

CHAPTER II

LITERATURE REVIEW

2.1 Housing and Health Overview

“To live in an adequate shelter means more than a roof over one’s head: It means to have a home, a place which protects privacy, contributes to physical psychological well-being, and supports the development and social integration of its inhabitants – a central place for human life” (World Health Organization [WHO], 2004).

Defining “healthy housing” therefore must require a broad discussion involving a variety of factors that contribute to the quality of housing and housing environment. It must involve the provision of adequate and functional physical and social conditions for health, hygiene, comfort and privacy. The United Nations member states and participating organizations declared during the 2nd HABITAT Conference in Istanbul (1996) defined the following elements that constitute “healthy housing”: *“Adequate space; physical accessibility; structural stability and durability; adequate lighting, heating and ventilation; water-supply, sanitation and waste-management facilities; suitable environmental quality and health-related factors; and exposure of children and women to toxic substances, should be considered.”*

Indeed the relationship between housing and health is complex. In a study, Shaw (2004) presented a model that describes the interaction between housing and

health, wherein he distinguishes between the concrete aspects of the shelter and physical infrastructure and the “soft” factors such as the social and perceptual dimension of housing (see figure 2). The study discusses the indirect and direct effects of poor housing conditions on mental and physical health, on the one hand presenting evidence how good housing can provide a sense of privacy, security and controls for individuals and on the other hand how substandard housing affect the individual’s physical and mental by increasing the level of stress because of the absence of the sense of security and long-term stability.

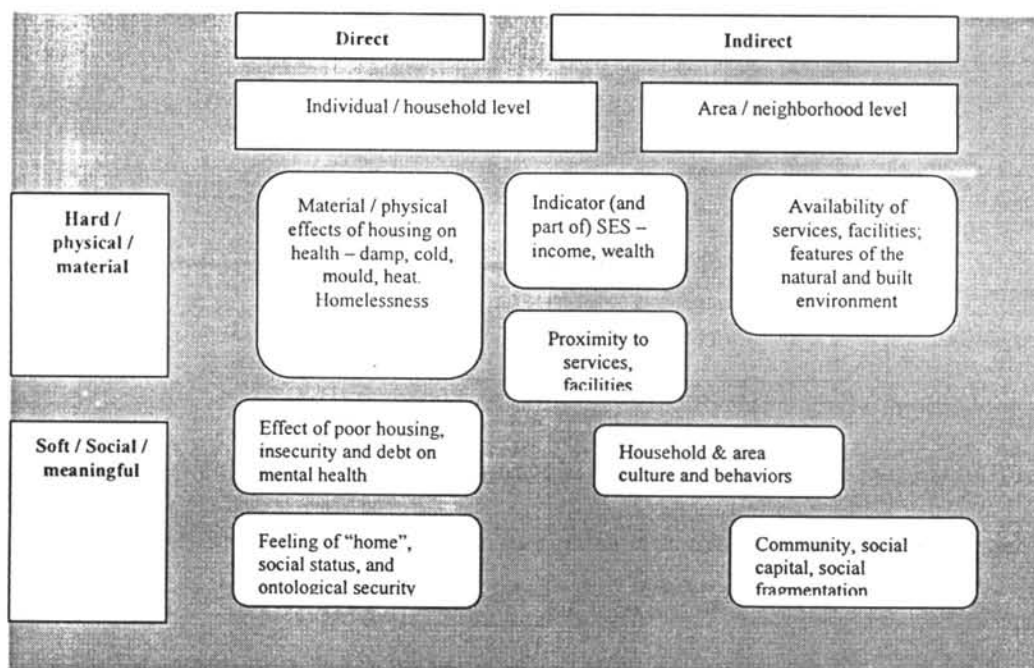


Figure 2: Conceptual model for housing and health interactions (Shaw 2004)

The study also examines the negative impact on the community’s ability to be healthy because of the material disparities of housing in neighborhoods, presenting evidence showing the ill-effects of the poor environmental within the community. Moreover, the study explores the “meaning of home collectively affects

neighborhoods and communities”, discussing how location and the surrounding environment are directly associated with the community’s ability to be cohesive and the ability of the community members to work together for the development of their own community. The study concludes by advocating improved housing at the individual and community level, a task that public health officials must address because improving the housing conditions is a critical element in tackling the broader health inequalities in the society (Shaw, 2004).

