BAU Journal - Health and Wellbeing

INVESTIGATING THE EFFECT OF URBAN BUILT ENVIRONMENTON MENTAL HEALTH(DEPRESSION): CASE STUDY OF DAMIETTA CITY, EGYPT

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Recommended Citation

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Abstract

Mental health disorders account for 7.4% of the burden of disease, and are now the leading cause of long-term disability worldwide. This paper explores the impact of the attributes of the built environment on mental health. It is difficult to measure mental health, so depression has been chosen to indicate it as the most common form of mental illness and its prevalence is projected to increase (CDC, 2013a) and it can be measured. Depression was assessed in across sectional survey of residents on (n=445) which has been divided into 4 study areas. Each 2 areas have the same socio-economic characteristics and different in urban built environment attributes depending on Hamilton rating scale for depression as instrument to evaluate the severity of depressive symptoms. The attributes of the built environment in those neighborhoods are investigated using geographic information systems. The results of this research may the anticipated specific guidelines for a healthy urban planning could be anticipated as it indicated to there is a relationship between the attributes of the urban built environment and the severity of the depressive symptoms also Emphasized the possibility of building psychologically healthy cities through urban design.

Keywords

INVESTIGATING THE EFFECT OF URBAN BUILT ENVIRONMENT ON MENTAL HEALTH
(DEPRESSION): CASE STUDY OF DAMIETTA CITY, EGYPT.

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ABSTRACT: *Mental health disorders account for 7.4% of the burden of disease, and are now the leading cause of long-term disability worldwide. This paper explores the impact of the attributes of the built environment on mental health. It is difficult to measure mental health, so depression has been chosen to indicate it as the most common form of mental illness and its prevalence is projected to increase (CDC, 2013a) and it can be measured. Depression was assessed in across sectional survey of residents on (n=445) which has been divided into 4 study areas. Each 2 areas have the same socio-economic characteristics and different in urban built environment attributes depending on Hamilton rating scale for depression as instrument to evaluate the severity of depressive symptoms. The attributes of the built environment in those neighborhoods are investigated using geographic information systems.*
The results of this research may the anticipated specific guidelines for a healthy urban planning could be anticipated as it indicated to there is a relationship between the attributes of the urban built environment and the severity of the depressive symptoms also Emphasized the possibility of building psychologically healthy cities through urban design.

KEYWORDS: *Urban health, mental health, urban built environment, Hamilton Rating Scale for Depression.*

1. INTRODUCTION

Studies have shown that urban life has both positive and negative effects on mental health. Urban living is associated with increases in the following mental health problems increase in mood disorders by up to 39%. Increase in anxiety disorders by up to 21% (peen et al, 2010), double the risk of schizophrenia (up to 2.37 times above average) (Vassos et al, 2010) and increase in rate of cocaine and heroin addiction (SAMHSA, 2012). On the other hand Urban living is associated with decreases in the following mental health problems almost half the suicide risk (varies with community size/density) (CDC, 2015), decrease in dementia by 10% (compared to rural living) (Russ et al, 2012), half the risk of Alzheimer's disease (compared to rural upbringing) (Nunes, 2010) and decrease in alcohol, marijuana, methamphetamine, prescription drug abuse (SAMHSA, 2012).

Away from mental health, there is the urban built environment that is another challenge which represents the other party to measure the effect. Therefore, it is necessary to define the urban built environment and determine its components so that the impact on mental health can be measured. Layla McCay,et al., Centre for Urban Design and Mental Health, 2017 reported that there is no one definition of urbanity. Many studies use a city's own boundary lines; others may break the city down into neighborhood type (downtown, inner suburb, etc), density (people/hectare), etc. This paper will discuss some attributes like green and blue spaces, accessibility and transportation, densities and socio-economic characteristics.

This paper aims to examine the relationship between mental health and the elements of the surrounding environment, the following studies of the impact of these elements on mental health will be presented below.

2. THE IMPACT OF URBAN BUILT ENVIRONMENT ON MENTAL HEALTH

A significant health issue relates to the Mental Illness, gives the influx of the population into urban settings. Sustainable city design is needed to promote and support good mental health and wellbeing. Hence, this increases the importance of research which studies the effect of the elements of urban built environment on mental health. As follows the research offers an overview of previous studies for elements of the built environment (urban spaces, urban density, Transportation and accessibility, Socio-economic characteristics… etc) and its impacts on mental health.

2.1 The Impact of Green Spaces on Mental Health.

Green spaces are the 'green lungs' of our towns by providing places for informal recreation - walking, cycling, sitting, socializing and children playgrounds - and 'breathing spaces' to take time out from the stresses of modern life. They bring the countryside into our towns and cities. Green spaces are multi-functional; they are used in many different ways. They include not only areas to which the public have physical access, but also visual access. For example, (1) play a recreational role in everyday life; (2) contribute to the conservation of biodiversity; (3) contribute to the cultural identity of the city; (4) help maintaining and improving the environmental quality of the city. Recent estimates of WHO Global Health Report 2016 showed that physical inactivity, linked to poor walk ability and lack of access to recreational areas, accounts for 3.3% of global deaths which led to great interest in bringing green areas to the heart of cities to keep healthy life rights for people. Historically, most cities were almost devoid of green spaces, but cities were relatively small and most people lived in rural areas. It wasn't until the 19th century that the importance of parks and other urban green for residents was recognized to some extent (Swanwick et al., 2003). Today, it is understood that urban green spaces are essential for well-functioning and livable cities.

