



Building on the evidence of the impact of coronavirus (COVID-19) in South African informal settlements. A mini Review

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Date of Submission: 20-05-2021

Date of Acceptance: 04-06-2021

ABSTRACT

The world is currently grappling with the coronavirus epidemic (COVID-19), which has created a sense of panic worldwide due to the humongous number of infections and lives that have been lost to date. In Africa, particularly in South Africa; poor and vulnerable populations in informal settlements are at risk of being seriously affected by this virus. As part of its findings, the review noted that informal settlements are currently operating on a 'survival mode' due to the underlying socio-economic problems that have been worsened by Covid19 pandemic. A dearth of holistic and adequate government support systems that are embedded on socio-economic pro-development policies that address the plight of the poor and marginalised in South Africa emerged as one of the causal factors that poses a huge threat towards inability of informal settlers to shield themselves from Covid 19 . We conclude the mini review by calling for immediate attention to the frailty that the informal settlers continue face which is strongly marked by a lack of sufficient health systems; knowledge sharing, unemployment, crime, gender-based violence and preposterous infrastructure amidst the Covid19 pandemic.

KEY WORDS: informal settlements; coronavirus, poverty; inequality; unemployment; outbreak.

I. INTRODUCTION

The coronavirus (COVID-19) has catapulted its way into daily consciousness of everybody's lives in the world. It is an inescapable subject that continues to be debated around the globe in every corner, hallway, wall, sector and avenue. One might say this is the world's greatest 'health epidemic and human disaster' due to its wide scope and the number of lives lost to date. In addition, it has disrupted all economic and social

activities worldwide with several governments to date having called for lock-downs to curtail its spread. However, COVID 19 has exposed the disparities in terms of health systems between the developed and developing countries in dealing with this pandemic. While Europe, America and India are the hardest hit countries so far, the risk posed to underdeveloped countries in Africa and Asia by this virus is insurmountable. This pandemic has been declared by the World Health Organisation (WHO) a disaster for the economic growth of African countries. Meanwhile, the United Nations (UN) has declared that the COVID-19 will cause more than half of jobs to be lost in Africa. Of particular interest is the high risk posed by this virus to poor and vulnerable communities located in informal settlements or 'slums' where one quarter of the world's population lives as UN-Habitat (2015) claims.

With more cases of new infections identified daily, the coronavirus (COVID-19) pandemic is continuing to escalate. The number of global cases has reached more 161 million mark at the moment; clearly showing no signs of stoppage. This is a cause for concern across the world. In addition, this pandemic has unparalleled global, economic and cultural effects on the African continent, and its impact would call into question its ability (Gopaldas, 2020) to deal with this magnitude of infectious disease outbreak. Though, Mususa (2020) suggests that countries in Southern Africa should use their previous population prevention experience to tackle infectious disease outbreaks such as malaria, HIV / AIDS and cholera. Nevertheless, as a result of on-going socio-economic problems, the COVID-19 pandemic has revealed the frailties of public health systems in both developed and developing countries with the former highlighting the underlying inadequate health care systems. Throughout the world, various



tactics have been used to curb the spread of the virus, such as introducing national lockdowns that have dire economic implications, particularly for the poor and vulnerable economies of most African countries.

Aside from the economy, COVID-19 outbreak presents a significant threat to public health in informal settlements. These are, by definition, poor, insecure, under resourced and overcrowded areas situated at the outskirts of urban centres. In its main urban centres (Brown-Luthango, Reyes, and Gubevu, 2016), South Africa has a significant number of informal settlements that are actually at high risk of being exposed to the disease. This is largely due to their poor living conditions and persistent poverty which makes them unable to cope with the outbreak of this magnitude. While the state of informal settlements continues to deteriorate, existing and previous mitigation approaches pursued by past and present governments to resolve the problems of informal settlements have proven unsuccessful (Misselhorn, 2008). Consequently, this challenges the readiness status of these densely populated areas to combat the spread of this pandemic despite their present realities which are strongly marked by a lack of sufficient health systems to cater for them. By locking down the country, informal settlements risk losing their source of income and ultimately their livelihoods due to the lack of safety nets and individual savings (Melber, 2020) to help mitigate COVID-19's social and economic impacts (Bodewig, et.al, 2020). With the introduction of the coronavirus (COVID-19) pandemic, the instability of the situation is likely to escalate. This paper therefore focused on examining the effect this pandemic has had on informal settlements in South Africa.

What is (COVID-19)?

The outbreak of the novel coronavirus (COVID-19) was first witnessed and reported in Wuhan, Hubei, China province, in 2019 (Mcleod, 2020). This prompted the World Health Organisation (WHO) to label the virus a global pandemic (South African Regulatory Authority for Health Goods, 2020). Several symptoms associated with the virus have been identified, but it has similar characteristics that are associated with common cold or flu with the inclusion of respiratory symptoms such as dry cough, fever, and shortness of breath and breathing difficulties (Mcleod, 2020), and its severe form can lead to death. In some cases it can cause serious acute respiratory syndrome, kidney failure and pneumonia (Mcleod, 2020). During

coughing and sneezing by infected people the virus will spread from one person to the other through droplets (WHO, 2020).

Knowledge sharing may be one of the best ways to teach people about this pandemic according to the World Health Organization (2020). This relates to concerns such as understanding the virus, how it spreads and the various mitigation strategies that can be used to curb its spread, such as regular hand washing with sanitizers or alcohol-related rubbers, and avoiding touching the nose (WHO, 2020). Countries such as the USA, Brazil, India, Russia, Peru, Colombia, Mexico, Spain and have reported a humongous number of cases and deaths due to COVID-19. In the African continent, South Africa has recorded the highest number of COVID-19 cases and it is part of the top 20 countries in the world that have been hit hard by this pandemic.

Recent global trends show that the number of cases of coronavirus (COVID-19) is "like a spread of wildfire" Such astronomical statistics of COVID-19 infections and death cases have sent shockwaves all over the world, with most governments resorting to the introduction of strict conditions to curb the spread of this virus. Most notably, lock-downs, travel bans (air, road and sea), restricted people's movements, closure of shops and other businesses, closure of schools and universities and prohibition of public gatherings. The virus embedded itself in every area of people's lives, putting a stop to human activities such as day-to-day tasks and encounters with humans. People were confined to their homes with limited outside world contact; a condition that is not conducive to people living in informal settlements. This is borne out by the argument that they are still living in crowded spaces with minimal resources where deprivation, unemployment, crime, gender-based abuse, inadequate infrastructure and poor delivery of services are rife.

