
Perception of Neighborhood Environments and Self-rated Health in Hong Kong

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Citation

T Wong, Y Yan. *Perception of Neighborhood Environments and Self-rated Health in Hong Kong*. The Internet Journal of Public Health. 2012 Volume 2 Number 1.

Abstract

Background: It is believed that where an individual resides is associated with his health status. This neighborhood and health relationship is well documented in western countries but receives very little attention in Hong Kong. Objective: The present study attempted to explore the relationship between perception of neighborhood environments and self-rated health (SRH) in Tin Shui Wai, Hong Kong. Methods: Questionnaire was used to collect people's perception of neighborhood environments, including the physical and living environment, service environment and social environment, and their SRH. Binary logistic regression was employed to explore the neighborhood environment and SRH relationship. Results: It was discovered that a significant negative association of poor SRH with perceptions of physical and living, service and social environments. Income and education levels also were significant predictors of SRH.

INTRODUCTION

The insight that where one resides is associated with one's health is not new. Since the late 18th century, studies have been carried out to examine the role of neighborhood in shaping people's health and the mechanism of differences in health between areas.^{1,2} This interest in the relationship between neighborhood and health increased sharply in the 1990s and a considerable number of studies in this aspect have been conducted.³

The physical and living environment, including environmental quality, the living conditions and community safety, in the neighborhood has significant impact on individual health. The poor environmental quality can adversely affect people's physical health through the air they breathe and the water they drink.⁴ The living density and the degree of public order and safety can also affect people in developing their social network and their psychological health status respectively. It is believed that a crowded living environment discourages the social network development while an unsafe community makes people worried and adversely affects their psychological health.^{5,6}

The service environment, that is the services and facilities within the neighborhood operated, managed and funded by authorities, also affect people's health. Sufficient community facilities and amenities allow people to take part in more

social activities and hence benefit people's psychological health.^{7,8} The availability and coverage of the medical services directly affect people's physical health.⁹ Widespread and adequacy of comprehensive social services assist people in developing their self-esteem and social networks thus positively contributing to good social and physical health status.¹⁰

Social environment in the neighborhood includes social capital, social networks and social cohesion. These social relations can be developed through communications and interactions among people. More communication and interaction between people in the neighborhood help enhance and flourish the social capital, social network and social cohesion and people are willing to offer assistance to each other. Therefore, people with a strong social network and social cohesion are more optimistic and positive when encountering difficulties and problems. Better social and psychological health statuses would be then anticipated.^{8,11,12}

A growing amount of research documents the association of an individual's perception of neighborhood environment and health status. Research of the western societies report that individual health is significantly influenced by the physical conditions of the neighborhood.¹³⁻²¹ In addition, empirical studies have repeatedly demonstrated associations between the social conditions of neighborhood and people's health

status.^{18,20-24} In Asia, Cho et al.¹⁶ discovered that Koreans with negative perceptions of their neighborhood characteristics had a higher risk of poor self-rated health status although such relationship was not detected in a previous study by Cho.²⁵

In Hong Kong, research of the neighborhood and health relationship receives very little attention. In order to acquire useful information for health management, policies formulation and community planning, an examination of the relationship between neighborhood and health status in Hong Kong is essential. The present study attempts to explore the perception of neighborhood environments and its association with self-rated health (SRH) of residents in Tin Shui Wai, a new town in Hong Kong.

METHODS

This study was an exploratory cross-sectional survey using a structured questionnaire. The target subjects were the residents of Chinese origin in Tin Shui Wai, Hong Kong.

STUDY AREA

Tin Shui Wai is located in the north-western part of Hong Kong (Figure 1). Its development began in 1987 on a total area of about 430 hectares of land which was created by reclamation from the sea of low-lying areas. It is a new town built for residential purpose with dominant public housing. A Light Railway and roads linking the New Town to the trunk road network provide communication with the urban areas beyond. Tin Shui Wai had a population of about 270,000, of which 52% were female, and 43% were aged 35 to 64. About 80% of the working population had a monthly income of less than HK\$ 15,000. More than a quarter (27%) of the population had not received any formal education and only 8% had tertiary education. Nearly two-fifth (37%) was born in mainland China and about 800 residents came from South Asia, including India, Pakistan and Nepal. Nearly four-fifths (77%) of the population had lived Tin Shui Wai for more than 10 years.²⁶ From 2004 to 2010, a number of social tragedies including suicides and family violence happened in Tin Shui Wai; and the mass media thus stigmatized Tin Shui Wai a “City of Misery”.²⁷⁻²⁹ It is assumed that the neighborhood environments would affect people's health, and thus induce the tragedies.