On the other hand, there is a good scientific evidence that contact with nature in urban areas can improve mental health and can help in the restoration on psychological well-being. People may therefore still experience positive emotions in more natural environments (Victoria Houlden, 2017).

According to Ulrich (2002), viewing of plants and flowers ameliorates stress within 5 minutes or less. Viewing nature for longer periods helps to calm residents and can foster improvement in mental health. There are adverse mental (and other) health consequences resulting from an absence of green space. After allowing for demographic and socio-economic characteristics, a study of three hundred and fifty thousand people in Holland found that the prevalence of depression and anxiety was significantly greater for those living in areas with only 10% green space in their surroundings compared to those with 90% green space(Maas J, et al., 2009).In the general population, there is now considerable evidence to indicate that —green exercise,‖ that is, walking in green spaces including parks and streets with trees, generates significant mental well-being benefits over and above walking in non-green environments, including increased mood, self-esteem, and energy (Roe & Aspinall, 2011a; systematic reviews by Thompson Coon et al., 2011; Bowler et al., 2010). Alcock et al. (2014) found mental health improvements in individuals relocating to areas with more green space in the UK and that these benefits were sustained three years post move (n=594).Sturm and Cohen (2014) found that Los Angeles residents' physical and mental health ratings increased with proximity to public parks.

On the other hand, studies have found a close correlation between green spaces and mental health diseases (depression, Stress and Anxiety, Schizophrenia, Post-Traumatic Stress Disorder (PTSD), Dementia…). The positive effect of green spaces has been appeared to reduce depression in studies around the world. In Wisconsin, found higher levels of neighborhood green space were associated with significantly lower levels of symptom logy for depression, anxiety and stress, after controlling for a wide range of confounding factors (n=2,479); Maas et al. (2009). Then research has evolved to determine the appropriate design distance to obtain the effect of green spaces such as exploring morbidity data in Danish medical practices serving a population of 345,143, found the prevalence of psychological morbidities (i.e., for anxiety disorder and depression) was lower in neighborhoods with more green space (i.e., in a 1 km radius around the home); in another Dutch study, Van den Berg and Van den Berg (2010) found relationships between quantity of green space (as measured by a 300km radius around the home) and the impact of perceived stressful life event (n= 4529) but found no statistically significant relationships between mental health benefits and green space quantity. In a New Zealand study, Nutsford, Pearson, and Kingham (2013) (n=7552) found statistically significant relationships between the quantity of green space (i.e., both total and useable green space within a 3 km radius around a home and distance to nearest useable green space) and decreased anxiety/mood disorder treatment counts in an urban setting. Lower risk of depression was strongly associated with green space quantity measures, including a higher percentage of neighborhood tree canopies. Using Wellbeing Index data and controlling for other

geographic and demographic factors, Larson, Jennings and Cloutier (2016) found that U.S. residents' wellbeing increases significantly with the portion of urban land devoted to parks (ranging from 2.0% to 23.0%), park quality (per capita parks spending) and accessibility (percentage of residents within ½-mile of parks). Also, research has been done for women, especially pregnant women because pregnancy depression is one of the most serious types of depression and depression in pregnancy is the highest risk factor for postnatal depression. Mc Eachan et al. (2015) found higher residential greenness was associated with a reduced likelihood of depressive symptoms in pregnant women. As for the elderly, the science of urban stress is being explored with new mobile technologies that map how people feel as they move through a city environment. For example, a novel study in Scotland has shown different patterns in brain activity from walking in a busy commercial urban area versus an urban park (Aspinall et al., 2013), with higher levels of meditation (as measured by electroencephalography (EEG) software developed by Emotive , Chris Neale, et al.,2017. experienced when moving in to the city green space. Further testing is ongoing in older adults aged 65+ analyzing the raw EEG data. The researchers hope to pinpoint those areas in a city that cause older people most stress—such as traffic junctions—and make recommendations for design improvements to improve access and mobility (Mood, Mobility, and Place, n.d.). Also for older people specifically, walkable green space in an urban neighborhood was associated with increased life longevity (Takano, Nakamura, & Watanabe, 2002).

As a result of the above it is clear that all studies agreed on the positive impact of green spaces on mental health and encourage communication with nature, green spaces have been found to be protective, providing opportunities for relaxation and the therapeutic value inherent to interaction with nature (Mitchell R, et al. 2008). It must therefore provide these green spaces in our cities to improve mental health.

2.2 Blue Spaces and Mental Health

In general, People feel comfortable inside the natural environment. The beach has always been associated with relaxation as the blue color is also comfortable for the eye and the soul. There is no clear definition of blue space, but at least it is the extent to which aquatic elements are available in space also is an urban design term for visible water. Attractive blue spaces such as waterfront parks, harbors, ports, marinas, rivers, open air streams, canals, lakes, ponds and fountains are thought to improve quality of life and help to moderate urban heat islands.

