

Impact of Physical Environment on Mental Health

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Abstract

We spend a lot of time of our lives in indoor activities yet we are not well aware about the built environment and mental health. The built environment affects mental health in two major ways. One of them is the characteristics of the built environment which has a direct impact on mental health and other is the environmental characteristics which includes housing, crowding, noise, indoor air quality and light. Research studies show that high rise & multiple dwelling units adversely affect the mental health of mothers & young children. Several research studies show that neighbourhood quality has adverse impact on children and their families. Noise and psychological distress are positively correlated. It was found that indoor pollutants like lead, solvents and pesticides have been associated with mental health outcomes. Several other hazardous materials (mercury, manganese, organic solvent) produce neuropsychiatric symptoms including anxiety, depression, irritability, and concentration difficulties. When people discover that they were exposed to hazardous chemicals then they show the symptoms of psychological distress. Studies indicate that people recover from cognitive fatigue and stress in the natural environment. People living in natural environment feel safer, recover cognitive energy and gain more psychophysiological recovery.

Key words: - Physical environment, mental health.

Major concepts and Definitions

Mental Health

The World Health Organisation defines mental health as "a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community"(WHO,2013) In this, the absence of mental disorder does not necessarily mean the presence of good mental health (Keyes, 2005 and Barry, 2009). It means that mental disorder persons can also lead a satisfying, meaningful life and contribute towards the society alongwith constraints of painful, distressing or debilitating symptoms.

Mental Disorders

Mental disorders include anxiety, depression, schizophrenia, and alcohol and drug dependency. Common mental disorders can result from stressful experiences (Patten, 1991), but also occur in the absence of such experiences; stressful experiences do not always lead to mental disorders. Many people experience sub-threshold mental disorders, which mean poor mental health that does not reach the threshold for diagnosis as a mental disorder (WHO, 2014). Mental disorders and sub-threshold mental disorders affect a large proportion of populations (Murray et. al. 2010), The commonly-used term, mental illness, refers to depression and anxiety (also referred to as common mental disorders) as well as schizophrenia and bipolar disorder (also referred to as severe mental illness) (Joint Commissioning Panel for Mental Health, 2013).

All of over the globe and particularly in developing countries like India, common mental disorders like anxiety and depression are rising due to many factors like physical, social, economic and political in daily life. The emphasis in this article is to see the impact of physical environment on mental health of a person. Comprehensive strategies to remove the disparities in physical environment will improve mental health and reduce inequality. There is good evidence, for example, that common mental disorders (depression and anxiety) are distributed according to a gradient of economic disadvantage across society (Campion et. al, 2013).

Impact of Physical environment:-

People spend more than 90% of their lives indoor. Research studies show that built environment also affects mental health. Such physical environment includes housing, crowding, noise, indoor air quality and light. Studies on house type coverage show that high rise, multiple dwelling units are inimical to the psychological well being of mothers with young children and possibly that of young children themselves (Evans et al., 2003 and Freeman et al., 1984). Such psychological distress may be due to social isolation of mothers and restricted play opportunities for children in high rise buildings. This is true for low income families where insufficient resources and space are hindrance in the maintenance social network. People living in poor-quality housing experience stigma and may attribute some of their predicament to themselves (Halpern, 1995 and Kearns et al. 2000). Parents in poor housing are more apt to contend with safety hazards including insufficient safety



protection, close proximity to higher volume street traffic, and a greater number of housing code violations, all of which contribute to childhood injury rates (Gielen et al, 1995; Macpherson et. al. 1998; Mueller et. al, 1990 and O'Campo et al., 2000), There is a growing literature demonstrating that neighbourhood quality has mental health impacts on children and their families, independent of household SES (Wandersman et al., 1998 and Loventhal et al. 2000). Several studies have indicated positive association between aircraft noise exposure, traffic noise from roads and railway track. A study of children exposed to traffic noise from roads and trains in small towns in Austria generated a dose-response function between noise and psychological distress (Lercher et al, 2002). These investigators also uncovered greater adverse impacts among children at higher biological risk (e.g. prematurely). One perspective study with children indicated that 8- to 10-year olds psychological health was adversely impacted by the opening of a new air port (Bullinger et al., 1999). There are also data indicating dose-response functions between airport noise and use of psychotropic drugs in adults (Grandjean et al., 1975 and Knipschild et al., 1977).