Conceptualisation of informal settlements

Informal settlements are a prominent feature in most urban areas and cities throughout the globe (30%), with Sub-Saharan Africa having 55% of its residents living in these areas (World Bank, 2018). In South Africa, informal settlements are a common feature mostly established by poor and vulnerable communities largely affected by the triple tragedy of poverty, unemployment and inequality. According to the UN-Habitat (2012), informal settlements by definition usually describe shelters and residential areas that are situated within the periphery of urban areas and these are homes or shelters that are constructed by the residents raising



questions on the legality of the existence of such areas as a consequence of non-compliance to housing regulations. Another description provided by UN Habitat (2015) purports that the predominant features of informal settlements include inadequate healthcare, lack of basic services, poverty, lack of water and sanitation, poor housing infrastructure and lack of security for the inhabitants of these poorly built housing infrastructure. Meshkini, Mansoor and Esfaram (2015) argue that the existence of informal settlements in urban areas is highly linked to the prevalence of poverty. This can be perceived through, “physical disconnection of some residential areas from whole city and in framework of reduced access to urban, social services, the quality of living; and on the other hand, marginalization and social isolation of some groups in such habitats” (Meshkini et al., 2011 p. 124). In quintessence, informal settlements are located in environmentally and geographically perilous zones with non-compliance to construction protocols by the occupants and permissible entitlement to the land on which the building of their houses is done (UN-Habitat, 2003). In the context of South Africa, it is imperative to take a closer look at the history and institutionalisation of informal settlements during the pre- and post-apartheid era, and how such establishments pose a major threat, particularly with the impending rise of this pandemic.

Informal settlements in South Africa: History and typology

South Africa has a long dual diachronic spatial development program initiated by the apartheid government resulting in separate urban-rural growth trajectories. However, people's exodus to seek better economic opportunities resulted in rapid migration to urban centres in search for greener pastures. This is due to the dire consequence of former Bantustans underdevelopment that gave the black majority little economic opportunity and action. In addition, the racist and segregatory policies enforced by the Apartheid government meant that Africans, Indians and Colored People had minimal socio-economic opportunities. Because of the high cost of living in these urban centres and the low minimum wages, informal settlements have been developed to ease the burden of housing and accommodation for those in desperate need of shelter.

In comparison, these areas are marked by dilapidated housing, inadequate water and sanitation, inadequate roads and services, poor health facilities and overcrowding, leaving these communities vulnerable to deprivation,

unemployment and inequality. That has resulted in protests against abuse, crime and service delivery being the order of the day in a majority of informal settlements across the country. Essentially, the ANC led government stands accused of failing to deliver the people residing in informal settlements to the “Promised Land” of socio-economic pro-development policies that address the plight of the poor and marginalised in South Africa. In the final analysis, what lies between the eradication of informal settlements and poverty is the adherence to human rights such as the right to life, the right to health, the right to human dignity, the right to education, the right to human protection, the right to democracy and, most importantly, the right to adequate housing, which has, sadly, eluded the potential of the ANC led government since the dawn of democracy. Adherence to these principles could eventually lead to the provision of basic services and amenities to eradicate poverty and other socio-economic challenges in informal settlements.

World Bank report in 2018 confirmed that South Africa is possibly the most unequal developing country in the world due to spatial gaps that remain deeply ingrained in the landscape, particularly in townships (where a number of informal settlements are located) situated in the periphery of urban centres (World Bank, 2018). Over the years, the number of informal settlements has increased in numbers due to the increasing levels of poverty, unemployment and inequality, especially among poor and vulnerable communities. Several characteristics are correlated with informal settlements in South Africa, including; insecurity and vulnerability; inappropriate positioning; lack of public and private sector investment; deprivation and lack of socio-economic growth and illegality and informality (Human Settlements Department, 2009).

Painting a picture of the historical and present realities of informal settlements in South Africa

Poverty levels that continue to increase are an indicator that low-income South Africans will remain locked up in informal settlements without sufficient water, sanitation of the right to quality education, human dignity for health, equality for citizens (women and children) and social stability (Noyoo & Sobantu, 2017). Hohmann (2013) therefore advances that the South African government is accused of failing to maintain the connection between human rights and housing (informal settlements). South Africa, for example, reported a total of 67 750 protests between 1997 and 2013 (Alexander, Runciman, & Maruping, 2017).



Whereas in 2015, Mukhuthu (2015) reported that the Eastern Cape police responded to 2 045 service delivery protests organized mainly in Informal and marginal settlements around accommodation, water and electricity (Tournadre, 2017). Earlier research study echoes the current status quo and advanced that what is currently taking place in informal settlements in South Africa is an indication that the state has largely ignored or declined to address questions relating to respect, protection, promotion and enforcement of the rights of informal settlements (Kellett & Napier, 1995).

In addition, scholars such as Gibson (2011) and Mottiar and Bond (2012) advance the notion that inhabitants of informal settlements in South Africa in the past have demanded and continue to demand human dignity and respect as equals. Reason for the de facto approach to informal

settlements was one of relocation, eviction and demolition at the expense of informal settlement residents, with a focus on fully formalised state-subsidised housing as the preferred model for providing housing to the poor (Chenwi, 2012). Reason being, these areas are vulnerable to infectious and non-communicable diseases such as cholera, diarrhoea, tuberculosis (TB), HIV/AIDS, chronic diseases, lower respiratory diseases and diabetes that weaken resident immune systems (Ambert, 2006). These have all contributed to a series of protests by residents because people living in informal settlements do not enjoy any of those basic cultural and socio-economic rights. This is demonstrated by features like inadequate housing, lack of employment, access to health care, living in unhealthy conditions, property rights and social security (RSA, 1996).



Source : Ground Up : Picture taken by J. Abrahams in Cape Town, Fransiena Louw at Egoli informal settlement during lockdown in 2020.



Source Ground up 2020: Photo by Mary-Anne Gontsana showing dirty water after a sewer pipe burst in Khayelitsha in an informal settlement called Thembeni.

As depicted above, shacks built in the informal settlement are dilapidated, hence the high prevalence of crime with little or no security. In addition, households are overcrowded leading to high risk and susceptibility to infectious diseases such as cholera, diarrhea, HIV / AIDS and tuberculosis (TB). This is combined with the shortage of health infrastructures such as hospitals and clinics to tackle the outbreak of these diseases. Inhuman conditions such as poor sanitation compel households to depend heavily on the bucket system. This shows the historical and present truths of how South Africa is accused of failing to meet its human rights obligations with respect to informal settlements, and how its policies are unsuccessful in resolving the challenges faced by poor and disadvantaged communities.