Figure 1

Figure 1 The location of Tin Shi Wai in Hong Kong



SUBJECTS

Survey responses came from various sources including onsite interviews, community organizations and secondary schools in Tin Shui Wai. Onsite interviews were conducted at Tin Shui Wai railway stations where interviewees were selected by convenience sampling. In the process of conducting the survey, a trained interviewer approached the target respondents and determined their eligibility by asking if they resided in Tin Shui Wai. For the participants of community organizations, the survey was administered during their weekly meetings in the community centers with the help of the personnel in these organizations. Questionnaires were given to the participants before the meeting and were collected after the meeting. For the survey in schools in Tin Shui Wai, students who were aged between 12 and 20 were invited to join the survey. Questionnaires were distributed to students during the lesson and were returned to teachers after completion.

The interviewer, personnel of the community organizations and teachers involved were informed of the objectives of the study and were briefed on the content of the questionnaire. They would provide assistance to the respondents in filling out the questionnaires when required. The data collection process started in January 2009 and ended in December 2009. A total of 410 (70 from onsite interviews, 274 from community organizations and 66 from secondary schools) out of 574 questionnaires were completed and returned, with an overall response rate of 71%.

Survey instrument

The survey instrument was an anonymous questionnaire. Its development was based on several overseas and local studies

which were highly valid and widely used in evaluating people's perception on neighborhood environments and assessing their health status.^{13,16,30} A pilot study was conducted in January 2009 for 20 samples using this questionnaire with Cronbach's alpha reliability coefficient over 7.0 that showed the questions asked were consistent and valid. The questionnaire consisted of three main domains. The first part collected demographic and socioeconomic status (SES) of the respondents, including age, gender, education level, family income, employment status, marital status, number of family members, type of house now living, the ownership of the house now living, place of birth and time living in the present neighborhood. The second part sought information on perception of neighborhood environments in respect of physical and living environment, service environment and social environment while the third part related to the SRH of the respondents. All questions were close-ended.

Perception of neighborhood environment

Neighborhood environments, for this study, include three subscales perceived by the respondents including (i) physical and living environment; (ii) service environment and (iii) social environment.

For physical and living environment, respondents were asked to evaluate the air quality, noise level, environmental cleanliness and hygiene and public security of their neighborhood by a five-point Likert scale ranging from 1, very serious problem to 5, not a problem. A total of 16 questions were asked in this part.

The measurement of service environment was obtained by asking respondents to assess the social services, social welfare facilities and some neighborhood facilities such as medical, recreational and cultural facilities in the neighborhood by a five-point Likert scale ranging from 1, very serious problem to 5, not a problem. Eight questions were administered in this part.

The social environment was represented by asking respondents to rate a total of 20 statements regarding social participation, social networking, social connectivity, relationship with neighborhoods and sense of belonging to the neighborhood by using a five-point Likert scale ranging from 1, strongly disagree to 5, strongly agree.

Responses to the individual items in each subscale were summed to produce the physical and living environment score, service environment score and social environment

score which indicated the overall assessment of the three neighborhood environments respectively. Higher score demonstrated that a respondent had better perception of the neighborhood.

SRH of respondents

Self-rated health (SRH) is a commonly used measure of perceived general health status and it is a strong predictor of morbidity and mortality.³¹⁻³³ SRH was assessed by a single question "In general, would you say your health is: (i) poor; (ii) fair; (iii) good; (iv) very good and (v) excellent at the present time?". Respondents were asked to rate their SRH on a five-point Likert scale, on which 1 indicated "poor" and 5 indicated "excellent".

DATA ANALYSIS

After the collection of the completed questionnaires, responses of the interviewees were coded and analyzed using Statistical Package for Social Sciences (SPSS) software (Version 16). Descriptive statistics were employed to describe the demographic/SES characteristics, perception on the neighborhood environments and SRH of the respondents.