Chemical properties of building materials themselves can be toxic, and heating and cooking systems affect indoor air quality (Evans, 2003) e.g. A gas stove without ventilation increases nitrogen dioxide concentration above typical outdoor level. Several research studies have been conducted on indoor pollutants and mental health. They have pinpointed on malodorous substances and various behavioural toxins (e.g. lead, solvents, pesticides). It is worth brief mention that outdoor ambient pollutants have been associated with mental health outcomes (Evans, 1994 and Rotten & Cohn, 2002). Most research on behavioural toxins such as heavy metals, pesticides and solvents has focused on neurological and cognitive impacts (Araki, 1994). Studies of cognitive deficits associated with early childhood lead exposure are a prime example (Needleman et al. 1979 and Needleman et. al, 1989). It is less well appreciated that several of the behavioural toxins, including lead, also impact psychological well being. Lead e.g. impedes self regulatory behaviour in children (e.g. focused attention, frustration tolerance), which in turn is related to behavioural conduct disorders such as yelling, fighting, and other forms of aggression (Needleman et. al, 1979 and Sciarillo et al., 1992). Several other hazardous materials (mercury, manganese, organic solvents) produce neuropsychiatric symptoms including anxiety, depression, irritability and

concentration difficulties (Bell et al., 2001). Exposure to heavy metals has also been linked to criminal behaviour in adults (Masters et al., 1998). Some behavioural reactions to toxins are caused by the psychological trauma associated with threats to personal health (Evan, 2003). Community members who discover they have been exposed to hazardous materials reveal multiple indices of psychological distress including fear and panic, sleep disturbance, feelings of loss of control and helplessness, pessimism and fatalism (particularly with respect to future health), and in some cases posttraumatic stress disorder (Edelstein, 1998, 2002).

Seasonal Affective Disorder (SAD) is a form of depression that occurs in relation to the amount of exposure to day light (Rosenthal et al., 1984). Individuals chronically exposed to shorter hours of day light suffer more sadness, fatigue, and, for some, clinical depression. Patients hospitalised for severe depression recover more quickly in sunny versus dimly lit rooms (Beauchenin & Hays, 1996). Level of illumination and not spectral frequency is the critical element in SAD (McCull & Veitch, 2001).

Several research studies have demonstrated that exposure to natural environment such as trees, water and natural landscapes replenishes cognitive energy. It has been observed that natural environment is directly linked to recovery from cognitive fatigue and stress. Self report and cognitive performance data converge on this conclusion (Kaplan et al. 1984; Kaplan et al. 1998 and Kuo, 2001), Psychophysiological recovery from experimental and naturalistic stress or exposure is also facilitated by exposure to natural elements (Parsons et al, 2000 and Ulrich et. al, 1993). In addition, views of nature (Kaplan & Kaplan, 1984) and landscape paintings (Ulrich et, al, 1993) as well as indoor plants (Larsen et. al, 1998) are all associated with increased positive effect and comfort. Several studies reveal correlations between rates of illness and room views of natural landscapers among institutional populations (Kaplan et al., 1993 and Ulrich et. al, 1993). Children in day care settings with greater access to nature are less impulsive and concentrate better (McCarney, 1995), children with attentional disorders (e.g. attention-deficit/hyperactivity disorder) have fewer behavioural problems when they spend more time in natural setting (Kuo, 2002). Low-income housing areas in London with less access to private gardens have higher prevalence of depression, independent of SES (Weich et. al, 2002), and public housing residents living adjacent to their living environment, feel safer, and have more positive effect than others

from the same housing development living near outdoor spaces devoid of nature (Kuo et al. 2001). Architectural designs of building also have the potential to develop mental health. Architectural features that support fascination, curiosity, or involuntary attention also help in recovery from mental fatigue. Views of nature, fireplaces, fountains, aquarium, and animals as well as paintings of landscape and other coherent, tranquil scenes are among the design elements with the potential to afford restoration (Kaplan et. al. 1984 ; Kaplan et. Al., 1998; Frumkin, 2001 and Ulrich, 1991). International effects of physical and social environment have also been found to have significant effect on mental health. The negative effects of housing quality (Earls and Nelson, 1998), residential crowding (Evans et. al, 2000 and Lepore et, al., 1991), noise (Evans et al., 1996) and air quality (Evans et al., 1987) on psychological health are all exacerbated by the presence of other social stressors such as family turmoil or interpersonal loss (Evans, 2003). Such persons who are already in psychosocial turmoil are more psychologically vulnerable to sub optimal physical environmental conditions.

References

Araki S (1994) *Neurobehavioral Methods and Effects in Occupational and Environmental Health*, New York, NY: Academic.