Findings and discussion on the impact of coronavirus (COVID-19) on informal settlements in South Africa

As previously eluded, South Africa's informal settlements are marked by significant

disparities in access to basic facilities, such as water, sanitation, accommodation, and electricity and the emergence of coronavirus has brought under the spotlight the plight and public health risk of poor communities, particularly in dense populated areas. The risk posed by this pandemic is immense due to a myriad of factors and underlying causes which clearly demonstrate the inability of informal settlements to deal with a virus of this magnitude. Hence, in accordance with the literature review, the findings of this paper are presented under the socio-economic themes.

Worsen underlying health conditions

Over the years, South Africa's healthcare system has been under criticism due to its divisive and segregatory nature, primarily created by the past and legacy of apartheid that side-lined the bulk of the black population from benefiting from the public health system. In addition, community members living in informal settlements have become victims of infectious diseases such as AIDS, tuberculosis, diarrheal diseases; lower respiratory tract infections



and non-communicable diseases such as diabetes, various types of heart disease and hypertensive diseases. In support of the foregoing is Flaherty, et al., (2020) who posit that a high burden of severe disease and death from the coronavirus disease 2019 (COVID-19) has been consistently observed especially those with pre-existing medical comorbidities. These scholars further posit that the outbreak of this virus will worsen the health conditions of members who currently have weak immune systems as a result of their underlying health conditions. Nwosu and Oyenubi (2021) further suggest that the vulnerable population due to lockdown have been the most affected as such have high chances of getting adequate health care especially for those with chronic diseases. This implies that with the outbreak of COVID-19, chances of surviving for people living in informal remains slim due to high levels of poverty, unemployment and lack of adequate socio-economic rights.

The sentiments reverberated by the foregoing scholars explicitly illustrate the threats and weaknesses that COVID-19 brings upon the safety of people living in informal settlements (Nyashanu, Simbanegavi, & Gibson, 2020). According to South Africa's Socio-Economic Rights Institute (SERI) (2018), residents in informal settlements are also more vulnerable to infectious diseases, with Tuberculosis (TB) along with diabetes and cerebrovascular disease as the leading causes of death among South Africans. Informal settlements are therefore heavily burdened with infectious and non-communicable diseases that worsen their plight against the advent of the novel COVID-19. What makes the situation even more difficult is the government's inability to resolve the inequality disparities particularly in the public health system (Weimann & Oni, 2019). Lack of healthcare facilities and staff in informal settlements has widened the divide between those who have medical aid systems and can afford private hospital healthcare and those who are poor and unemployed and have to resort to the already overburdened public hospital healthcare network (Corburn & Sverdlik, 2017; Govender, Barnes & Pieper, 2011).

Plummeting unemployment levels

South Africa is considered a middle-income country; however, it is continually plagued by high levels of unemployment which have exacerbated rates of poverty in poor communities including informal settlements. As such, most people living in informal settlements are unable to access jobs due to low levels of education, high

transport costs, lack of knowledge and networks to job opportunities (Nyashanu et al., 2020). To make matter worse, the advent of COVID-19 has contributed to the shutdown of businesses and industries resulting in the country having little economic activity; increasing the already high rates of unemployment. Informal settlements are the hardest hit because people are unable to access work. According to Smit (2020, p.1) informal settlement are also particularly vulnerable to economic shocks, such as those caused by the COVID-19 lockdowns and restrictions, as most residents have precarious short-term sources of income, for example, from informal trade or from casual work. In essence, the fact that unemployment has always been one of the biggest challenges facing residents of informal settlements meant that the closing down of businesses during the shutdown imposed by the government culminated to little or no chances of getting employed with the youths being the most affected by unemployment. According to a global Report in 2020, it emerged that the impact of the pandemic on young people who are already being termed the "lockdown generation" was not only systematic but deeply entrenched and was particularly hard on young women, younger youth and youth in lower-income countries (ILO, 2020a). In their article titled 'Now my life is stuck!': Experiences of adolescents and young people during COVID-19 lockdown in South Africa, Gittings, Toska, Medley, Cluver, Logie, Ralayo, Chen & Mbithi-Dikgole (2021) cement the above contentions. These researchers in their findings document lack of basic necessities, food insecurity, lost livelihoods, changes to social service provisions, school and work disruptions and psychosocial stress among the youth.

Thus it cannot be denied that there exists an intertwined relationship between infectious disease outbreak (in this case COVID-19) and the toll it takes on the economy; especially in the way it has negatively affected the youth who are the future generation while worsening the situation of those who are unemployed. To make matters worse, the location of informal settlements plays a crucial role in terms of economic opportunities and unemployment. Tissington (2012) argues that the location of informal settlements in relation to work opportunities and social services is an extremely important factor and this is due in large part to the proximity of workers, the cost of transport and costs of living. Families and households in informal settlements fail to shield themselves from COVID-19's extreme effects on the broader economy and its job prospects.



Loss of livelihoods

Livelihoods of people living in informal settlements depend heavily on the informal sector. This form of business fosters social interaction and contact; a sharp contrast of social distancing encouraged in curbing the spread of COVID 19. Consequently, the restrictions placed on companies (both formal and informal) during the lock-down compounded on their survival. Of particular interest is the effect of this virus' outbreak on informal enterprises where a majority depend on it as a source of livelihood. This is especially evident in the establishment of numerous informal businesses in informal settlements such as the liquor businesses which were forced to close down and never to open again and in the process the poverty level rose exponentially. In support of the foregoing views is Satterthwaite and Mitlin (2014, pp. 240–241). These scholars posit that:

Poverty is often a defining characteristic of informal settlements. Residents of these settlements are faced with vulnerabilities such as inadequate and unstable incomes, payment of high prices for necessities, inadequate protection of rights through the operation of the law, voicelessness and powerlessness within political systems, inadequate provision of infrastructure, lack of collateral for accessing credit, few or no savings and health burdens from undernutrition and the use of poor-quality food, fuel and water.