To evaluate the association of perception of neighborhood environments and SRH, binary logistic regression was employed. Odds ratio (OR), that is a way to compare whether the probability of a certain event is the same for two groups (i.e. the ratio of the probability that the event of interest occurs in one group to the probability that it occurs in another group)³⁴, was reported to present the odds of respondents having poor SRH with the effects of perception of neighborhood environments and demographic/SES variables.

SRH was dichotomized into (i) poor health and (ii) good health. Respondents who rated SRH in the categories of "poor" and "fair" were classified as poor SRH while those respondents who claimed they had good, very good and excellent SRH were regarded as good SRH. Models which combined the perception of neighborhood environments and demographic/SES variables to explore their effects on SRH were then developed. In these models, perception of neighborhood environments and demographic/SES variables were regarded as independent variables while SRH was set as dependent variables. The significance level was set as 95 percent.

RESULTS

DEMOGRAPHIC AND SOCIOECONOMIC (SES) CHARACTERISTICS OF RESPONDENTS

As presented in Table 1, more female respondents (52%) took part in this study than male. Over two-third of the respondents were aged under 45. Over half were single. About 40% of the respondents were born in Guangdong or other provinces and 55% were born in Hong Kong. About four-fifths of the respondents had more than 3 family members. About two-fifths had received secondary

education while only one-fifths had attended tertiary education. About 80% of the respondents earned less than HK\$ 20,001 a month. Less than 20% lived in private housing while the remainder lived in either public housing or subsidized sale flats that were housing under various subsidized schemes provided to eligible low-income persons by the Hong Kong government. Concerning the length of residence, two-fifths of the respondents were living in Tin Shui Wai for 6 years or more.

Figure 2

Table 1. The demographic and socioeconomic background of the respondents

Demographic and SES variables	Number (%)
Gender	
Male	195 (48%)
Female	215 (52%)
Age groups	
15 and below	35 (9%)
16-30	111 (27%)
31-45	131 (32%)
46-60	84 (20%)
61 or above	49 (12%)
Marital Status	
Single	218 (53%)
Married	151 (37%)
Divorced/separated/widowed	41 (10%)
Place of birth	
Hong Kong	225 (55%)
China (Guangdong)	151 (37%)
China (Other provinces)	24 (6%)
Overseas countries	10 (2%)
Number of family member	
2	91 (22%)
3	150 (37%)
4	141 (34%)
5 or above	28 (7%)
Education level	
Not received formal education	73 (18%)
Primary education	78 (19%)
Secondary education	180 (44%)
Tertiary education or above	79 (19%)
Monthly Income (HK\$)	
\$10000 and below	146 (36%)
\$10001- \$20000	177 (43%)
\$20001- \$30000	40 (10%)
\$30001 or above	47 (11%)
Employment status	
Employed	353 (86%)
Unemployed	57 (14%)
House ownership	
Owned	150 (37%)
Rented	260 (63%)
Type of house	
Public housing	238 (58%)
Private housing	79 (19%)
Subsidized sale flats	93 (23%)
Length of residence in the present community	
1 year and below	32 (8%)
2-5 years	209 (51%)
6-10 years	80 (19%)
11 years or above	89 (22%)

PERCEPTION OF NEIGHBORHOOD ENVIRONMENTS AND SRH

Table 2 shows the mean scores and standard deviations of the respondents on the perception of three community subscales and SRH status. Respondents perceived average problems in the physical and living environment, slightly inadequate services provided and unsatisfactory social environment in Tin Shui Wai. The mean score of the SRH of the respondents was 2.8 which indicated that respondents rated their health slightly below “good”.

Figure 3

Table 2. Mean scores of perception of neighborhood environments and SRH

	Total score	Mean score (Standard deviation)
Physical and living environment	80	43.3 (16.1)
Service environment	40	21.7 (8.1)
Social environment	100	51.8 (19.1)
SRH	5	2.8 (1.2)

RELATIONSHIP BETWEEN PERCEPTION OF NEIGHBORHOOD ENVIRONMENTS AND SRH

Five models were developed to assess the association of perception of neighborhood environments with SRH (Table 3). Models 1-3 considered the three neighborhood environments separately. It was discovered that perception of physical and living environment, service environment and social environment were negatively related to poor SRH, i.e. poor SRH was inversely related to better (higher scores of) perception of neighborhood environments. Respondents with poor perception of physical and living environment (OR=0.89, 95% CI= 0.87-0.91), poor perception of service environment (OR=0.80, 95% CI= 0.77-0.84) and poor perception of social environment (OR=0.91, 95% CI= 0.90-0.93) had higher odds having poor SRH.