Krieger et al. (2002) suggests that there is increasing evidence that housing conditions directly affect the health of individuals, families and communities. Housing quality has been linked to morbidity from infectious diseases, chronic illnesses, injuries and mental disorder. There are studies that show how substandard housing conditions pose challenges to health in the form of physical manifestations and mental health effects. Some physical manifestations of substandard housing are *infection* (TB, skin abscesses) and *asthma and other respiratory diseases*. The mental health effects of substandard housing manifest in the form of “intense loneliness”, chronic stress and an environment of ambivalence and hopelessness, according to studies undertaken. In places where there is prevalence of violence and insecurity where parents protect their children by keeping them inside the house and away from perceived danger, children are isolated from friends and peers and may manifest loneliness and even depression.

2.1.1 Housing and Infectious and Chronic Diseases

Krieger et al. (2002) further explores studies undertaken that links housing quality with morbidity from infectious and chronic diseases. Lack of safe

water source and ineffective waste disposal, which are common features of substandard housing have been identified as contributing elements to the spread of infectious diseases. Dampness and extreme indoor temperatures are also associated with asthma and other chronic respiratory illnesses. There are also studies that found old and dirty carpeting contributing to allergy, respiratory, neurological and hematological illnesses.

The paper further cites studies related to pest infestations (cockroaches, rats, etc.), which links substandard housing to chronic illness. Cockroaches are known causes of allergic sensitization that triggers asthma and mouse allergen are known to be the cause for allergies and possibly asthma morbidity. These pests normally are present in the dwelling that are damaged or in poor conditions. The presence of toxic materials found in substandard houses is an obvious cause of chronic health problems. Poor ventilation increases exposure to smoke and moderately elevated levels of carbon monoxide causes headache and higher levels cause acute intoxication. Lead exposure (from paint and dilapidated piping) in run down dwellings have been clinically established to cause neuro-developmental abnormalities and more recently associated with hypertension. Moreover, asbestos exposure, which comes from deteriorating insulation, have been established to cause *mesothelioma* and lung cancer. The above mentioned are evidence that substandard housing contributes to increased exposure to harmful biological and chemical hazards, which directly affect the physiological and biochemical processes (Krieger, 2002).

2.1.2 Housing and Respiratory Illnesses

People spend a significant amount of their time inside the house. Indeed, children and women spend most of their time in it. Therefore, the quality of indoor air has direct impact on one's respiratory condition. Moreover, the duration of exposure to indoor air quality is not the only influencing factor, but also the concentration levels of air pollutants that may be present. Examples of these are: Concentrations of volatile organic compounds (VOCs) from cleaning materials, solvents, etc.; emissions of pollutants from cooking with solid bio-fuels (e.g. firewood, charcoal, etc.). The presence of moisture and mould in the home has also been linked to certain respiratory illnesses of the occupants.

In a study of the effects of indoor air pollution from biomass fuels in Nepalese households, Sherestha & Sherestha (2005) observe that indoor air pollution from biomass smoke poses a significant public hazard for many families in the developing world. They estimate that about 2 billion people still rely on solid bio-fuels for cooking daily meals and heating homes. And in Nepal, 80% of the households use biomass fuels for cooking and where 4.2% and 6.9% of the total deaths in 2000 have been attributed to pneumonia and asthma/bronchitis, respectively. The study concludes that one the main reasons for indoor pollution is poor ventilation of the dwelling especially in the kitchens where the concentrations of air pollutants are three times higher than the other parts of the house. Moreover, they observe that respiratory illnesses were more prevalent in those living in mud or brick houses compared with those living in concrete housing; the latter generally representing a higher standard dwelling.