There have been numerous studies on the importance of blue space for public health. Urban designers used water elements in the coordination of sites and gardens (fountain - industrial waterfall - lakes) as well as sea façades and beaches .There are no clear indications of the amount of water in space and the period of exposure or relationship to age but there is a basis for consensus studies on the positive impact on health. For example Pearson said as a result of his studies a ―statistically significant‖ impact on mental health for people who were able to see the sea. Visibility of blue space was associated with lower psychological distress even after accounting for age, sex, income and neighborhood features like crime rates and wealth. The effect of blue space does not depend solely on vision but it addresses all senses, whether hearing or smell. As the basic inputs of the human mind, there is a natural reaction to its mental health. This is what A. Pawlowski, 2016 confirmed as he said, ―Think about looking out at the ocean: you can hear it, hear the waves, and there's a rhythm to that . You can also smell the ocean. It hasn't been sure if it's just visual — it may be other senses as well". On the other hand, a research in New Zealand, Kingham, 2016, proved that blue space is good for mental health. This study was to know the effect of blue and green space on mental health and the result was in favor of blue space and reported no green space effect on mental health in New Zealand, while having a strong relationship between blue space and improving mental health. "Interestingly, the research in New Zealand has not found strong links between green space and mental health," Kingham, 2016 said. This explains that the population of New Zealand has managed to reach a very large proportion of the green areas, so that they are not distinctive and have no effective effect on the equivalent of exposure to water.

Over all, Blue and green space both have a positive impact on mental health but there must be diversity in the distribution of these spaces and justice in the localization of different uses and levels of housing. In order to ensure the effective effect of these spaces by translating the experience of the individual and drawing a different mental image through the vision and sounds, as well as smells and access to nature in its various forms, which affects the mental health of individuals.White, M.P.; et al., 2012 found that living less than 5 km from the coast improved mental health (measured with the GHQ) compared to living further away, even after adjusting for percentage of green space and fresh water. But Amoly, E.; et al.,2014 said that there is not assess the effects of blue spaces on children's behaviour and emotion because less than 2% of the study population lived within 500 m of the beach. According to Triguero-

Mas, M.; et al., 2015 there is no association's observation between the presence of blue spaces (within buffers ranging from 100 to 1000 m) and mental health.

Despite the lack of evidence of the effect of blue spaces on mental health, but when compared to the effect of green space has had a greater impact in addition to the studies agreed to positively affect them, although not possible to determine the type or area, but the direct vision of the blue surface improves mental health.

2.3 Urban Density and Mental Health

Although the majority of studies agree on the negative impact of high densities on public health, there are studies that support high densities for mental well-being. Several factors thought to affect community-level happiness, such as density and commute time, do not appear to have a statistically significant effect on happiness when normalized for income (Florida, Mellander and Rentfrow, 2013) .While a lot of researchers have already presented evidence of the importance of urban trees and parks, which can have a profoundly beneficial impact on psychological wellbeing and general mental health. Mental health is affected by urban density what made the researchers care about this came from a variety of views because of the high density overall effect appears to be negative on public health as we have been already explained. But when the study was focused on mental health, the results were different. Behaviors, feelings and mental health are affected by constant movement and social interactions directly which was the nucleus of the positive side of high densities. According to a study in Turin, Italy, 2015 densities could contribute to reduced risk of depression, especially for women and elderly by increasing opportunities to move around and have an active social life (Giulia Melis,et al., 2015).

Also, city centers subsequently city centers which have high densities can affect positively on mental health. If linked the high densities of cities would find almost half the suicide risk (varies with community size/density) (CDC, 2015), decrease in dementia by 10% (compared to rural living) (Russ et al, 2012), half the risk of Alzheimer's disease (compared to rural upbringing) (Nunes, 2010) and decrease in alcohol, marijuana, methamphetamine, prescription drug abuse (SAMHSA, 2011).

From the above it has been concluded that there is a relationship between mental well-being and high urban density. It has been found that more positive for older people and women where they feel safer and more easily socialize with the surrounding world, but there were studies that had another opinion. There is convincing evidence showing adverse mental health consequences from increasing density. Tony Recsei in a monumental Swedish study 2013 of over four million Swedes examined whether a high level of urbanization (which correlates with density) is associated with an increased risk of developing psychosis and depression. Adjustments were made to cater for individual demographic and socio-economic characteristics. It was found that the rates for psychosis (such as the major brain disorder schizophrenia) were 70% greater for the denser areas. There was also a 16% greater risk of developing depression. The conclusion states: "A high level of urbanization is associated with increased risk of psychosis and depression"(Sundquist, et al., 2004). In another study there is an association between overall Human Happiness and density. Professor Cummins R.A, 2006, Australian Unity Wellbeing Index reports that the happiest electorates have a lower population density. Lawton M.P., et al., 1975 in a United States study found the satisfaction of older adults living in higher density social housing reduces as building height increases and as the number of unit's increases. In contrast, in lower densities there are higher friendship scores, greater housing satisfaction, and more active participation. This does not apply only to single family houses: Residents of garden apartments have a greater sense of community than residents of high-rise dwellings Lawton M.P.,et al., 1975.