The above citation highlights how COVID-19 outbreak has had a significant negative effect on the activity of informal businesses that are the key source of livelihood for the majority of informal settlement people. Petersen and Charman (2017) contend that more than 50% of all economically disadvantaged and predominantly black South Africans are directly affected by the township economy. Such South Africans live mostly in densely populated (informal) areas and Covid19 has forced a majority of these families into the pit of deprivation. Greenberg (2015) argues that micro-enterprises in this context (informal settlements) are an organic phenomenon in the South African economic system, generating substantial livelihood opportunities to keep people out of poverty with the informal economy, which is a broad periphery of formal food value chains. Undoubtedly, COVID-19 has immensely contributed to unparalleled effects on the informal economy, exacerbating households' livelihood prospects in informal settlements even further. For instance, it has been noted that the impact of the pandemic has mostly been along the

lines of the already well known and documented vulnerabilities such as lack of safety nets (Asante-Poku & van Huellen, 2021; Abraham, Basole, & Kesar, 2021).

Household food insecurity

Food insecurity is a major problem for households in informal settlements due to deprivation, overpopulation and unemployment that prevents people from accessing jobs to earn income from buying food and other necessities. While food is a basic human right, most families struggle with hunger, which is mostly defined by some households who endure sleeping without putting something into their stomachs. COVID-19 has further intensified this fact which is restricting breadwinners' attempts to find new ways to put food on the table (Kesar, Abraham, Lahoti, Nath & Amit Basole, 2021). As a result, these families have to contend with the veracity with which COVID-19 has slowed economic activities that provided them with a lifeline to reduce the challenges of food insecurity, hunger and starvation (Chen, 2014). Food insecurity for the urban poor is a significant public health problem according to (Naicker, Mathee & Teare, 2015). Recent research by Abraham, et al., (2021) suggests that families living in informal settlements in South Africa did not have a 'food safety net' to live and sustain themselves continuously during the implementation of a shutdown of commercial activities such as that experienced by the government's lockdown to curb the spread of COVID-19. Thus, a stop to economic development meant more poverty for families living in these chronically impoverished and vulnerable communities taking. This has been aggravated by the fact that these poor and marginalized communities that mostly depend on the informal economy rely on public spaces and facilities to sustain themselves much more than other populations (Achmadi & Purdey, 2020, Santi Kusumaningrum, Siagian & Harriot Beazley, 2021).

Deteriorating conditions of access to water and sanitation

Lack of access to basic facilities such as water and sanitation is one of the prominent features of informal settlements (UN_Habitant, 2014). In South Africa, owing to on-going protests to resolve such anomalies, responsible municipalities around the country have struggled dismally to provide effective service delivery (Pan, Armitage, & van Ryneveld, 2018, Muanda & Haldenwang, 2020). While the current government inherited a predominantly segregatory, racist and divisive



apartheid regime that abandoned informal settlement growth, little has been done to resolve this growing gap between formal and informal settlements. In addition, lack of access to water and sanitation poses a high risk to residents' health, leading to increased exposure to waterborne diseases such as diarrhoea and cholera. Informal settlements are characterised by contaminated and polluted water coupled with spilling sewages. Over and above, this poses grave danger amongst communities to curb the spread of COVID-19 through regular washing of hands (Kimani, Steege, Makau, Nyambu, Wairutu, & Tolhurst 2021). In South Africa, the informal settlements already have problems of poor people who lack access to basic services such as water, sanitation and electricity (Muanda & Haldenwang, 2020). As such, Covid19 has meant that most of these families spend time in their very small shacks with a large number of family members which is a complete contradiction of social distancing. This has led to their health being compromised due to these persisting problems and extant literature suggests that the situation is going to be aggravated by the COVID-19. This has in the process made the Informal settlements to emerge as the epicentre in the global battle against COVID-19 (French, Ramirez-Lovering, Sinharoy, Turagabeci, Latif, Leder & Brown, 2020). A study by Roeleveld, (2020) also concluded that community members' readiness to combat the spread of COVID-19 by daily hand washing is under risk due to lack of water access adequate sanitation. An earlier report by WHO in 2009 further cements the preceding assertions that the lack of, or inadequate access to improved sanitation facilities and poor hygiene practices has been flagged amongst the contributing factors to high incidences of sanitation and hygiene-related mortality and morbidity.

According to the South African Socio-Economic Rights Institute (SERI) (2018), access to water in informal settlements is typically limited to communal water sources. This implies that community members in informal settlements have access to community water pipes that are normally congested with long queues of people in need of water and sanitation. In addition, this exposes people to large group gatherings that clearly contravene the restrictions imposed such as social distancing (Knipper, Sedas, Keshavjee *et al.*, 2021). Many community members receive their water from polluted sources in some instances which pose a major threat to their health. This claim is supported by Weimann and Oni (2019) who note that the community characteristics of informal settlements contribute to access to polluted water, either due to

the proximity of informal settlements to rivers or due to the lack of drainage. Therefore, even the most basic COVID-19 prevention measures, such as hand washing (limited water supply), social distancing (high density living), and working from home (informal sector employment), are not possible for informal settlement residents (Corburn *et al.*, 2020). The situation is further aggravated by the lack of collection of refuse from the responsible authorities which exposes residents to disease outbreaks. To make matter worse, the current state of sanitation and toilet supply in the informal settlements is deplorable (Parikh, Diep, Gupte, & Lakanpaul, 2020). For instance, sewage spills the bad stench flowing right in front of the residents doorsteps, along the small alleys between the shacks and just outside the community taps where they get water is the order of the day for these informal settlements. In fact, the lack of toilets makes it impossible for people to have safe and dignified areas in which to relieve themselves. As a result, they turn to desperate measures such as the bucket system to ease themselves in their one or two roomed shacks. These practices are not recommended during COVID-19 outbreak which requires a high level of environmental and personal cleanliness. In support of the foregoing assertions, (Parikh, et al., 2020; Wasdani & Prasad, 2020) advance that the COVID-19 pandemic has exposed long-lasting issues in Water, Sanitation and Hygiene (WASH) sector globally. Whereas, Hara, Ncube and Sibanda, (2020 p.3) writing from South Africa perspective using case examples of Cape Town Townships and informal settlements had this to say:

The Covid-19 hygiene guidelines and requirements not only reveal the yawning gap in inequality in terms of adequate access to water and sanitation between poor and marginalised communities and the rest of society, but paints the grim picture that this gap might actually be widening.

The above sentiments are not surprising taking into consideration that in 2019 a United Nations Report on progress towards the sustainable development goals illuminated that an estimated 60% of people in the world, and only 38% in least developed countries have a basic handwashing facility with soap and water at home, leaving out about 3 billion people (United Nations, 2019).

