

Exacerbation of psychopathology due to urbanization.

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Abstract

In 1950, more than 70% of the world's population lived in rural areas. The urban population has grown rapidly and since 2014 more than half of the world's population resides in towns and cities and this proportion is growing. Urban environment seems to be associated with increased prevalence of psychopathology including psychosis, anxiety and mood disorders. This association does not appear to be explained solely by population characteristics such as age, gender, marital status, social class or ethnicity. Various social environment features (such as higher rates of criminality, mortality, social isolation, air pollution and noise) seem to be more prevalent in urban settlements compared to rural environments and may predispose susceptible individuals to the development of psychopathology. Mental health clinicians and government agencies should be aware of this increased demand in mental health services in urban environments.

Key words: Urbanization, psychopathology, loneliness, stress, schizophrenia, depression, PTSD

Introduction

In 2014 more than half of the world's population and more than 80% of the North American population resided in towns and cities, according to a World Urbanization Prospects: The 2014 Revision report. (United Nations, Department of Economic and Social Affairs, Population Division 2015).

Countries in Asia and Latin America are expected to urbanize faster than countries in other regions. The urban population in China has more than tripled since 1980, (Gong et al., 2012) and more than 70% of Brazilians were concentrated in urban areas at the end of the 20th century. (Ludermir and Harpham, 1998).

Urbanization and Psychopathology

In the meta-analysis by Peen et al (2010), urban dwellers have a 20 per cent higher risk of developing anxiety disorders, and a 40 per cent higher risk of developing mood disorders. For schizophrenia, double the risk has been shown, with a 'dose-response' relationship for urban exposure and disease risk. Urbanization seems to affect mental health through the influence of increased stressors and factors such as overcrowded and polluted environment, high levels of violence, loneliness and reduced social support.

Compared with children in rural areas, children in urban environments have double the odds of developing schizophrenia in adulthood. (Vassos et al., 2012, Schiz Bulletin). A study by Newbury et al (Newbury et al., 2016, Schiz Bulletin) indicates that increased crime victimization and low social cohesion in neighborhoods located in urban areas explain approximately 25% of the association between urban upbringing and increased risk of psychotic symptoms in children. Children living in low-income, high-crime neighborhoods are significantly more likely to experience trauma, which makes them susceptible to later development of stress-related disorders such as PTSD. (Lambert et al. 2015).

For what concerns mood disorders, China's rapid urbanization and sociocultural change from 1980 to 2010 was concomitant with a marked increase in prevalence of lifetime major depressive disorder (Sun and Ryder, 2016, Front Psychol).

Extended exposure to artificial light in towns and cities ("light pollution") affects 99% of North American and European populations and is associated with increased risk of mental illness such as mood disorders, including MDD.7 Nonhuman animal studies indicate that light exposure at night negatively affects mood and cognition by decreasing

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the expression of trophic and growth factors (eg, brain-derived neurotrophic factor) and increasing the expression of proinflammatory cytokines (eg, tumor necrosis factor-alpha) in the hippocampus. (Lambert et al. 2015).

Evidence is beginning to surface that indicates that the urban population shows a stronger brain response to stress, and stronger cognitive impairment under stress. A recent fMRI study in the journal *Nature*, conducted by a German research group, showed that these effects seem to occur irrespective of age, gender, general health status, marital or income status. In this study, the amygdala (a brain region that regulates emotions such as anxiety and fear) showed higher activation under stress in healthy individuals from large cities compared to their counterparts from rural regions. Interestingly, activation grew with the size of the current home city. Further, activity in another brain region associated with depression (Pezawas et al, 2005;), the perigenual anterior cingulate cortex, was positively correlated with the time that an individual had spent in a large city as a child (Leberbogen et al., 2011).. The more years someone had spent growing up under urban conditions, the more active this brain region tended to be. The pACC is a key regulatory region for amygdala activity in the context of negative affect, (LeDoux, 2000, *Ann Rev Neurosci*).

Loneliness

A German researcher and clinician, Dr Mazda Adli, says. "if social density and social isolation come at the same time and hit high-risk individuals ... then city-stress related mental illness can be the consequence."