On the other hand, some studies have shown the bad influence of high urban densities on children through a British study which found that 93% of children living in centrally located high-rise flats had behavioral problems and that this percentage was higher than for children living in lower density dwellings, Anti-social behavior often results (Evans G. W., et al., 2002). An Austrian study showed disturbances in classroom behaviour higher for children living in multiple-dwelling. The results of density studies differed in the impact on mental health, but there is a reason for this difference is the difference in place and characteristics of the population. From our point of view, the high densities that allow the creation of social relations and are located in a central area with the existence of paths and the diversity of the existence of green areas affect positively on mental health. Therefore, the elements of the urban environment must be integrated together so as to positively affect mental health.

2.4   Urban Density and Mental Health

A specific research on transportation design factors for public mental health McCay L,et al., 2017 . Evidence from other fields of urban design may point to research and innovation opportunities within the transportation sector. Key urban design factors that can affect mental health include design for: access to natural (green and blue) spaces, the promotion of physical activity, pro-social activity, safety (including way finding, crime, air quality, and traffic), visual pollution (aesthetics), light and sound pollution, and sleep quality and public transport.

2.4.1   Public transport and mental health.

Given the world's orientation towards sustainable development through health and considering transport a major factor directly affecting global health rates. Public transport was the most convenient but with certain conditions and policies that guaranteed people to choose public transport tend to affect travel activity in ways that provide large health benefits, including reduced traffic crashes and pollution emissions, increased physical fitness, improved mental health, improved basic access to medical care and healthy food and increased affordability which reduces financial stress to lower-income households (Litman, 2010). Local transport conditions affect mental health and happiness (Montgomery 2013) where it has been explained in his book

Happy City. Transportation conditions, services and availability can create a socially cohesive happy city where people can create places of social communication in the waiting stations and during the journeys. Other studies have agreed with him as in 2015 in Italy proved that access to public transport reduces depression, especially in women and the elderly (Melis, et al., 2015). Around the world, Studies have been conducted to determine the impact of public transport on mental health. In 2011, using data from the Quality of Life Survey, which asked residents in 10 major cities (New York, London, Paris, Stockholm, Toronto, Milan, Berlin, Seoul, Beijing, and Tokyo) to rate their happiness, Leyden, (Goldberg and Michelbach, 2011) conclude that happiness tends to increase if cities have efficient public transport; convenient access to cultural and leisure amenities; are considered affordable, safe, clean and attractive; and foster social connections. Martin, Goryakin and Suhrcke (2014) used data from eighteen waves of the British Household Panel Survey to evaluate.

2.4.2   Distance between housing and work.

There is a direct relationship between production in the workplace and the work environment and the psychological state of the workers whenever there is mental well-being T. Rajgopal, 2010. There is production and development in the work. Accordingly, many psychologists and economists were interested in measuring the criteria for achieving a suitable healthy environment for work. One of the most important items was transportation and the distance between housing and work. A UK Office of National Statistics study 2014 also found that commute duration is negatively related to personal well-being .The data indicate that automobile commutes exceeding 15 minutes are associated with reduced happiness and increased anxiety, while public transport commuting does not reduce personal well-being until journey times exceeds 30 minutes. The Gallup Health ways Index 2012 indicates that large, compact, multi-modal cities such as Boston, San Francisco, Chicago, New York and Washington D.C. have significantly higher rates of exercise, and significantly lower rates of depression, obesity, diabetes and smoking than sprawled, automobile-dependent cities such as Fort Wayne, Indianapolis, Oklahoma City, Tulsa and Durham-Chapel Hill (Gallup 2016). The Index indicates that, controlling for age, education, and income levels, longer commutes reduce subjective well-being, as illustrated. Among employees with commutes exceeding 90 daily minutes, 40% experienced worry for much of the previous day -- significantly higher than the 28% among those with commutes of 10 minutes or less, and extremely long commuters were less likely to have experienced enjoyment for much of the previous day or report feeling well - rested. People with shorter commutes tend to have higher well-being ratings. This suggests that more compact development can increase happiness, so commute duration affected on mental health directly as can achieve to healthy environment through provide safety and fast public transportation or housing behind work.

2.4.3   Walking paths (walkability).

Pathways are the other branch of health that integrates with the public transport system. Walking provides mental health and happiness benefits, Robertson, et al. 2012. Since walking

