarly, Mr. Anish Sarkar, 70 years, a retired person, observes

"I go out for a morning walk along with my friends. Since I have diabetes, walking improves my health condition. But, nowadays, my health is suffering the most due to this lockdown situation."

The above narrations express their apprehensions on their physical and mental well-being out of the lockdown. Many of them are confined in their homes and not having any physical contact with their close-tied people, which adds up to their stress. Therefore, they are eagerly waiting to get over with this situation, so that they can be back in their normal social life with adequate social interaction and daily living activities. The elderly people, who were social or community workers, or those who were associated with cultural activities in their community, are now feeling distressed for being away from their charitable activities. They desperately wish to reschedule these activities, very soon in the future. Mr. Santa Sengupta, 60 years, secretary of a religious organization opined hereunder:

"We had stopped our annual festival to avoid mass gathering, but we are concerned with the rescheduling of the event after this lockdown comes to an end".

This situation has a serious impact on these elderly, as they are gradually getting dependent on their adult children in many ways such as buying essential commodities, for vegetable marketing, or paying the electric bills. After being retired from their respective jobs, they have got engaged in domestic activities, social or community-related services. They now have a sense of confinement in this lockdown situation that is reportedly affecting their psychological and physical health, adversely.

3.4. Interpreting the 'pandemic anxieties' in elderly social lives: etic view

In a broad-spectrum, the family is perceived as a primary source of social support for the elderly (Choi & Wodarski, 1996). However, friends

do exert an influential role in promoting their well-being in their later life. The elderly feels comfortable sharing their emotional feeling with their friends, who belong to their same age grades that boosts '*shared understanding*' between them (Matt & Dean, 1993). Additionally, neighbours provide mental and instrumental support in case of any medical emergencies or during crisis hours (Kaulagekar, 2007). This study outcomes validate an ongoing *paradox in a relationship,* as we see cohesive bonding within their proximate networks of family members as they are confined at home, and on the other hand, the elderly are distanced from the other significant proximate networked people (friends and neighbours). The families provide a zone of comfort to fulfill the basic needs such as "*eating together", "cooking together", "buying essential commodities", "sharing love, companionship, and respect"*. On the other hand, friends and neighbours fill in the emotional vacuum in their lives by *"seeking well-being", "provide suggestion",* and *"help in need"* that cater to their well-being, which is now have become a distant reality under the present 'lockdown' circumstances. Social distancing for such a long time and restriction on regular activities has disturbed the elderly life. This has adversely affected their mental well-being and thus, lead to increased loneliness and depression amongst them. Furthermore, there is an increasing apprehension regarding their future concern to get back to normal life that includes *"morning walk", "shopping groceries", "rebuilding those old connections"*, and *"rescheduling their social life engagements"* during post-pandemic times. Meanwhile, they have developed some coping strategies to adapt themselves in this period of crisis to retain their well-being. They are involved in leisure activities such as "*listening to old songs in their old tape recorder", "watching the telecast of the bygone tele--shows", "involved in spiritual activities",* to get rid of the pandemic anxieties, conscious about their "*daily hygiene*" or want to supervise the *"irresponsible reckless behavior"* of the young generations. Thus, 'uncertainty' in this existing pandemic crisis and towards their future preparedness to yearning for a normal life has added anxieties, and mental stress to these vulnerable elderly groups. Besides this, a large proportion of the elderly interviewed here are pensioner holders, thus they are not facing any difficulties to run their livelihoods. However, those who are not receiving any pension and are not being offered any special grants in this lockdown period had to depend entirely on their deposits and children that adds up to their anxieties regarding the socio-economic crisis. Further, some pensioner elderlies are anxious about their adult children's job securities, if they become jobless in the crisis hour; management of the household is not an easier task for them at this stage of life.

4. Conclusion – A way forward

Throughout this paper, it was found that elderly people with comorbidities are a more vulnerable group in this pandemic era (Ministry of Health and Family Welfare, India, 2020). Thus, social isolation and distancing is a major strategy to reduce the chance of infection in them that in turn resulted in major psychological implications such as loneliness, depression, and anxiety (Morley & Vellas, 2020). The empirical findings stated here mentions that although the family networks are rejuvenated during these days of lockdown for being confined under the roof, the relations with friends and neighbours are distant. They are getting involved in myriad leisure and household activities to cope with their loneliness and anxieties and trying to survive in this present situation. However, many of them are debarred from doing the essential activities in their life such as morning walks, sharing emotional attachments with friends, shopping, and buying medicines. Further, some of them are worried about their dependency on their children in this lockdown situation, while the others are worried about the job securities of their children. In this regard, the present paper highlights the situational analysis of the elderly living in a peri-urban region of India to enforce necessary policies and strategies to upgrade their conditions. The section below provides some initiatives taken by global and national levels to upgrade their well-being and seek a way forward to implement those policies for them in the peri-urban Indian region based on its socio-cultural contexts.