Agnihotram (2005), in a paper reviewing respiratory disease burden in rural India, suggests that “respiratory disorders are mainly due to unfavorable housing and living condition.” He points to the statistics provided by the 1993-1994 National Health Survey revealing that only 11% of households live in good housing and only 7% have a flushing toilet. Along with other environmental factors, he suggests that this situation leads to the TB prevalence of 138 per 100,000 in India, while the world average is 59.7 per 100,000. The paper further discusses how asthma and bronchitis take a major toll in India, especially among children and the aged population. Although the causes are not very well understood, it points to studies undertaken in the country that link environmental factors such as poor housing conditions and bed dust allergy as significant causes.

Significant levels of moistures and the mould are generally indications of a substandard housing condition. Although mould spores are present in all kinds of indoor environment, excessive levels usually are manifested when there is an adequate supply of moisture, which generally characterize older or damaged houses. Moreover, poor social conditions such as overcrowding were found to be significant predictors of damp, moldy homes (Butler et al., 2003).

Koskinen et al. (1999) in a study of the relationship between moisture and presence of mold in the houses and the health of the occupants concludes that “exposure to moisture was significantly associated with sinusitis, acute bronchitis, nocturnal cough, nocturnal *dyspnoea* and sore throat, and the exposed inhabitants had significantly more episodes of common cold and tonsillitis.” A sample of the proportions of the occupants with at least one episode of respiratory illnesses in the past 12 months indicates that 71% of those with reported presence of

moisture have common cold compared with only 58% with those reporting absence of moisture; 68% of those exposed to moisture have sore throat compared to 48% who were not exposed; and 53% of those exposed having Rhinitis compared to 41% of those unexposed. According to the study, when individuals are exposed at home to building-related moisture, the risk is significantly high for acquiring respiratory infections, respiratory symptoms and non-respiratory illnesses.

The WHO Europe housing and health survey (2004) known as LARES (Large Analysis and Review of European Housing and Health Status), further suggests that dampness and observable mould growth in the homes were significantly linked to asthma, nasal allergies and eczema due mainly to the poor indoor air quality. Moreover, it concludes that there is a significant increase for chronic bronchitis and cold throat illness among individuals living in damp or moldy houses.

2.1.3 Housing and Mental Health

Although it is more complex to define mental well-being than physical well-being, because the former involves the interaction of multiple factors, including social, cultural and personal realities, there are several studies in the field of social and environmental psychology that examine the effects of environmental factors such as crowding, pollution and noise on mental health (Evans et al., 1998; Kearns & Smith, 1993; Smith et al., 1993; Gomez-Jacinto & Hombrados-Mendieta., 2002).

Smith et al. (1993) in a study in New Zealand demonstrated that housing stressors are linked significantly with the mental/psychological illnesses.

Moreover the study emphasizes that living in substandard housing is a significant source and independent variable of stress to individuals and families.

Another study conducted by Evans (2003) presents evidence that demonstrates how pre-existing psychiatric problems are aggravated by the stress caused by living in substandard housing conditions. Although it does not produce serious mental illness, residential crowding and excessive external noise sources are linked to elevated psychological distress, and insufficient natural light is associated with increased symptoms of depression, the study observes.

Data gathered from the WHO LARES (2004) indicate that people suffer from mental and psychological illness when they live in the following housing conditions:

- There is no sufficient protection from external intrusions: noise, vibrations, dampness, moulds, draughts, cold during winter;
- When there is overcrowding or structurally do not allow privacy or when they do not feel free in the their own home;
- The house lacks sufficient natural lighting and does not offer view of the outside environment;
- When there are no community infrastructure (common areas, parks) that facilitate socialization;
- Presence of vandalism.

Indeed, as mentioned earlier, the relationship between housing and mental health is a complex one. Moreover, to discuss this matter one cannot restrict to the physical conditions of the dwelling/shelter, but rather one must also include all

the factors that affect the life of an individual or family including the opportunities that are available to them to satisfy their needs and their particular histories, both physical and social. However, there is enough body of evidence to conclude that housing conditions affect ones mental health—although it may not necessarily be the cause, it certainly contributes to its deterioration or its wellness.