whether for recreation or transportation is considered an accessible means of gaining moderate physical activity, it has been reasoned that mental health benefits of physical activity could reasonably be applied to walking. Improved walking conditions and increased walking activity can increase community cohesion, community security, public fitness, and health, Appleyard, 2012. Many more examined relationships between levels of physical activity and mental health symptoms such as anxiety and depression, Nelson et al., 2007.The Gallup Health ways Index indicates that large, compact, multi-modal cities such as Boston, San Francisco, Chicago, New York and Washington D.C. have significantly higher rates of exercise, and significantly lower rates of depression, obesity, diabetes and smoking than sprawled, automobile-dependent cities such as Fort Wayne, Indianapolis, Oklahoma City, Tulsa and Durham-Chapel Hill ,Gallup, 2016. Strawbridge et al. 2002 found high levels of physical activity were associated with low prevalence of baseline depression. This relationship also existed at the five year follow-up, where physical activity was a strong predictor of new onsets of depression. For women, engaging in regular physical activity may also prevent mental health disorders or at least indicate the risk of future onsets of depression. Farmer et al. 1988 recorded physical activity levels for 1497 women without depressive symptoms and followed up with a self-reported mental health questionnaire eight years later. Results of the study revealed that the women reported little to no physical activity were twice as likely to have developed depressive symptoms as those who reported moderate to high levels of activity. A study by Kramer et al. 1999 found that subjects assigned to an aerobic walking program as opposed to anaerobic stretching and toning showed substantial improvements in mental functions, such as the speed at which they could switch between tasks.

Evacuation from the above, the public transport study has proved to have a positive impact on mental health. The proximity to public transport stations helps to improve mental health In addition, the distance between housing and work affects labor productivity and mental health Pathways and pathways mental health is developed through physical activity hence, good design for public transport network can improve mental health.

2.5 Socio-Economic Characteristic.

There are social factors that contribute to how healthy people are. These social factors come from both our environment and our social world. Socioeconomic status is a term that social scientists use to capture a number of different factors. It refers to a person's income level, education, and general position in society. Socio- economic characteristics vary from region to region, and affect urban environment as it causes to create different environments these disparities starting to live in slums or live in a sophisticated and distinctive community. Evidence indicates to a strong relationship between socioeconomic characteristics and mental health where studies have agreed that disadvantaged neighborhoods are associated with mental health diseases and high crime rates. According to Patel, 2015, mental health problems are more prevalent in socio-economically disadvantaged people and in 2008. Mair C, et al., found that poor urban design has been associated with depression and depressive symptoms and has also been implicated in the creation of dysfunctional spaces and weakened infrastructure i.e., waste disposal, water supply, and sewage systems with resulting health inequities. Living in high density, overcrowded conditions, with limited amenities and social services puts urban dwellers at increased risk for poor mental health. This was consistent with the results of a study for Analyzing British twins (which allows researchers to separate genetic from environmental factors), Newbury, et al. (2016) found that children in deprived urban neighborhoods were ~80% more likely to experience psychotic symptoms than those in non- urban neighborhoods, but this primarily reflected increased social disorder and crime risk in deprived neighborhoods, and so does not apply to affluent urban areas. In view of the economic side, Economic stresses may contribute to mental illness and unhappiness (Tobin 2014; Winter and Li 2016) and poverty has been associated with mental illness due to exposure to physical and social stressors that limit the capacity to respond to adverse life events, Lorant V, et al., 2003 .On the other hand, a randomized controlled trial that moved families from high poverty neighborhoods to nonpoor neighborhoods showed that both parents and children who moved reported fewer psychological distress symptoms than did control families who did not move. Sandro Galea, et al., 2005 addressed also that workers who move from impoverished rural areas to cities with better economic opportunities can gain happiness overall because their income gains more than offsets any happiness reduced by city living (Albouy 2012). In other studies discussed the relationship of happiness with socio - economic characteristics. Montgomery argues in his 2013 book, Happy Cities, that people can be happy in cities provided that they are designed

to meet residents' emotional and social, as well as physical needs. Happiness tends to increase with housing prices, which probably reflects a combination of increased productivity and therefore economic opportunities, and improved livability in higher-priced areas. In these regions, individuals can afford and benefit from neighborhood-related amenities, which in turn increases happiness, (Florida, Mellander and Rentfrow, 2013).

Socio- economic characteristics are important factors in the built environment that affects mental health because it concerns the population's concern, their thinking, their physical situation and their way of life. Disadvantaged areas have been associated with mental health and vice versa but this result is not absolute as Environmental psychology also confirms the relationship between man and place that man has a reaction to the environment and one of these reactions is to adapt after a period with the environment in which lives.

3. METHODOLOGY

3.1 The Research Method is Based on Two Parts, First: the Theoretical Part,

Data sources were searched through search engines (science direct, Google scholar, Pub Med, Amazon, journal of Center of urban design and mental health, International Journal of Environmental Research and Public Health and other web sites.

3.2 Statistical Analysis of the Data:

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Ar monk, NY: IBM Corp) Qualitative data were described using number and percent Quantitative data were described using range (minimum and maximum), mean, standard deviation and median. Significance of the obtained results was judged at the 5% level. The used tests were 1 - Chi-square test, for categorical variables, to compare between different groups, 2 - Monte Carlo correction, Correction for chi-square when more than 20% of the cells have expected count less than 5.