Predominance of Gender-based Violence (GBV) due to Covid 19

Gender-based violence (GBV) has and continues to ravage South African society which has in the process weakened women and girls'



dignity and worth. Over the years, a substantial number of cases have been captured through mass media and women and girls have fallen victim to physical violence, sexual harassment, rape and murder; perpetuating in and out of family setup and in the process promoting a sense of unease and lack of protection. Unfortunately, GBV has been escalating since COVID-19 outbreak. Mittal and Sighn (2020) advance that Covid-19 is not different to the pandemics in the , since this too has resulted in an increase in cases of domestic violence. Whereas, Bradbury-Jones and Isham (2020) add that the Covid19 has granted greater freedom to abusers. For instance in South Africa, with just seven days into lockdown the South African Police Service (SAPS) received a staggering 2,300 calls for help related to GBV and nearly three months into lockdown a total of 21 women and children had been killed in South Africa. Women are continuously witnessing this trend which has ravaged and fractured not only the South African society but other countries as well and informal settlement are not an exception (Schalatec, 2020; ILO, 2020; Karaka, 2020; Smith, 2020; the Guardian, 2020). Poverty has been highlighted as one of the causal factors pushing men to abuse women because of food insecurity and income constraints. In particular, women living in vulnerable and disadvantaged societies are facing the largest brunt of these odious acts. In South Africa, one woman is killed every 3 hours due to GBV now referred to as the second pandemic and a twin pandemic to COVID19 (Dlamini, 2020). Accordingly, United Nations 2020 recently highlighted that the global restrictions have only worsened the already miserable living conditions of women and children through GBV (UN, 2020). Whereas, UN Women (2020) further added that at the time when a majority of the global population was in lockdown due to COVID-19, the number of women and girls between ages of 15 and 49 who had been subjected to sexual and/or physical violence perpetrated by an intimate partner (GBV) was no less than 243 million (UN Women, 2020a, Dlamini, 2020).

II. CONCLUSION

The novel COVID-19 has revealed structural issues in public health systems around the world; with developing countries unable to cope with the pandemic because of the complexity of its magnitude and the numbers of infections that are ballooning. In Africa, while the number of infections is much lower than in Europe and America, the public health infrastructure is already

weak; causing tremendous danger and vulnerability to populations that are already weak. These issues and challenges are not unique to South Africa as a whole. People living in informal settlements have been the most affected as they continue to struggle to cope with the realities of this epidemic, which has taken its toll on their lifestyle and daily routines. The COVID-19 outbreak has highlighted the underlying socio-economic challenges that these vulnerable, marginalized communities face. The current government led by ANC has failed to resolve the divisive and segregating apartheid structure that oppressed informal settlements by subjecting residents to inadequate service delivery, deprivation, unemployment, and inequality. The government's lock-down regulations have driven informal settlements to the verge of the 'survival of the fittest' analogy; as families struggle to survive in this tough time, despite their circumstances. Residents in these heavily populated areas run a high risk of having rights violated by this epidemic unless and until the government tackles their underlying socio-economic issues. Until now, any attempt to alleviate the current situation of informal settlers has not been evident, and currently they are operating in a 'survival mode' with a weak public health system, underlying socio-economic problems, lack of virus knowledge, and lack of a proper support network from their own government that poses a huge threat to their existence.

REFERENCES

- [1]. Abrahams, J. (2020) Lockdown in pictures: a Cape Town photographer's powerful record. <https://www.sabcnews.com/sabcnews/lockdown-in-pictures-a-cape-town-photographers-powerful-record> (Accessed 19 May 2020)
- [2]. Achmadi, A, & Purdey, J. (2020). Talking Indonesia: Covid-19 and the City. <http://indonesiaatmelbourne.unimelb.edu.au/talking-indonesia-covid-19-and-the-city/> (Accessed 13 May 2021).
- [3]. Alexander, M.C. (2018). Infographic: Exploring poverty in South Africa's provinces. Available online at <https://southafrica-info.com/people/infographic-exploring-poverty-south-africa-provinces/>. (Accessed 29 April 2021).
- [4]. Alexander, P., Runciman, C and Maruping., B (2017). SA Crime Quarterly: The Use and Abuse of Police Data in Protest Analysis: South Africa's Incident Registration Information System (Iris).