2.2 Housing and Children's Health

Children are a vulnerable population. Under normal circumstances, as a group they live a simple and healthy way of life: they play a lot and eat a lot. Most often their activities evolve around the house: the actual shelter and its immediate surroundings. A WHO European Division (2004) study in observes that infants and young children spend 90% of their time in the home setting. And while the home is usually considered the safest place, it is also a cause of harm for children when it is physically and socially inadequate and non-functional: Host to insects, rodents and harmful elements, no privacy, lack basic hygiene, etc. Studies have shown that a growing number of diseases in children have been linked the environment that they are exposed into, especially in the home setting.

Some of the findings that WHO study presented at the 2004 Budapest Ministerial Conference on Environment and Health indicate: (1) *"Damp conditions nurture the growth of mould, which affects children's respiratory diseases; (2) Indoor solid-fuel combustion, humidity, dust mites and dander from pet animals represent major threats to the air children breathe. In the WHO European Region, over 50,000 children aged 0-4 years are estimated to die each year from acute lower*

respiratory infections due to indoor pollution; (3) The quality of sleep is associated with health status; (4) One of the severe threats to children's health is lead poisoning; in old dwellings, lead is found in paint or solder for pipes; (5) accidents are the primary cause of death of children aged 5-15 years, and the home is one of the places where are exposed to risks of injury, many of which are preventable; and (6) of the children surveyed, 20% declared that they did not have enough space for recreation around their homes. This may have direct consequences on amounts of physical activity."

Housing condition is an important determinant for children to acquire certain infections and diseases, to be exposed to harmful products and chemicals and allergens such as dust mite feces. Brown et al. (2001) in a study on the effectiveness of housing policies in reducing US children's lead exposure indicates that in many children has been linked to pain, dust and soil, which prevail in inadequate housing environment in poor, urban and often minority communities especially on children between 18 and 36 months of age. Samples were taken from a listing of all addresses with lead-poisoned children identified between May 1992, and April 30, 1993, taken from the lead screening registries in 2 northeastern states. Results of the study indicate that the risk of identifying 1 or more children with significant blood lead levels (10 ug/dL or greater) was 4 times in areas where there is limited enforcement of lead reduction exposure. It concludes that "enforcement of housing policies interrupts the cycle of repeated lead exposure." This study shows clearly that there is a significant association between housing condition and the health of children, as lead generally found in deteriorating paint or solder for pipes that characterize old houses.

Studies conducted in developing countries show similar findings, where inadequate housing is an important contributor to ill health. Gastrointestinal, respiratory and malarial infections have been directly linked to the quality and specific attributes of the house. Residential chronic overcrowding is associated with children's behavioral difficulties in school, elevated blood pressure, and impaired parent-child interpersonal relationships in a study using a sample of working-class 10 to 12-year-old children living in urban India (Evans et al., 1998).

A study by Wolf et al. (2001), sponsored by the Rollins School of Public Health of Emory University, whose objective was "to evaluate the effects of a Habitat for Humanity housing improvement program in northern Malawi on the prevalence of childhood illnesses" focused on evaluating the impact of better housing on health of children under five years old. The Habitat program had been in place for about 5 years in the study area. The team from Emory University collaborated with the Ekwendeni Mission Hospital and Habitat for Humanity project office in the remote rural town of Ekwendeni. Subjects were randomly selected from a list of the more than 300 homes built by Habitat for Humanity in the area. Habitat for Humanity staff assisted guiding the project team in locating each household, and trained community surveyors were employed for data collection and implementation of the questionnaire. Permissions were also obtained to collect water samples from the household storage containers and water source, which were then tested for *coliforms*. Permission was likewise obtained to collect blood from the subject children's fingers and to administer medical examination, which included checking of the spleen to determine if there are any infection. After administering this to

Habitat for Humanity households, the closest non-Habitat neighbors were selected, with whom the same process was repeated.

Two surveys were undertaken in 1997, the first one in March and the next in August. The data analyzed consisted of 211 households with 318 children, 143 of them lived in 98 Habitat houses and the other 175 children lived in the 113 non-Habitat houses. The Habitat and non-Habitat households basically showed similar socio-economic variables, and both groups had an average of 3 rooms and 6 family members per house. However, there were significant differences in the physical conditions of the houses: Habitat houses were mostly made out of bricks, tile-roofs and concrete floors, while the non-Habitat houses were mostly made of thatch roof, mud floors and unburned bricks or mud as walls.