4.1. Action and strategies for the elderly

COVID-19 has made a dramatic change in the daily routine of the elderly, in terms of their care and support system, and their social connections. Therefore, it is essential to foster healthy and successful ageing during this pandemic (WHO, 2020c). In this regard WHO has declared an agenda of "Decade of Healthy Ageing (2020–2030)". It comprises of an opportunity to bring together government, civil societies, international agencies, professionals, academicians, the media and private sectors, and so on under a collaborative action to improve the lives of the elderly, their families, and the community in which they live (WHO, 2020b).

Similarly, Help Age International has depicted six messages to the global policymakers/decision-makers emphasizing the strategies to promote the well-being of the elderly people. The policies include firstly, *equality, and non-discrimination:* focusing that the elderly should not be neglected from right to health such as health care, access to information regarding care and medical services. Secondly, *preparedness and planning* that includes the additional risks of them are to be focused in this domain. Thirdly, *public information reaching the older persons* shall indicate regular communications with the public and at-risk population to prevent infections, saving lives by minimizing the adverse outcome. Fourthly, the *access and support* include specific measures to support the older people by providing access to alcohol-based hand rubs in places having scarcity of water, access to social support, and essential supplies for the elderly who are in quarantine or self-isolating. Fifthly, *conflict and displacement settings* include the contingency planning by the governments and humanitarian agencies to address the high risk faced by the older refugees and displaced people to provide access to health care and treatments. Finally, *development and humanitarian fundings,* in this criteria the elderly persons are often overlooked, thus the major focus should be given to the elderly population in allocating the funds (Help Age International, 2020).

Likewise, UNICEF-India has mentioned some of the measures for them in these trying times. Like, providing *social support* through regular contacts with the elderly by phone calls, messages, leave a note for them in front of their doors, and cooking food for the elderly. *Running errands* includes buying essential commodities for the elderly. *Practice social distancing, not isolation* by helping them understand the need to practice social distancing, stay connected, feel involved in any purposeful activities. *Postpone unnecessary medical visits* by informing them to take the help of telemedicine. *Set-up emergency contacts and speed dials* include involving a reliable person to look after the elderly, adding the emergency numbers in their contacts list (UNICEF-India, 2020).

Jawaid (2020) has advocated television and radio live shows on myriad topics on elderly people that shall encourage them to express their views through live calls. Further, volunteering services for the elderly group may be initiated through phone contact to rebuild friendships and deliver mentorship so that ties between them are rejuvenated. Besides these, imparting mental health support hotlines to reach the affected group for screening their anxieties and depression is needed to be part of policy formulations (Jawaid and Sills, 2020). Further in another study, Sood mentions to combat prevailing myths regarding the pandemic safety measures, or to clarify the doubts and misinformation online tele-counseling can be an effective measure. Simultaneously, an online neighbourhood voluntary help-groups can be constituted to reduce the risk of loneliness and to maintain the cohesive fabric. Those who are confined in their homes due to the lockdown or are quarantined can engage themselves in a blended exercise regime, yoga, meditation, and musical therapy, so to regain their physical and psychological well-being (Sood, 2020).

These policies may influence them to cope with the social isolation due to social distanciation to provide some meaningfulness in their life and to cope with this stressful period. Besides that, their family members should be encouraged to spend some quality hours with them to understand their anxieties and to enhance their sense of self-worth.

Intergenerational relations should be developed through various programs where the exchange of knowledge between people of different generations may be prioritized. It will allow the young generation to learn the age-old wisdom from their grandparents while the young generation may in turn update their older generation with the usage of modern technologies. These can be a strong influential strategy in family-centric societies or places to rebuild intra-family bonding that shall go a long way in the post-pandemic era.