- [5]. Ambert, C. (2006). An HIV and Aids Lens for Informal Settlement Policy and Practice in South Africa. In Huchzermeyer, M., and A. Karam (eds), *Informal Settlements: A Perpetual Challenges?* Cape Town, University of Cape Town Press.
- [6]. Bank, L. (2005). *Rhythms of the yards: urbanism, gender, and backyard shack upgrading in a South African city*. Paper presented at the Panel on 'Household Welfare, Gender Roles and Labour in the Current World Order' at the Queen Elizabeth House's 50th Anniversary Conference: 'New Development Threats and Promises', Oxford University, 5 July 2005.
- [7]. Bank, L. (2011). *"Home Spaces, Street Styles: Contesting Power and Identity in a South African City"*. London: Pluto Press
- [8]. Bodewig, C., Gentilini, U., Usman, Z., & Williams, P. (2020). https://blogs.worldbank.org/africacan/covid-19-africa-how-can-social-safety-nets-help-mitigate-social-and-economic-impacts?CID=WBW_AI_BlogNotification_EN_EXT. (Accessed 29 April 2021).
- [9]. Bradbury-Jones, C., & Isham, L. (2020). The pandemic paradox: The consequences of COVID-19 on domestic violence. *Journal of clinical nursing*, 29(13-14), 2047–2049. <https://doi.org/10.1111/jocn.15296>
- [10]. Brown-Luthango, M., Reyes, E & Gubevu, M. (2016). Informal settlement upgrading and safety: experiences from Cape Town, South Africa. *Journal of Housing and the Built Environment*, 31(1), 123-140.
- [11]. Butchart, A., Kruger, J & Lekoba, R. (2000). Perceptions of injury causes and solutions in a Johannesburg township: Implications for prevention. *Social Science Medicine*, 50(3), 331–344.
- [12]. Chen, M.A. (2014). Informal Employment and Development: Patterns of Inclusion and Exclusion. *European Journal of Development Research* 26(4), 397–41.
- [13]. Chenwi, L. (2012). Legislative and judicial responses to informal settlements in South Africa: A silver bullet? *Stellenbosch Law Review*, 23(3), 540–563.
- [14]. Corburn J., Sverdlik A. (2017). Slum Upgrading and Health Equity. *International Journal of Environmental Research and Public Health* (IJERPH), 14(4), 342. <https://doi.org/10.3390/ijerph14040342>.
- [15]. Corburn, J., et al., (2020). Slum health: arresting COVID-19 and improving well-being in urban informal settlements. *Journal of urban health*, 97(3), 348–357.
- [16]. Covid19 Cases https://www.worldometers.info/coronavirus/?utm_campaign=homeAdvegas1 (Accessed 17 May 2021).
- [17]. Department of Housing. (2004b). *National Housing Programme: Upgrading of Informal Settlements*. Pretoria: Government Printers.
- [18]. Department of Human Settlements (DHS). (2009). *'Upgrading of Informal Settlement Programme', Part 3 of the National Housing Code*. <https://www.gov.za/about-sa/humansettlements> (Accessed 12 March 2021).
- [19]. Dlamini, J. (2020). Gender-Based Violence, Twin Pandemic to COVID-19. *Critical Sociology*. <https://doi.org/10.1177/0896920520975465>
- [20]. Egger, D., Miguel, E., Warren, S. S., Shenoy, A., Collins, E., Karlan, D., Parkerson, D., Mobarak, A. M., Fink, G., Udry, C., Walker, M., Haushofer, J., Larrebourg, M., Athey, S., Lopez-Pena, P., Benhachmi, S., Humphreys, M., Lowe, L., Meriggi, N. F., Wabwire, A., ... Vernot, C. (2021). Falling living standards during the COVID-19 crisis: Quantitative evidence from nine developing countries. *Science advances*, 7(6), eabe0997. <https://doi.org/10.1126/sciadv.abe0997>
- [21]. Flaherty, G.T., Hession, P., Liew, C.H. et al. COVID-19 in adult patients with pre-existing chronic cardiac, respiratory and metabolic disease: a critical literature review with clinical recommendations. *Tropical Disease Travel Medicine and Vaccines*, 6, 16. <https://doi.org/10.1186/s40794-020-00118-y>
- [22]. ForWordpress. (2013). Duncan Village 2. <https://nellapowell.wordpress.com/2013/08/13/scenes-from-a-moving-car/duncan-village-2>. Accessed 4 April 2021.
- [23]. French, M., Ramirez-Lovering, D., Sinharoy, S. S., Turagabeci, A., Latif, I., Leder, K., & Brown, R. (2020). Informal settlements in a COVID-19 world: moving beyond upgrading and envisioning revitalisation. *Cities & Health*, 1–4. <https://doi.org/10.1080/23748834.2020.1812331>
- [24]. Gibson, N.C. (2011). *Fanonian Practices in South Africa: From Steve Biko to Abahlali baseMjondolo*. Scottsville, South Africa: University of KwaZulu-Natal Press.
- [25]. Gilili, C. (2017). Three years without electricity for Duncan village residents.



- <http://wwmp.org.za/elitsha/2017/10/19/three-years-without-electricity-for-duncan-village-residents/>. (Accessed 4 April 2021).
- [26]. Gittings, L., Toska, E., Medley, S., Cluver, L., Logie, C. H., Ralayo, N., Chen, J., & Mbithi-Dikgole, J. (2021). 'Now my life is stuck!': Experiences of adolescents and young people during COVID-19 lockdown in South Africa. *Global public health*, 1–17. Advance online publication. <https://doi.org/10.1080/17441692.2021.1899262>
- [27]. Gopaldas, R. (2020). Time Will Tell the Impact of COVID-19 on African economies. <https://allafrica.com/view/group/main/main/id/00072308>. (Accessed 4 April 2021).
- [28]. Govender T., Barnes J.M., Pieper C.H. Housing conditions, sanitation status and associated health risks in selected subsidized low-cost housing settlements in Cape Town, South Africa. *Habitat International*, 35(2), 335-342.
- [29]. Greenberg, S. (2015). *Corporate concentration and food security in South Africa: is the commercial agro-food system delivering?* Institute for Poverty, Land and Agrarian Rural Status Report 1.
- [30]. GroundUp (2020). 2020 in pictures: A year of living dangerously Covid-19, evictions, fires and an elephant: GroundUp's photos of the year <https://www.groundup.org.za/article/2020-year-review/> (Accessed 19 May 2020)/
- [31]. Handcock, M.S & Gile, K.J. (2011). Comment: on the concept of snowball sampling. *Sociological Methodology*, 41(1), 367-71.
- [32]. Hara, M., Ncube B., Sibanda, D. (2020). Water and sanitation in the face of Covid-19 in Cape Town's townships and informal settlements. Technical Report. https://www.researchgate.net/publication/343588510_Water_and_sanitation_in_the_face_of_Covid-19_in_Cape_Town's_townships_and_informal_settlements/references Accessed 17 May 2021).
- [33]. Henning, E., Van Rensburg, W. & Smit, B. (2004). *Why Conduct Qualitative Inquiry. Finding your way in Qualitative Research*. Pretoria: Van Schaik Publishers.
- [34]. Hohmann, J. (2013). *The Right to Housing Law, Concepts and Possibilities*. Oxford: Hart.
- [35]. ILO (2020). COVID-19: Stimulating the economy and employment, As Job Losses Escalate, Nearly Half of Global Workforce at Risk of Losing Livelihoods, ILO, www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_743036/lang-en/index.htm (Accessed 03 May 2021).
- [36]. Karakas, B. (2020), "Violence against women in Turkey during COVID-19", www.mei.edu/publications/violence-against-women-turkey-during-covid-19 (Accessed 28 April 2021).
- [37]. Kellett, P. & Napier, M. (1995). Squatter Architecture? A Critical examination of vernacular theory and spontaneous settlement with reference to South America and South Africa. *Traditional Dwellings and Settlements Review*, 6(2), 7-24.
- [38]. Kesar, S., Abraham, R., Lahoti, R., Nath, P., & Basole, A. (2021). Pandemic, informality, and vulnerability: impact of COVID-19 on livelihoods in India. *Canadian Journal of Development Studies / Revue canadienne d'études du développement*, 42(1-2). 145-164, DOI: 10.1080/02255189.2021.1890003
- [39]. Kimani, J., Steege, R., Makau, J., Nyambuga, K., Wairutu, J., & Tolhurst, R. (2021) 'Building Forward Better: Inclusive Livelihood Support in Nairobi's Informal Settlements'. In Taylor, P. and McCarthy, M. (Eds) Building a Better World: The Crisis and Opportunity of Covid-19, IDS Bulletin 52.1, Brighton: IDS
- [40]. Kusumaningrum, S., Siagian, C., & Beazley, H. (2021). Children during the COVID-19 pandemic: children and young people's vulnerability and wellbeing in Indonesia. *Children's Geographies*, DOI: 10.1080/14733285.2021.1900544
- [41]. Nadvi, L. (2009). Gender approaches to poverty reduction in informal settlements in South Africa: Some perspectives from the Social Movements Indaba—KZN, *Agenda*, 23(81). 80-89. DOI: 10.1080/10130950.2009.9676256
- [42]. M. Knipper, A.C. Sedas, S. & Keshavjee et al., (2021). The need for protecting and enhancing TB health policies and services for forcibly displaced and migrant populations during the ongoing COVID-19 pandemic. *International Journal of Infectious Diseases*. <https://doi.org/10.1016/j.ijid.2021.03.047>
- [43]. Mcleod, V. (2020). COVID-19: A History of Coronavirus. Available online at <https://www.labanager->