The results of the study reveal that children 5 years old and below experienced lower incidence of 3 particular illnesses than those living in the traditional houses: Respiratory infection 21% to 29%; gastrointestinal disorder, 10% to 14%; and malaria, 15% to 20%. The study shows the results of the multivariate analysis, determining the relation between housing the state of health of children 5 years old and below. When adjusted for housing type and water source, the ORs were significant for any illness but not for specific types of illness. Children under 5 years old living in Habitat houses were 45% less likely to have illnesses when access to safe water was controlled (the fully adjusted ratio was 0.46(0.28 to 0.76), showing it is statistically significant. The same table also reveals that the incidence of respiratory infection was significantly reduced in Habitat children (0.60, 95% CI 0.34 to 1.06).

Although reductions in individual illnesses were not significant, the study also revealed that improved housing was associated with reduced risk of respiratory infection, gastrointestinal illness, and malaria by 44% in children under 5 years old. Moreover, the study revealed that having access to safe water, above-average knowledge about malaria and owning a private toilet were significantly associated with lowering the odds of acquiring some illnesses.

Dedman et al (2001) in a study examined associations between five measures of housing conditions during childhood and subsequent mortality from all causes, coronary heart disease, stroke, and cancer. The five variables analyzed were crowding, water supply, toilet facilities, adequacy of ventilation and cleanliness of the household. The study concludes that "associations between housing conditions in childhood and mortality from common diseases in adulthood are not strong." However, this same study shows that the housing conditions where one spends his/her childhood have measurable effects on mortality in adulthood. The main results found statistically significant, or marginally significant, links between lack of private indoor tapped water supply and increased mortality from coronary heart disease (hazard ratio 1.73%, 95% CI 1.13, 2.64); and between poor ventilation and overall mortality (hazard ratio 1.30%, 95% CI 0.97, 1.74).

2.3 Housing and Women's Health

Similar to children, women are more likely to stay within in the confines of the house than men, largely because of economic and cultural reasons. In poor communities around the world women take on the responsibilities at home, and thus

are more at risk to the health effects of inadequate housing conditions. Even in advanced and modern societies many women and families suffer from inequities in accessing basic social services, including housing.

Among women there are both physical and social consequences of substandard housing. Welch (1997) in a paper on women's health and low-income housing presents the common physical manifestations of substandard housing listed as the following: Infections from overcrowding, lack of clean water and predisposition to poor sanitation have been report; asthma and other respiratory illnesses are also common effects because of dampness, dust and insects in the house; and lead poisoning from direct exposure to lead paint and contaminated soil. The study emphasizes that socially, women in poor housing situations suffer from injury and violence and isolation and marginalization. Studies have also shown that substandard housing causes fear, intense loneliness, etc. linked to the unpredictable environment in which they live and the feeling of hopelessness because of overcrowding and litter.

Welch further suggests that although women and children living in substandard housing may already be at risk for poor health because of their overall socioeconomic status, health workers must ask questions about housing conditions as a normal part of client histories so it can be determined whether health problems are induced or made worse by substandard housing. The following are the factors to be assessed that contribute to the potential of injury, risk of infection, worsening of chronic disease, stress and poor health:

- *“Environmental hazards posed by the location of low-income units near toxic waste sites*

- *Safety hazards posed by facilities that have become dilapidated or otherwise fallen into disrepair*
- *Physical conditions such as crowding and disrepair*
- *Psychological factors including isolation, low self-worth, anxiety, and depression*
- *Geographic factors, including proximity to grocery stores and pharmacies and access to transportation*
- *Social factors such as crime and violence*
- *Discrimination by race, gender, social class, or location, all of which may contribute to health risks.*
- *Access to health care is often inaccessible or less accessible to marginalized women."*

A study conducted by Al-Khatib et al. (2003) on the housing environment and women's health in a Palestinian refugee camp community in the city of Nablus in Palestine involved interviews with 150 women of different age groups and different marital status, with results showing significant associations between women's physical and mental health and housing conditions. The results of family social and economic profiling show that the average size of the family is 8.06 members; 28.7% of which had nine or more members, 20% seven members, 13.3% six members and 23.3 families had five members or less. The results also show varying housing conditions: 40% of the interviewed households have three rooms or less; 48% of the houses had only 1 window, 50% had 2 windows and the remaining 2% had no window at all.