4.2. Limitations of the study

The observations, patterns, and suggestions are extrapolated based on responses from the few participants in this study. We have encountered the challenge of limiting the size of the participants, keeping in mind the study is being conducted at the time of pandemic crisis when strict lockdown policy and social distanciation are the new normative order. Having accepted our limitation of not being able to garner a large sampled population for this study that provide some statistical inferences in order to come up with a generalized view of the societal impacts on the elderly at large. But this exploratory study is based on the in-depth interviews amongst a few participants to unravel the underlying broader patterns of their situational contexts, their coping strategies, and future preparedness pertaining to this pandemic crisis within the peri-urban Indian in West Bengal, India. The authors give a way forward to future research on COVID-19 and its impact on the elderly population to follow a mixed-methods strategy for better understanding the generalisability and uniqueness of the study.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Submission declaration

The manuscript has not been published previously and it is not under consideration for publication elsewhere.

Use of inclusive language

The use of Inclusive language acknowledges diversity, conveys respect to all people, is sensitive to differences, and promotes equal opportunities. The Articles make no assumptions about the beliefs or commitments of any reader, and contain nothing which might imply that one individual is superior to another on the grounds of race, sex, culture or any other characteristic.

CRediT authorship contribution statement

Moumita Das: Writing – original draft, Writing – review & editing. **Asmita Bhattacharyya:** Writing – original draft, Writing – review & editing, (1) Conceived and/or designed the work that led to the submission, acquired data, and/or played an important role in interpreting the results.

Declaration of competing interest

The authors declare that they have no conflict of interest.

References

Aravind, I. (2020, March). *Covid-19: Why social distancing is a big worry for senior citizens*. Retrieved April 25, 2020, from The Economic Times: https://economictimes.indiatimes.com/news/politics-and-nation/covid-19-why-social-distancing-is-a-big-worry-for-senior-citizens/articleshow/74866566.cms.

Banerjee, D. (2020). The impact of Covid-19 pandemic on elderly mental health. *International Journal of Geriatric Psychiatry*, 1–2. https://doi.org/10.1002/gps.5320

Barrett, R., & Brown, P. J. (2008). Stigma in the time of influenza: Social and institutional responses to pandemic. *The Journal of Infectious Diseases, 197*(Supplement 1), s34–s37. https://doi.org/10.1086/524986. Avian and Pandemic Influenza.

Berkman, L. F., Sekher, T. V., Capistrant, B., & Zheng, Y. (2012). Social networks, family, and care giving among older adults in India. In J. P. Smith, & M. Majmundar (Eds.), *Aging in asia: Findings from new and emerging data initiatives* (pp. 261–278). Washington, DC: The National Academic Press.

Brody, J. E. (2020, March). *Take steps to counter the loneliness of social distancing*. Retrieved April 25, 2020, from The New York Times: https://www.nytimes.com/2020/03/23/well/family/coronavirus-loneliness-isolation-social-distancing-elderly.html.

Chanda, S., & Sekher, T. V. (2020). Disability during COVID-19 increasing vulnerability and neglect. Retrieved December 6, 2020, from Economic and Political Weekly: https://www.epw.in/journal/2020/39/perspectives/disability-during-covid-19.html#:~:text=COVID%2D19%20is%20intensifying%20the,towards%20PWDs%2C%20they%20are%20neglected.

Chan, A., Raman, P., Ma, S., & Malhotra, R. (2015). Loneliness and all-cause mortality in community-dwelling elderly Singaporeans. *Demographic Research, 32*(49), 1361–1382. https://doi.org/10.4054/DemRes.2015.32.49

Choi, N. G., & Wodarski, J. S. (1996). The relationship between social support and health status of elderly people: Does social support slow down physical and functional deterioration? *Social Work Research, 20*(1), 52–63. https://doi.org/10.1093/swr/20.1.52

Cornwell, E. Y., & Waite, L. J. (2009). Social disconnectedness, perceived isolation, and health among older adults. *Journal of Health and Social Behavior, 50*(1), 31–48. https://doi.org/10.1177/002214650905000103

Das, M., & Bhattacharyya, A. (2020). Subjective well-being through social support networks among Indian peri-urban elderly. *Indian Journal of Gerontology, 34*(3), 293–312.

Dey, J. K., & Dey, S. K. (2020). SARS-CoV-2 pandemic, COVID-19 case fatality rates and deaths per million populations in India. *Journal of Bioinformatics, Computational and Systems Biology*, 1–12.

Dommaraju, P. (2015). One-person households in India. *Demographic Research, 32*, 1239–1266.