Barry MM (2009) Addressing the Determinants of Positive Mental Health: concept, evidence and practice. *International Journal of Mental Health Promotion*, 11 (3): 4-17.

Beauchemin KM, Hays P (1996) Sunny hospital rooms expedite recovery from severe and refractory depressions. *J Affective Disorders*. 40 : 49-51.

Bell IR, Baldwin CM, Schottenfeld RS (2001) Psychological Sequelae of hazardous materials exposure, In: Sullivan JB. Krieger GR eds. *Clinical Environmental Health and Toxic Exposures*. 2nd ed. Philadelphia, Pa: Lippincott, Williams and Wilkins: 404-412. 552 EVANS.

Bullinger M, Hygge S, Evans GW, Meis M, vanMackensen S (1999) The psychological cost of air craft noise for children. *Zentralblath Hygiene Umweltmedizin* 202: 127-138.

Campion J, Bhugra D, Bailey S, Marmot M, (2013) Inequality and mental disorders: opportunities for action. *The Lancet* ; 382 (9888): 183-4.



- Earls M, Nelson G. (1988) The relationship between long term psychiatric clients' psychological well being and their perceptions of housing and social support. *Am J Community Psychol*, 16: 279-293.
- Edelstein MR (1988) *Contaminated Communities*. Boulder, Colo: West view
- Edelstein MR (2002) Contamination: the invisible built environment. In: Bechtel RB, churchman A, eds. *The Handbook of Environmental Psychology*. 2nd ed. New York, NY: Wiley; 559-588,
- Evans GW, Jacobs SV, Dooley C, Catalano R (1987) The interaction of stressful life events and chronic strains on community mental health. *Am J Community Psychol*, 15: 23-34,
- Evans GW (1994) The psychological costs of chronic exposure to ambient air pollution. In: Isaacson RL, Jensen KF eds. *The Vulnerable Brain and Environmental Risks*, New York, NY: Plenum; 167-182
- Evans GW, Allen K, Taffala R, O' Meara T (1996) Multiple stressors: performance, psychophysiological, and affective responses. *J Environ Psychol*; 16: 65-74,
- Evans GW & Saegert S (2000) Residential crowding in the context of inner city poverty. In: Wapner S, Demick J, Minami H, Yamamoto T eds. *Theoretical Perspectives in Environment-Behaviour Research*. New York, NY: Plenum; 247-268.
- Evans GW (2003) The built environment and mental health. *Journal of Urban Health: Bulletin of the New York Academy of Medicine* Vol. 80 No. 4
- Evans GW, Wells NM, Moch A (2003) Housing and mental health: a review of the evidence and a methodological and conceptual critique. *J Soc Issues* 59; 475-500,
- Freeman HL (1984) Housing. In: Freeman HL ed. *Mental Health and the Environment*. London, England: Churchill Livingstone; 197-225.
- Frumkin H (2001) Beyond toxicity: human health and the natural environment. *Am J Prev Med*; 20: 234- 240.
- Gielen AC, Wilson M, Faden R, Wissow L, Harvilchuck J (1995) In-home injury prevention practices for infants and toddlers: the role of parental beliefs barriers, and housing quality. *Health Educ Q* ; 22 : 85-95.

- Grandjean E, Graf P, Lauber A, Meier H, Muller R (1976) Survey on the effects of noise around three civil airports in Switzerland. In: Kerlin R, ed. *Internoise '76*, Washington, DC: Institute of Noise control Engineers, 85-90
- Halpern D (1995) *Mental Health and the Built Environment*. London, England: Taylor and Francis.
- Joint commissioning Panel for Mental Health(2013) *Guidance for commissioning public mental health services-Practical mental health commissioning*.
- Kaplan R, Kaplan S (1984) *The Experience of Nature*, New York, NY: Cambridge University Press
- Kaplan R, Kaplan S, Ryan RL (1998) *With People in Mind*. Washington. DC: Island Press;
- Kearns A, Hiscock R, Ellaway A, Macintyre S (2000) Beyond four walls. The psychosocial benefits of home: evidence from West Central Scotland. *Housing stud.*; 15: 383-410.
- Keyes CL (2005) Mental illness and/or mental health? Investigating axioms of the complete state model of health. *J Consult clinPsychol*; 73 (3): 539-48.
- Knipschild P, Oudshoorn N. VII (1977) Medical effects of aircraft noise: drug survey. *Int Arch occup Environ Health* ; 40: 197-200.
- Kuo FE, Sullivan WC, Coley R. Brunson L (1998) Fertile ground for community: inner-city neighbourhood common spaces. *Am J Community Psychol*; 26: 823-851.
- Kuo FE (2001) Coping with poverty. *Env Behav* ; 35: 5-34
- Kuo FE (2002) Bridging the gap: how scientists can make a difference. In: Bechtel RB, churchman R, eds. *Handbook of Environmental Psychology*. 2nd ed. New York, NY: Wiley
- Larsen L, Adams J, Deal B, kweon BS, Tyler E (1998) Plants in the workplace. *Env Behav*; 30: 261-281
- Lepore SJ, Evans GW, Palsane MN (1991) Social hassles and chronic strains: a hierarchy of stressors? *J Health Soc Behave*; 357-367.
- Lercher P, Evans GW, Meis M, Kofler W (2002) Ambient neighbourhood noise and children's mental health. *Occup Environ Med.*; 59 : 380-386.
- Leventhal T Brooks-Gunn J (2000) Neighbourhoods they live in: the effects of neighbourhood residence on child and adolescent outcomes. *Psychol Bull*; 126: 309-337.