The study reveals association of housing conditions with women's reproductive health: A noticeable degree of abortion incidence, pregnancy complications and anemia diseases. It shows that 87.4% of married women suffer from physical illness. And most of these women (96.7%) when interviewed showed that their housing conditions greatly affect their physical well-being. One hundred fifteen (115) of the women interviewed, or 76.7%, suggested that humidity and bad ventilation to diseases such respiratory asthma, the spread of communicable diseases, arthritis and joint pain. The interview further revealed that most of the married women reported that they suffer from lack privacy in their house, mostly because limited space as 40% of the houses have an area of 60 m² or less, leading to problematic marital relationships, stress, and frustration. Moreover, the results indicate young women suffering certain physical illnesses such as continuous headache without apparent reasons and consequences of them such as of irregular periods (Al-Khattib I et al., 2003).

2.4 Health Benefit of Improved Housing

Studies have been undertaken to measure the health benefits of improved housing. Those conducted in the developing world have not shown conclusive link between improved housing and good health. Studies conducted to measure the effect of improved housing on general health and illness episodes, have the majority finding some health improvements while the reason finding no difference or mixed effects. Studies conducted on the effects on respiratory health are inconclusive. However, virtually all studies conclude that improving housing would generate

mental health gains. Moreover, studies conducted to measure a range of social outcomes indicate improvements after improving housing conditions with respondents reporting reduced sense of isolation, reduced fear of crime and a feeling of belongingness. However important these changes are, researchers have yet to conclude that these changes translate into health improvements. (Thompson et al., 2001)

A few studies undertaken in developing countries show a direct link between housing improvement and improved health, especially in children. While recognizing that measuring the health benefits of improved quality of housing is complicated, the physical benefits and the improved outlook from improved housing are presented. More importantly, improved housing has been directly linked to significant reduction in the burden of diseases in children.

The study by Wolf et al. (2001), cited earlier, concluded that the Habitat for Humanity housing improvement program improved the health of children 5 years old and below, and further suggested that the health benefits obtained from improved housing were not solely derived from the physical housing structure and other tangible environmental improvements, but also come from an improved outlook in life because of improved housing conditions. In the survey conducted, when families were asked to rank their physical, emotional and overall quality of life on a scale of 1 to 10, the mean responses in all three cases from Habitat families was greater to the mean responses of the non-Habitat families. Although the study admitted to certain limitations, it further concludes that “regardless of what aspect of housing contributed to health, this study strongly suggests that the Habitat for Humanity

housing program significantly reduced the burden of disease in children under five years old.”

Moreover, there are other studies indicating that intervention to improve housing is essential to improve and maintain children’s health, where psychological, environmental, socioeconomic, behavior-cultural and physiological factors have been shown to mediate housing and children’s health (Chaudhuri, 2004). Data from the study by Shrestha (2005) “show a decreasing inclination in the prevalence of respiratory diseases as well as respiratory symptoms from the mud houses to the concrete houses. For example, research data indicates that the incidence of chronic respiratory diseases were 27%, 19.4%, 12.5%, and 4.8% in people living in mud, brick, mixed-type, and concrete houses, respectively.

However, Thomson et al. (2001), in a study entitled “Health effects of housing improvement: systematic review of intervention studies”, discovered that there are few studies examining the effects of housing improvement on health, and which they identified generally poor in quality. Although the studies that they have examined point to self-reported improvements in physical and mental health, they argue that the methodological limitations of these studies makes it impossible to be specific about the nature and size of the health gain as a result in housing improvements. One of the inherent methodological difficulties in assessing the health effects of housing improvements is that households with poor housing conditions often experience other forms of socio-economic deprivations concurrently, which could also have an effect on their health. Because “housing interventions rarely occur in isolation, this may affect the socio-demographics of the study area and make the before and after comparisons problematic,” the study further concludes.