Gardner, W., States, D., & Bagley, N. (2020). The Coronavirus and the risks to the elderly in long-term care. *Journal of Aging & Social Policy*, 1–6. https://doi.org/10.1080/08959420.2020.1750543

Gautam, S., & Hens, L. (2020). SARS-CoV-2 pandemic in India: What might we expect? *Environment, Development and Sustainability, 22*, 3867–3869. https://doi.org/10.1007/s10668-020-00739-5

Gavazzi, G., Herrmann, F., & Krause, K.-H. (2004). Aging and infectious diseases in the developing world. *Clinical Infectious Diseases, 39*(1), 83–91. https://doi.org/10.1086/421559

Graham, C. L., Scharlach, A. E., & Wolf, J. P. (2014). The impact of the "village" model on health, weil-being, service access, and social engagement of older adults. *Health Education & Behavior, 41*, 91S–97S. https://doi.org/10.1177/1090198114532290 (Supplement Issue: Fostering Engagementand Independence: Opportunities and Challenges for an Aging Society).

Gupta, S. (2020). *Social distancing comes with psychological fallout*. Retrieved April 25, 2020, from ScienceNews: https://www.sciencenews.org/article/coronavirus-covid-19-social-distancing-psychological-fallout.

Help Age International. (2020). Retrieved November 23, 2020, from www.helpage.org: https://www.helpage.org/what-we-do/protecting-older-people-during-the-coronavirus-covid19-pandemic/.

Iecovich, E., Barasch, M., Mirsky, J., Kaufman, R., Avgar, A., & Fogelson, A. K. (2004). Social support networks and loneliness among elderly jews in Russia and Ukraine. *Journal of Marriage and Family, 66*(2), 306–317. https://doi.org/10.1111/j.1741-3737.2004.00022.x

Jawaid, A. (2020). SCIENCE. In J. Sills (Ed.). *Protecting older adults during social distancing* (Vol. 368, p. 145). https://doi.org/10.1126/science.abb7885 (6487).

Kaulagekar, A. (2007). Ageing and social support: A study of low-income urban elderly in pune. *Indian Anthropologist, 37*(2), 45–53.

Khan, A. (2020). *Doctor's Note: The psychological effects of social distancing*. Retrieved April 25, 2020, from AlJAZEERA: https://www.aljazeera.com/indepth/features/doctor-note-psychological-effects-social-distancing-200414071411061.html.

Leonard, S. H., & Gutmann, M. P. (2005). Isolated elderly in the U.S. Great plains. The roles of environment and demography in creating a vulnerable population. *Annales de d'Émographie Historique, 2*(110), 81–108.

MacKinnon, M. E., Gien, L., & Durst, D. (2001). Silent pain: Social isolation of the elderly Chinese in Canada. In I. Chi, N. L. Chappell, & J. Lubben (Eds.), *Elderly Chinese in pacific rim countires* (pp. 1–14). Hong Kong University Press.

Mane, A. B. (2016). Ageing in India: Some social challenges to elderly care. *Journal of Gerontology & Geriatric Research, 5*(2), 1–2. https://doi.org/10.4172/2167-7182.1000e136

Matt, G. E., & Dean, A. (1993). Social support from friends and psychological distress among elderly persons: Moderator effects of age. *Journal of Health and Social Behavior, 34*(3), 187–200.

Ministry of Health and Family Welfare, India. (2020). *Health advisory for elderly population of India during COVID19*. Retrieved April 9, 2020, from Ministry of Health and Family Welfare, India: https://www.mohfw.gov.in/pdf/AdvisoryforElderlyPopulation.pdf.

Morley, J. E., & Vellas, B. (2020). COVID-19 and older adults. *The Journal of Nutrition, Health & Aging, 24*, 1–2. https://doi.org/10.1007/s12603-020-1349-9

Mui, A. C., & Kang, S.-Y. (2006). Acculturation stress and depression among asian immigrant elders. *Social Work, 51*(3), 243–255. https://doi.org/10.1093/sw/51.3.243

Murray, E. J. (2020). Epidemiology's time of need. *The Journal of Economic Perspectives, 34*(4), 105–120. https://doi.org/10.1257/jep.34.4.105

Nahemow, N. (1979). Residence, kinship and social isolation among the aged baganda. *Journal of Marriage and Family, 41*(1), 171–183. https://doi.org/10.2307/351741

Panda, P. K. (1998). The elderly in rural Orissa: Alone in distress. *Economic and Political Weekly, 33*(25), 1545–1550.