Loneliness could be defined as a subjective experience in which a person feels psychological discomfort because he/she is unable to increase the quality and/or quantity of relationships to the person's desired level (Cassidy & Asher, 1992; Peplau & Perlman, 1982). On the contrary, solitude is a state of seclusion or isolation which may be often desirable and valued as a time when one may work, think or rest without being disturbed. Loneliness occurs following a perceived lack of and/or loss of significant relationships and can contribute to several physical and psychological health problems. Loneliness, like any situation that requires behavioral adjustment is stressful, and the fight or flight response is evoked. Walter B. Cannon described the "fight or flight" response to stress, identifying a consistent set of physiologic changes that occur when animals, including humans, are exposed to stress. (Cannon and de la Paz, 1911; Sterling and Eyer, 1988; McEwen 1998; Charney, 2004; Benson and Casey, 2008; Chrousos, 2009; Theleritis, 2010, 2011).

What is stress?

Stress hormones (cortisol, adrenaline and noradrenaline) prepare the body to fight or flee. Breath quickens, heart

beats faster, senses are sharpened (sight and hearing), the individual become more alert, certain blood vessels constrict, which helps direct blood to the muscles and the brain and away from the skin and other organs. Body systems not needed for immediate actions are suppressed. The stomach and intestines cease operations. Sexual arousal lessens. Repair and growth of body tissues slows. Hans Selye (1956) was the first to advance the idea that physical and psychosocial stressors trigger the same physiological response. He also suggested that short-term stress (good stress) stimulates people in order to overcome obstacles while ongoing and overabundant stress (bad stress or distress) wears down the ability to adopt and cope. Two Harvard researchers Yerkes and Dodson (1908) noted that as stress or anxiety levels rose, so did performance and efficiency-up to a point. At this turning point, further stress and anxiety led to significant declines in performance and ability.

Overabundant (bad) stress is linked to health problems

Hypertension, allergic skin reactions, anxiety, arthritis, constipation, cough, depression, diabetes, dizziness, headaches, heart problems (angina, heart attack, and cardiac arrhythmia), infectious diseases such as cold and herpes, infertility, irritable bowel disease, insomnia, menopausal symptoms such as hot flashes, nausea and vomiting of pregnancy, pains (backaches, headaches, abdominal pains, muscle aches etc.), premenstrual syndrome, slow wound healing, side-effects of AIDS, cancer and cancer treatment, ulcers etc.

Overabundant (bad) stress warning signs

Physical symptoms

Tight neck and shoulders, back pain, sleep difficulties, tiredness or fatigue, racing heartbeat or palpitations, shakiness or tremor, sweating, ringing in ears, dizziness or fainting, choking sensation, difficulty swallowing, stomach-ache, indigestion, diarrhea or constipation, frequent urgent need to urinate, loss of interest in sex, restlessness.

Behavioral Symptoms

Grinding of teeth, inability to complete tasks, bossiness, fidgeting, overuse of alcohol, emotional eating or over-eating, taking up smoking or smoking more than usual, increased desire to be with or withdraw from others, rumination (frequent talking about stressful situations).

Emotional Symptoms

Crying, irritability, edginess, anger, feeling powerless to change things, nervousness, feeling anxious, quick temper, lack of meaning in life and pursuits, boredom, loneliness, unhappiness with no clear cause, depression.

Cognitive Symptoms

Continual worry, poor concentration, trouble remembering things, loss of sense of humor, indecisiveness, lack of

creativity, trouble thinking clearly.

Populations at risk for loneliness

Populations at risk for loneliness include the elderly, young college students, the seriously ill, the disabled, those who experience significant loss, and those who are isolated like the patients with psychiatric problems (Theleritis, 2015).

Exposure to nature can increase cognitive control in urban environments

Researchers from the USA have shown that simple and brief interactions with nature can produce marked increases in cognitive control. (Berman et al., 2008, Psychological Science) and up to a point alleviate attention deficits in children (Taylor and Kuo, 2009, Journal of Affective Disorders). According to attention restorative theory after interacting with natural environments, one is able to perform better on tasks that depend on directed-attention abilities. Unlike natural environments, urban environments contain bottom-up stimulation (e.g., car horns) that captures attention dramatically and additionally requires directed attention to overcome that stimulation (e.g., avoiding traffic, ignoring advertising, etc.), making urban environments less restorative (Berman et al., 2008). It is worth noting that exposure to nearby nature, for instance, a garden or a grassy area with trees, may reduce aggression (Kuo & Sullivan, 2001, Environment and Behavior).

Proposals

Urban environments can be less cognitive restorative; it is proposed that walking in nature can improve directed-attention abilities.

Mental health clinicians and government agencies should be aware of this increased demand in mental health services in urban environments

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