Table 1: Relation between Severity of Depressive Symptoms with Areas in Damietta (n=445)
Reference: The author by SPSS

Area do you live in Damietta	Severity of depressive symptoms										Total (n=445)	
	Normal (n=97)		Mild (n=105)		Moderate (n=94)		Sever (n=63)		Very sever (n=86)			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
A	26	26.8	17	16.2	15	16	24	38.1	15	17.4	97	21.8
B	20	20.6	23	21.9	30	31.9	7	11.1	17	19.8	97	21.8
C	15	15.5	31	29.5	20	21.3	13	20.6	18	20.9	97	21.8
D	25	25.8	19	18.1	17	18.1	12	19	24	27.9	97	21.8
Others	11	11.3	15	14.3	12	12.8	7	11.1	12	14	57	12.8
χ^2 (p)	29.428* (0.021*)											

χ^2: **Chi square test**

p: p value for comparing between groups

*: Statistically significant at $p \leq 0.05$

3.3 Second: Practical Part

Divided into two sections,

3.3.1 First part: how to measure mental health.

It was difficult to discern a medical dimension in the search and to arrive at the results to be considered, therefore, the research plan first conducted small interviews with the number of 18 doctors in Egypt to make sure that a method of measurement can be found and Outcome: A method of measuring mental health cannot be generalized but must choose a disease such as depression and anxiety. Depression was chosen due to it Constitute 17.3% of all the world's diseases (WHO

) is the most common mental disorder that occurs in people of all ages across the world (Ferrari et al., 2013). In Egypt, Mohamed Refaat Elfeki, 2018 said that depression and anxiety constitute 65% of the mental illness. On the other hand, Dr. Ahmed Okasha at the first international conference on addiction said that 1.5 Million Egyptians suffer from depression of the 350 million pe ople with depression around the world 2017. The next step was about measuring depression. Measurement methods vary from methods to diagnosis of the disease, which are medically invasive and must be dependent on diagnostic and statistical manual (DSM) criteria which recognized in Egypt for diagnosis of mental illness. Or other way (scales) to infer the severity of symptoms of depression. They are the most widespread and used in scientific research. It is used as a tool to indicate the severity of the symptoms and give a primary outcome of symptom availability, so it has been chosen scales to evaluate depressive symptoms not for diagnosis.

Finally, Hamilton Rating Scale for Depression (HAM-D) has been used among 5 different scales for depression (Beck Depression Inventory (BDI), Inventory of Depressive Symptomatology (IDS or QIDS), Montgomery–Asberg Depression Rating Scale (MADRS) and Zung Self-Report Depression Scale (Zung SDS) as Bagby RM, et al., 2004 reviewed 70 studies on psychometric properties of the HAM-D, published since 1979, and showed that the majority of HAM-D items have adequate reliability. All those scales have relative strengths and weaknesses and some of them have been more successful than others, and have become the gold standards for depression as (HAM-D). the scale aimed at assessing depression severity among people through 17- item which include Questions about sadness, anxiety, and symptoms such as loss of appetite and weight loss. The total score is obtained by summing the score of each item, 0–4 (symptom is absent, mild, moderate, or severe) or 0–2 (absent, slight or trivial, clearly present).For the 17-item version, scores can range from 0 to 54. (0-7) indicated to normal, (8-13) mild, (14-18) moderate, (19-22) sever and ($\geq$ 23) very sever.

3.3.2 Second part: case study of Damietta, Egypt.

Damietta is located in Egypt in North Delta on the east bank of the Nile . It contains the highest standard of living per capita compared to the rest of the governorates of Egypt also there is no unemployment due to the economic activity in this Governorate is one of the best economic patterns as it is characterized by diversity and based on the human element. The economic activity in Damietta depends on small production units, mostly owned and managed by the private sector. In addition, it contains the largest port in the Middle East. This economic activity directly affects social characteristics and creates different urban environments. In this paper, previous studies have been applied in the literature on the urban environment in Damietta city to assessment the relationship between mental health and urban built environment attributes through Sample n = 445 people, An 97 questionnaire form was distributed in four different areas of the city A, B, C and D (as shown as Fig. 1).

Both areas have the same socio-economic characteristics. (A and B) have low socio-economic characteristics, (C and D) have high, but there are different in urban built environment attributes among them. Then analyze the urban data and use the GIS program as a tool to assist in the urban study and linking these data with the statistical results of the questionnaire in the areas.

A description of the social and economic characteristics of the study area, (A and B), the inhabitants of these areas are interested in teaching crafts more than schools, where
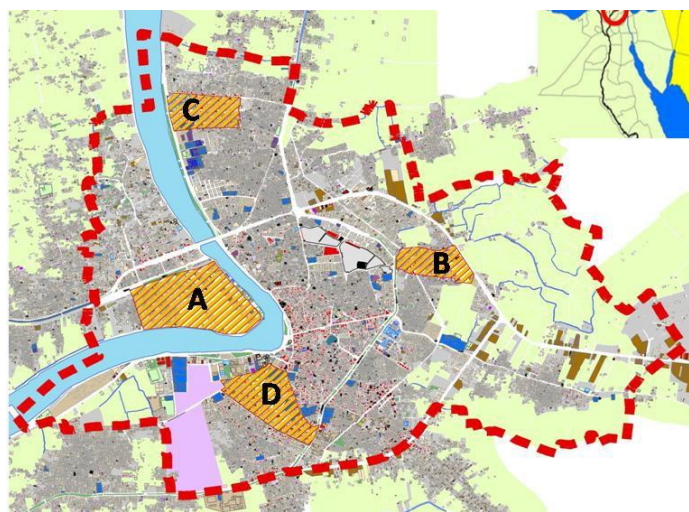

Fig. 1 study area, Damietta city (CAPMAS)
Reference: the author by GIS

children and adults work due to the large material return compared to government jobs, Housing in these areas, special and include garages on the ground floor used for workshops, storage and commercial purposes and early marriage is one feature of this areas.(C and D), Residents of these areas are interested in education, culture, social advancement, government jobs, companies and banks and housing in these areas is an apartment. We conduct the urban analysis and link it to the statistical results (as shown in Table 2) In order to explain the variables affecting mental health.