Paslithil, A. (2010). An aging Indian population : Issues and problems. *Proceedings of the Indian History Congress, 70*, 1095–1099.

Qiu, W., Rutherford, S., Mao, A., & Chu, C. (2017). The pandemic and its impacts. *Health, Culture and Society, 9–10*, 1–11.

Rajan, S. I., & Kumar, S. (2003). Living arrangements among Indian elderly: New evidence from national family health survey. *Economic and Political Weekly, 38*(1), 75–80.

Rana, U. (2020). Elderly suicides in India: An emerging concern during COVID-19 pandemic. *International Psychogeriatrics*, 1–2. https://doi.org/10.1017/S1041610220001052

Saltzman, L. Y. (2020). Loneliness, isolation, and social support factors in post-COVID-19 mental health. *Psychological Trauma: Theory, Research, Practice, and Policy, 12*(S1), S55–S57. https://doi.org/10.1037/tra0000703

Sekher, T. (2018). Plague administration in princely Mysore: Resistance, riots, and reconciliation. In W. Ernst, B. Pati, & T. V. Sekher (Eds.), *Health and medicine in the Indian princely states: 1850-1950*. London and New York: Routledge Studies in South Asian History. Retrived December 5, 2020 from https://books.google.co.in/books?id=RgkqDwAAQBAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false.

Selvam, A. M., & Vignesh, D. (2020). Analysis of the effects of social distancing in controlling the spread of COVID-19. *Alochana Chakra Journal, IX*(IV), 217–221.

Sood, S. (2020). Psychological effects of the Coronavirus disease-2019 pandemic. *RHiME, 7*, 23–26. Retrived August 4, 2020 from https://www.rhime.in/ojs/index.php/rhime/article/view/264.

Steptoe, A., Shankar, A., Demakakos, P., & Wardle, J. (2013). Social isolation, loneliness, and all-cause mortality in older men and women. *Proceedings of the National Academy of Sciences of the United States of America, 110*(15), 5797–5801. https://doi.org/10.1073/pnas.1219686110

Swetha, G., Eashwar, V. M. A., & Gopalakrishnan, S. (2019). Epidemics and pandemics in India throughout history: A review article. *Indian Journal of Public Health Research & Development, 10*(8), 1503–1509. DOI: 10. 1570. 10.5958/0976-5506.2019.02328.3.

Temkin-Greener, H., Bajorska, A., Peterson, D. R., Kunitz, S. J., Gross, D., Williams, T. F., & Mukamel, D. B. (2004). Social support and risk-adjusted mortality in a frail older population. *Medical Care, 42*(8), 779–788. https://doi.org/10.1097/01.mlr.0000132397.49094.b3

Thanakwang, K., & Soonthorndhada, K. (2011). Mechanisms by which social support networks influence healthy aging among Thai community- dwelling elderly. *Journal of Aging and Health, 23*(8), 1352–1378. https://doi.org/10.1177/0898264311418503

Thu, T. P. B., Ngoca, P. N. H., Hai, N. M., & Tuan, Le A. (2020). Effect of the social distancing measures on the spread of COVID-19 in 10 highly infected countries. *The Science of the Total Environment, 742*, 1–8. https://doi.org/10.1016/j.scitotenv.2020.140430

UNICEF-India. (2020). Caring for the elderly during the COVID-19 pandemic. Retrieved November 24, 2020, from www.unicef.org https://www.unicef.org/india/stories/caring-elderly-during-covid-19-pandemic.

WHO. (2020a). *Coronavirus disease 2019 (COVID 19) situation report -72*. Retrieved May 15, 2020, from WHO: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200401-sitrep-72-covid-19.pdf?sfvrsn=3dd8971b_2.

WHO. (2020b). *Decade of healthy ageing*. Retrieved November 4, 2020, from WHO: https://www.who.int/initiatives/decade-of-healthy-ageing#:~:text=The%20Decade%20of%20Healthy%20Ageing%20(2020%2D2030)%20is%20an,people%2C%20their%20families%2C%20and%20the.

WHO. (2020c). *Older people & COVID-19*. Retrieved November 4, 2020, from WHO: https://www.who.int/teams/social-determinants-of-health/covid-19.

Yu, D., Lin, Q., Chiu, A. P. Y., & He, D. (2017). Effects of reactive social distancing on the 1918 influenza pandemic. *PloS One, 12*(7), 1–16. https://doi.org/10.1371/journal.pone.0180545