- com.cdn.ampproject.org/v/s/www.labmanager.com/lab-health-and-safety/covid-19-a-history-of-coronavirus-2021. Accessed 4 April 2021.
- [44]. Melber, H. (2020). Africa needs tailored responses to coronavirus. <https://nai.uu.se/news-and-events/news/2020-04-03-africa-needs-tailored-responses-to-coronavirus.html>. (Accessed 4 April 2021).
- [45]. Meshkini, A, Mansoor, E,S., & Esfaram, Y. (2015). Analyzing Effective Factors in Establishing Informal Settlements in Babol City using Pathway Analysis (PA) Model, *Cumhuriyet University Faculty of Science Science Journal (CSJ)*, 36(3), 4289-4303.
- [46]. Meshkini, A., Sajjadi, J., Tafakori, A., & Dindoust, J. (2011). Organizing informal settlements through empowerment (Case study: Bagher Shahr, Baba Jafari neighborhood). *Quarterly of Geographical Studies*, 26 (3), 123-148.
- [47]. Meth, P. (2017). Informal Housing, Gender, Crime and Violence: The Role of Design in Urban South Africa'. *The British Journal of Criminology*, 57(2), 240-241.
- [48]. Misselhorn, M. (2008). Informal Settlements Upgrading. Position Paper On Informal Settlements Upgrading : Strategy For The Second Economy For The Office Of The South African Presidency, Urban Landmark.
- [49]. Mittal, S. & Singh, T. (2020). Gender-Based Violence During COVID-19 Pandemic: A Mini-Review. *Womens Health* 1:4. doi: 10.3389/fgwh.2020.00004
- [50]. Mottiar, S. & Bond, P. (2012). The Politics of Discontent and Social Protest in Durban. *Politikon*, 39(3). 309-330.
- [51]. Muanda, C., Goldin, J., & Haldenwang, R. (2020). Factors and impacts of informal settlements residents' sanitation practices on access and sustainability of sanitation services in the policy context of Free Basic Sanitation. *Journal of Water, Sanitation and Hygiene for Development* ,10 (2), 238–248.
- [52]. Mukhuthu, Z. (2015). Eastern Cape Police Pleased with Annual Crime Stats. <http://www.dispatchlive.co.za/news/2015/10/02/eastern-cape-police-pleased-with-annual-crime-stats/> (Accessed 12 March 2021).
- [53]. Mususa, P. (2020). Community response makes for effective prevention. Available online at <https://nai.uu.se/news-and-events/news/20-04-03-community-response-makes-for-effective-prevention.html>. (Accessed 4 April 2021).
- [54]. Naicker, N, Mathee, A. & Teare, J. (2015). Food insecurity in households in informal settlements in urban South Africa. *South African Medical Journal*, 105(4), 268-270. DOI:10.7196/SAMJ.892.
- [55]. Nana Amma, A. & van Huellen, S. (2021). Commodity Exporter's Vulnerabilities in Times of COVID-19: The Case of Ghana. *Canadian Journal of Development Studies*, 42(1/2). 122-144.
- [56]. Nehebay, S. & Kelland, K. (2020). COVID-19 infections growing exponentially, deaths nearing 50 000 worldwide-WHO. Available online at <https://www.iol.co.za/news/world/covid-19-infections-growing-exponentially-deaths-nearing-50000-worldwide-who-45929354>. Accessed 10 April 2021.
- [57]. Noyoo, N., & M. Sobantu. (2017). *Deconstructing and Decolonising Spatiality: Voluntary Housing for a Transforming Johannesburg.* Paper presented at the Joint Seminar on Spatial Transformation in Johannesburg, Johannesburg Institute for Advanced Studies, Melville, South Africa.
- [58]. Nwosu, C.O. & Oyenubi, A. (2021). Income-related health inequalities associated with the coronavirus pandemic in South Africa: A decomposition analysis *International Journal for Equity in Health*, 20(2), 1-12.
- [59]. Nyashanu, M., Simbanegavi, P., & Gibson, L. (2020). Exploring the impact of COVID-19 pandemic lockdown on informal settlements in Tshwane Gauteng Province, South Africa. *Global public health*, 15(10), 1443–1453. <https://doi.org/10.1080/17441692.2020.1805787>
- [60]. Pan, S. M., Armitage, N. P. & van Ryneveld, M. B. (2015). Assessing equity: a way to improve sanitation service delivery in South African informal settlements. *Journal of Water, Sanitation and Hygiene for Development* 8 (3), 429–438.
- [61]. Parikh, P., Diep, L., Gupte, J., & Lakhanpaul, M. (2020). COVID-19 challenges and WASH in informal settlements: Integrated action supported by the sustainable development goals. *Cities (London, England)*, 107, 102871. <https://doi.org/10.1016/j.cities.2020.102871>
- [62]. Petersen, L.M. & Charman, A.J.E. (2017). The scope and scale of the informal food economy of South African urban residential townships: Results of a small-area micro-