4. RESULTS AND DISCUSSION

4.1 Theoretical Results:

There is clear evidence of the impact of urbanization on health, where the result of the research that the environment surrounding the human affects his health completely but for the effect of the physical environment on mental health, the evidence is few and related to certain elements, but for green areas, studies have confirmed the positive impact on mental health, especially if helped to physical activity, but all these studies did not specify the quality of space and green space. As well as the blue space where luxury was associated with exposure to blue space, whether it was a sea, a river or other. There is still a lack of clarity in the duration of exposure or the type of blue space.

As for the density, the views of the researchers varied about their impact on mental health. The positive effect is not a condition to be linked to the few densities, because the large densities give room for social relations
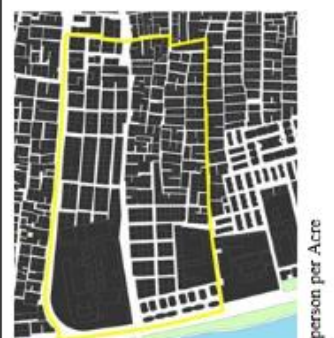
For accessibility, studies have been agreed to be an effective component of mental health impact. Vital areas associated with major axes and close to public transportation are associated with good mental health, and the long distance between housing and work negatively affects mental health.

4.1.1 Urban built environment and depressive symptoms

Only a handful of studies have examined built environment features of neighborhoods in relation to depression and depressive symptoms ,and these studies suggest that the built environment may be implicated in depression/depressive symptoms (Kim, 2008; Mair et al., 2008).

This fundamental gap in knowledge is problematic as environmental-level investigations can underscore specific modifiable aspects of the environment that may improve mental health.It has been found only 13 papers discussing the relevant between the built environment and depressive symptoms during the period from 2006 to 2018.5 of them were targeted to the elderly because they are the most vulnerable, 1 child, 1 young, 1 female, 1 pregnant and 1 male. Eight of them were assessed for evaluating depression symptoms through different measures to measure depression like using the 10-item Centre for Epidemiological Studies Depression Scale (CES-D), (NWS) depression module, Modified Depression Scale (MDS) and other instruments as the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV).

Urban attributes	A	B	C	D	Analysis
		LOW		HIGH	
Depressive symptoms severity	The severity of symptoms of depression is 40.2%, higher than the global average by 15.2%	The severity of symptoms of depression is 24.7%, lower than the global average by .3%	The severity of symptoms of depression is 40.2%, higher than the global average by 6.9%	The severity of symptoms of depression is 40.2%, higher than the global average by 12.1%	The highest incidence of the severity of depressive symptoms in (A), the lowest in (B) although they have the same socio-economic characteristics.
Socio-economic characteristics / Area definition	Predominantly rural overlooking the River Nile spreading the artisanal activity separated from the rest of the city railway line Services are lacking because they are random	One of the city's extension areas Spread by artisan activity Far from the Nile Highly communicative with the main traffic axes	Service Area It has banks, a general hospital and a business center Overlooking the Nile, it has a leisure corniche and restaurants	The commercial heart of the city is spread by markets and shops very crowded with population high connectivity in other areas	Religious / Scholastic / Commercial / Residential / Handicraft
Blue spaces	Overlooking the Nile but the Nile is not used in this area and is not used by people for entertainment	away from the Nile 1, 3 km	Overlooking the River Nile, it has a Corniche area for entertainment and is centered on restaurants	Close to the Nile	The impact of the Nile on mental health is related to the extent of its exploitation. Thus, its presence in Area A, while not being exploited, is not significant.
Green spaces	the agricultural land surrounding the area and Due to the random extension of the buildings shrunk its area.	the agricultural land surrounding the area and Due to the random extension of the buildings shrunk its area.	There are no green areas except the main road island overlooking the Nile	Damietta City Stadium is green area but surrounded by a wall and not available for visibility	There is a green flat in the city but it is not entertaining and is on the outskirts of the city. The positive effect on mental health is related to exposure to the amount of green cover. This

corresponds to the high proportion of symptoms of depression in general in the city

Mental health has been linked to accessibility of services and public transport. This explains the high incidence of depressive symptoms in area A.

In high socio-economic areas. High population density negatively affects mental health while other people go to these areas for shopping and entertainment. These areas are enjoyable for its users despite the congestion Studies have justified that the shopping areas create an opportunity for social relations that improve mental health.