When all the three neighborhood environments were considered simultaneously (Model 4), the effects of perception of physical and living environment, service environment and social environment were again negatively related to poor SRH. It also revealed that respondents with poor perception of physical and living environment (OR=0.95, 95% CI= 0.88-1.00), poor perception of service environment (OR=0.90, 95% CI= 0.76-0.96) and poor perception of social environment (OR=0.98, 95% CI= 0.94-1.00) had higher odds having poor SRH.

In Model 5, demographic/SES variables were simultaneously considered with perception of neighborhood environments. Perception of physical and living environment, perception of service environment, perception

of social environment, education level and income level were negative statistically significant with poor SRH. Respondents with poor perception of physical and living environment (OR=0.98, 95% CI= 0.90-1.00), poor perception of service environment (OR=0.88, 95% CI= 0.74-0.94), poor perception of social environment (OR=0.98, 95% CI= 0.94-1.00), lower education level (OR=0.52, 95% CI= 0.26-0.83) and lower monthly income (OR=0.67, 95% CI= 0.38-1.00) had higher odds having poor SRH.

Figure 4

Table 3. The effects of perception of neighborhood environments and demographic/SES variables on “poor” SRH

	Model 1	Model 2	Model 3	Model 4	Model 5
Physical & living environment	β -0.108 OR=0.89 (0.87-0.91)			β -0.044 OR=0.95 (0.88-1.00)	β -0.016 OR=0.98 (0.90-1.00)
Service environment		β -0.214 OR=0.80 (0.77-0.84)		β -0.095 OR=0.90 (0.76-0.96)	β -0.120 OR=0.88 (0.74-0.94)
Social environment			β -0.085 OR=0.91 (0.90-0.93)	β -0.015 OR=0.98 (0.94-1.00)	β -0.010 OR=0.98 (0.94-1.00)
Education level					β -0.660 OR=0.52 (0.26-0.83)
Monthly income					β -0.390 OR=0.67 (0.38-1.00)
Nagelkerke R ²	0.468	0.472	0.440	0.476	0.506

The values in parentheses are the Confident Intervals (CI)
OR is odds ratio

DISCUSSION

Results of the current study revealed that respondents generally perceived an average physical and living environment, insufficient service environment and unsatisfying social environment in Tin Shui Wai. The findings of the association of poor physical and living environment, service environment and social environment with poor SRH status were in accordance with many previous studies.^{13,16,18,21,35}

For physical and living environment, adverse environmental exposure can threaten health. Living in an area with high air pollution is related to the presence of respiratory symptoms, deterioration of lung function, more emergency room visits or hospitalizations and more medication use.³⁶ The significant positive associations between hospital admissions for all respiratory diseases, cardiovascular diseases, chronic obstructive pulmonary diseases, and heart failure and the concentrations of sulphur dioxide, nitrogen dioxide, ozone, and particulates in Hong Kong further support the findings of the present study that a poor physical and living environment had negative effects on health.^{37,38}

Poor living conditions such as over-crowding can affect

health directly through interpersonal contact and indirectly through the effect of emotional stress and poor social networking. Transmission of viruses is active in high living density environment and the crowded conditions.^{39,40} It is discovered that Hong Kongers living in a high density environment rated themselves less happy and more worried and more likely to have headaches, nervousness and insomnia than those living in a low density environment.⁴¹ The high building density in Hong Kong exerts remarkable effects on health. Massive development of high rise buildings in urban areas induces wall effects and stifles ventilation. The temperature of the affected areas increases and air pollutants cannot disperse easily and stagnate in the neighborhood thereby causing serious threats to the health of residents, such as the spread of flu and prevalent of respiratory diseases.⁴²

Provision of services, facilities and amenities within the neighborhood and management strategies imposed by the government can affect people's health status. The provisions of better neighborhood aesthetics and facilities, such as green areas and parks, can attract people doing more physical activities and thus results in better physical and mental health.⁴³ Cultural activities can reduce stress and help people to develop their social network and stabilize their emotions which benefit psychological and social health. A previous study indicated that residents in Tin Shui Wai were not satisfied with the transport management, job opportunity, crime, prostitution and medical facilities. More than three-quarters of the respondents stated that the problems of crime and gangs were serious in their communities which may affect their psychological and social health.⁴⁴ These discontented service provisions and safety worries in the neighborhood is a major source of stress, resulting in poor health.