- enterprise census. *Development Southern Africa*, 35(1), 1-23.
- [63]. Pinchoff, J., Austrian, K., Rajshekhar, N., Abuya, T., Kangwana, B., Ochako, R., Tidwell, J. B., Mwanga, D., Muluve, E., Mbushi, F., Nzioki, M., & Ngo, T. D. (2021). Gendered economic, social and health effects of the COVID-19 pandemic and mitigation policies in Kenya: evidence from a prospective cohort survey in Nairobi informal settlements. *BMJ open*, 11(3), e042749. <https://doi.org/10.1136/bmjopen-2020-042749>
- [64]. Roeleveld, J. (2020). COVID-19 and Fiscal Policies: Strategies and Challenges Amidst COVID-19 Facing South Africa and Neighbouring Countries. *Intertax*, 48(8-9), 776-782.
- [65]. Rosa, A., Basole, A., & Kesar, S. (2021). *Tracking Employment Trajectories during the COVID-19 Pandemic: Evidence from Indian Panel Data*. Working Paper, Centre for Sustainable Employment. Working Paper #35, Azim Premji University, Bangalore.
- [66]. Satterthwaite, D., & Mitlin, D. (2014). *Reducing urban poverty in the global south*. Oxon: Routledge.
- [67]. Schalatek, L. (2020). The invisible coronavirus makes systemic gender inequalities and injustices visible”, available at: <https://us.boell.org/en/2020/04/30/invisible-coronavirus-makes-systemic-gender-inequalities-and-injustices-visible> (Accessed 17 May 2021).
- [68]. Simiyu, S., Cairncross, S. & Swilling, M. (2019). Understanding Living Conditions and Deprivation in Informal Settlements of Kisumu, Kenya. *Urban Forum* 30, 223–241. <https://doi.org/10.1007/s12132-018-9346-3>
- [69]. Smith, K.I. (2020), Coronavirus does not cause men’s violence against women”, available at: <https://kareningalasmith.com/2020/04/15/coronavirus-doesnt-cause-mens-violence-against-women> (Accessed 17 May 2021).
- [70]. Socio-Economic Rights Institute of South Africa (SERI). (2018). *Informal Settlements and Human Rights in South Africa*, Submission to the United Nations Special Rapporteur on adequate housing as a component of the right to an adequate standard of living. SERI Publications.
- [71]. South African Health Products Regulatory Authority (SAHPRA). (2020). COVID-19 Information. <http://www.sahrpa.org.za/be-prepared-for-covid-19/>. (Accessed 21 April 2021).
- [72]. The Constitution of the Republic of South Africa. (1996). <https://www.justice.gov.za/legislation/constitution/SACConstitution-web-eng.pdf>. (Accessed 29 April 2021).
- [73]. The Guardian (2020). Lockdowns around the world bring rise in domestic violence”, available at: www.theguardian.com/society/2020/mar/28/lockdowns-world-rise-domestic-violence (Accessed 17 May 2021).
- [74]. The World Bank. (2018). The World Bank Data: Population Living in Slums (Percentage of Urban Population). https://data.worldbank.org/indicator/EN.POP.SLUM.UR.ZS?contextual=region&locations=ZG&name_desc=true. (Accessed 10 August 2021).
- [75]. Tissington, K. (2012). *Upgrading in South Africa: Linkages to Livelihood Creation, Informal Sector Development and Economic Opportunity Generation*, Working Paper No. 2 Socio-Economic Rights Institute of South Africa (SERI).
- [76]. Tournadre, J. (2017). Because we are the only ones in the community!: Protest and daily life in poor South African neighborhoods.” *Focal-Journal of Global and Historical Anthropology*, 78, 52-64.
- [77]. “Treated like Furniture”: Gender-based violence and COVID-19 response in Southern Africa <https://reliefweb.int/report/madagascar/treated-furniture-gender-based-violence-and-covid-19-response-southern-africa> (Accessed 15 May 2021).
- [78]. UN (2020), Covid-10 and ending violence against women and girls”, accessed at: <https://reliefweb.int/sites/reliefweb.int/files/resources/issue-brief-covid-19-and-ending-violence-against-women-and-girls-en.pdf> (Accessed 17 May 2021).
- [79]. UN Habitat. (2003). *The challenges of slums: global report on human settlements 2003*. Available online at <https://www.unhabitat.org/grhs/2003>. (Accessed 10 August 2021).
- [80]. UN-Habitat (2012). *Housing and Slum Upgrading*, <http://unhabitat.org/urban-themes/housing-slum-upgrading>. (Accessed 10 August 2021).



- [81]. UN-Habitat, OHCHR, UNOPS. (2015). Habitat III Issue Papers: 22 - Informal Settlements. Habitat III Issue Papers. 2015; 22. Available: <https://unhabitat.org/habitat-iii-issuepapers-22-informal-settlements>. (Accessed 16 April 2021).
- [82]. UN-Habitat. (2015). Habitat III Issue Papers 22—Informal Settlements; UN-Habitat: New York, NY, USA.
- [83]. United Nations. (2019). Special edition: Progress towards the sustainable development goals. E/2019/68. <https://undocs.org/E/2019/68>. Accessed 15 May 2021.
- [84]. Wasdani, K. P., & Prasad, A. (2020). The impossibility of social distancing among the urban poor: The case of an Indian slum in the times of COVID-19. *Local Environment*, 25(5), 414–418. <https://doi.org/10.1080/13549839.2020.1754375>
- [85]. Weimann, A., & Oni, T. (2019). A Systematised Review of the Health Impact of Urban Informal Settlements and Implications for Upgrading Interventions in South Africa, a Rapidly Urbanising Middle-Income Country. *International journal of environmental research and public health*, 16(19), 3608. <https://doi.org/10.3390/ijerph16193608>
- [86]. World Bank. (2018). Overcoming inequality in South Africa. An assessment of Drivers, Constraints and Opportunities <http://documents.worldbank.org/curated/en/530481521735906534/pdf/124521-REV-OUO-South-Africa-Poverty-and-Inequality-Assessment-Report-2018-FINAL-WEB.pdf>. (Accessed 29 April 2021).
- [87]. World Health Organisation (WHO). (2020). Coronavirus. Available online at https://www.who.int/health-topics/coronavirus#tab=tab_1. (Accessed 4 April 2021).
- [88]. Worldometer. (2020). COVID-19 CORONAVIRUS PANDEMIC. Available online at https://www.worldometers.info/coronavirus/?utm_campaign=homeAdvegas1?. (Accessed 30 April 2021).
- [89]. Zanganeh, M., Varesi, H.R. & Zangiabadi, A. (2013). Strategic housing planning through sustainable development approach in Iran Metropolitans: Case study of Metropolitan Mashhad. *Journal of Basic and Applied Scientific Research* 3(9), 52.