Transportation & accessibility	The area is separated from the rest of the city by a railway line but its near to main roads, so it suffer from difficulty of accessibility It is located on the other side of the Nile	The area has easily accessible to the main traffic arteries connecting it with the regional roads which were the cause of urban encroachment on agricultural land.	Located on the main road overlooking the Nile Corniche and connected to other major hubs, Concentrated services and the traffic flow rate increases	It's the city center which linked to the main axes and It is the busiest city in the city
Densities	100person per Acre	120 person per Acre	80 person per Acre	90 person per Acre

4.2   Practical Results:

By using the Hamilton scale to measure severity of depressive symptoms and its link to urban areas, the severity of depression symptoms was assessed, 21 .7% of the total sample is normal, 23.5% mild, 21.1% moderate, 14.1% sever and 19.3 % very sever and according to Hamilton while the score higher (indicated at least moderate severity) is usually required for entry into a clinical trial, so 33.5 % of the total sample requiredfor entry into a clinical trial D (as shown as Fig. 2).
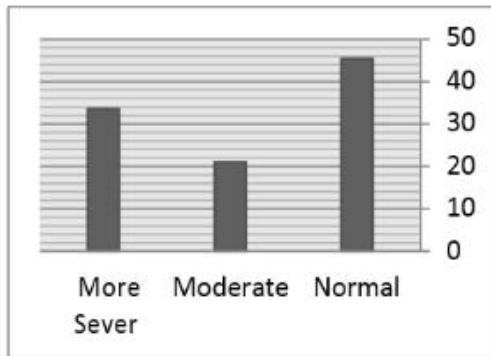

Fig. 2 The severity of depressive
symptoms for total sample n=445

Fig. 3 The highest value of the severity of
depressive symptoms in (A) and the lowest in (B)

On the other hand, Area (A) scores the highest value of the severity of the symptoms of depression, the lowest in (B) (as shown as Fig. 2) although they have the same socio-economic characteristics, so there are other factors that have a greater impact on mental health. Through the urban analysis of Area A and its comparison with Area B. The symptoms of depression in the area are very high for the total sample in the area up to is 40.2%, higher than the global average by 15.2% and is 24.7%, lower than the global average by .3%. It has been found that they are similar in some characteristics and differ in others where they are similar to that they are located on the outskirts of the city and surrounded by agricultural land, they are also random areas arose on the crawl on agricultural land lacking services and spread by artisanal activity and differ in that the area A overlooking the Nile, while the area B away from the Nile 1, 3 km But the Nile in Area A is not being exploited as a means of entertainment and away from the main traffic axes in the area. Also differ in the ease of accessibility where area A is located on the other side of the Nile separated from the city railway line despite the presence of a bridge and boats to the other side but it suffers from poor accessibility While Area B has a high connectivity to the main road network and regional and this serves the artisanal and basic activity in the area as well as the availability of public transport stops near them, so it has been expected that accessibility and near to public transportation have a main effect on mental health.

In the urban analysis of Area C and compared to the area D, it has been found that depression rates are higher in both areas, although they are characterized by high socioeconomic status. The symptoms of depression in the area are very high for the total sample in the area up to 31.9%, higher than the global average by 6.9% and 37.1%, higher than the global average by 12.1%. Area C is a service that includes the regional services, colleges, public hospitals, banks, overlooking the Corniche of the Nile, There are no green areas and characterized by high accessibility. Area D is the commercial heart of the city is very crowded all the time also has 4 schools and restaurants, its traffic flow rates, located in the city center and has high accessibility, Close to the Nile and there are no green areas except Damietta Stadium, which is surrounded by a wall so that the population does not benefit from the vision, so it has been expected that high severity of depression symptoms in the area D due to the high congestion associated with noise and car sounds, which directly affects mental health. Moreover, high socioeconomic characteristics are associated with increased severity of symptoms due to heightened awareness and educational level and looking to live in better places and this corresponds to the proportion of people who want to move from these areas to New Damietta and Ras Al Bar where they reached 34%.

Despite the direct impact of noise, congestion and poor road conditions in Area B, but it has the lowest rate of severe symptoms of depression. The reason for this is the population's satisfaction with living in this region where a large proportion of individuals own their own jobs and close to the main axes and other workshops as well as adapting to the high voices of carpentry and high music in the workshops, thus the area meets the needs of its inhabitants. Finally, the results confirmed the relationship between elements of the built environment and mental health

5. CONCLUSIONS

Because of the nature of mental health disorders they are accompanied by human satisfaction and comfort, The socio-economic dimension is the main influence because it is linked to the needs of the population In the sense that the impact of the elements of urbanization linked to the needs of human and physical daily, where people prefer to live in an unhealthy environment, but close to work and public transport and save ti me and effort. In the case of Damietta city, the focus of low socio-economic classes is on accessibility and proximity to work but the upper classes were concerned about calm, services and green areas.The availability of a green area in the area but not exploited and I cannot reach it is equal to the lack of mental health begins with the rest of the senses as well as the existence of a blue space is not exploited apart from the fact that they help to reduce heat and their benefits live, but the psychological impact comes from the relationship directly spaces.

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