- Macpherson A, Roberts I, Pless IB (1998) Children's exposure to traffic and pedestrian injuries. *Am J Public Health*; 88: 1840-1845.
- Masters RD, Hone B, Doshi A (1998) Environmental pollution, neurotoxicity and criminal violence. In: Rose J. ed. *Environmental Toxicology*, New York, NY: Gordon and Breach; 13-48
- McCarney SB, (1995) *The Attention Deficit Disorders Evaluation scale (ADDES): Home Version Technical Manual*, 2nd ed. Columbia, Mo: Hawthorne Educational Services.;
- McColl SL, Veitch JA (2001) Full spectrum fluorescent lighting: a review of its effects on physiology and health. *Psychol Med*; 12: 305-357.
- Mueller BA, Rivera FP, Lii SM, Weiss NS (1990) Environmental factors and the risk for childhood pedestrian-motor vehicle collision occurrence. *Am J Epidemiol*; 132: 550-560.
- Murray CJL, Vos T, Lozano R, Naghavi M, Flaxman AD, Michaud C, et al. (2012) Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* ; 380 (9859): 2197-223.
- Needleman HL, Gunnoe C, Leviton A et al. (1979) Deficits in psychological and classroom performance of children with elevated dentine lead levels. *N Engl J Med*; 300: 689-695
- Needleman HL, Schell A, Bellinger D, Leviton A, Allred E (1989) The long term effects of low doses of lead in childhood: an 11 year follow up report. *N Engl J Med*.; 322: 83-88.
- O'Campo P, Rao RP, Gielen AC, Royalty W, Wilson M (2000) Injury-producing events among children in low-income communities: the role of community characteristics. *J Urban Health*; 77: 34-49.
- Parson R, Hurtig T (2000) Environmental psychophysiology. In: Casioppo JT, Tassinary LG, Berntson GG, eds. *Handbook of Psychophysiology*. 2nd ed. New York, NY: Cambridge University Press; 815-846.
- Patten SB (1991) Are the Brown and Harris "vulnerability factors" risk factors for depression? *J Psychiatry Neurosci*; 16 (5): 267-71.
- Rosenthal NE, Sack DA, Gillin JC et al. (1984) Seasonal affective disorder. *Arch Gen Psychiatry*. 41: 72-80.



- Rotten J, Cohn EG (2002) Climate, weather and crime. In: Bechtel RB, churchman A, eds. *Handbook of Environmental Psychology*, 2nd ed. New York, NY: Wiley, 481-498.
- Sciarillo WG, Alexander G, Farrell KP (1992) Lead exposure and child behaviour. *Am J Public Health*, 1356-1360.
- Ulrich RS (1991) Effects of interior design on wellness: theory and recent scientific research. *J Health care Interior Design*; 3:97-109.
- Ulrich RS (1993) Biophilia, biophobia, and natural landscapes, In: Kellert SR, Wilson EO, eds. *The Biophilia Hypothesis*. Washington DC: Island Press, 73-137,
- Wandersman A, Nation M (1998) Urban neighbourhoods and mental health. *Am psychol* 53: 647-656.
- Weich S, Blanchard M, Prince M, Burton E, Erens B, Sproston K (2002) Mental health and the built environment: cross sectional survey of individual and contextual risk factors for depression. *Br J Psychiatry*, 176: 428-433.
- World Health Organization (2013) What is mental health? WHO web page: World Health Organization. <http://www.who.int/features/qa/62/en/>.