Provision of adequate medical services and easier access to health care allow people to frequently visit the hospitals and clinics for medical checkups, preventive measures and follow-up care.^{45,46} These can improve the continuity of care and increase the utilization of appropriate diagnostic and therapeutic procedures, thus people's health will be improved.⁴⁷ However, the medical and healthcare services in Tin Shui Wai are extremely inadequate.⁴⁴ There is only one General Out-patient Clinics operating in Tin Shui Wai, and thus residents have to visit a hospital located in another district for emergency, specialist, advanced and comprehensive medical and healthcare services. This inadequacy of medical and healthcare services, that

exacerbate the health problems in Tin Shui Wai, is the prominent reason for the poor perception of the service environment in the present study.

Transport services and transport policies also affect health. Inefficient transport management and poor transport planning lead to traffic jams. Traffic jams will result in stress that is proved to be associated with anxiety and depression.^{48,49} Concerning the effect of transport services and policies on residents in Tin Shui Wai, the West Rail Line, which connected Tin Shui Wai and the rest of Hong Kong, aims to improve residents' accessibility, reduce traffic congestion and boost regional development. However, due to poor transport planning and management, the West Rail Line cannot meet its aims. It is believed that expensive fares, poor location of stations away from major housing areas and keen competition from buses, are the major reasons leading to its failure. The West Rail Line has experienced a number of accidents and signaling failures since its first operation in early 2004, These safety problems increase people traffic stress and cause negative effects on people's psychological health.^{50,51}

A sound social environment can improve people's sense of well-being and management of stress and the adverse impacts of challenging life events and circumstances, and thus will result in better SRH, physical health and psychological health.⁵² The degree of support available, the existence of networks, vibrant formal and informal community organizations, can facilitate people making connections with each other, construct relationships of trust and reciprocity and develop good social health and networking. Social organizations of the neighborhood are often reflected in social capital and cohesion, that are important for social and community health.^{35,53} Nevertheless, community organizations, that are short of financial resources, short of manpower and lack of usable space, are unevenly distributed in Tin Shui Wai.⁵⁴ This insufficient social support evidently affect people's health.

Other studies reveal that social capital and cohesion affect health which is in line with the present study. Poder and He⁵⁵ found that family, friends, colleagues and associations of social networks could provide moral support. Moral support could eliminate feelings of vulnerability and insecurity from daily difficulties. People having strong moral support resulted in less stress and depression. Chronic diseases and infectious diseases were then less likely to emerge. Besides, having strong social capital and cohesion enable people to

mobilize the material resources for health through these networks more easily and effectively.^{56,57} In Tin Shui Wai, residents have poor relationships among neighbors and low trust level with each other. They do not participate actively in social activities. There is also segregation of underprivileged groups that are the new immigrants and those who are dependent on social security.⁵⁸ This poor social cohesion apparently impact on people's health.

Income was a significant predictor for the health outcome in the present study. It is suggested that poor health status was due to low income. People's inability to purchase goods and services such as nutritious food and quality medical care due to low income could lead to poor health status.⁵⁹ Income level can also determine the living conditions and the accessibility to safe housing and neighborhoods. Poor living conditions and unsafe living environment due to low income level result in higher emotional stress and eventually lead to illness, mental and psychological problems. Additionally, lower income discourages people from engaging in social activities resulting in social alienation, poor social interaction and networking, and thus leading to increased stress and then poor health.^{11,60}

The effects of income on health status are believed to be more evident and serious in a city of high wealth inequality and uneven distribution of wealth like Hong Kong.⁶¹ In such a city, a majority of the power, resources and assets are controlled by the rich and the poor are deprived. When the gap between rich and poor becomes larger, the comparative powers of the rich people increases while the poor people's declines. In this regard, the poor are further marginalized in term of social and physical aspects. This further supports the findings in the present study. The mean monthly income in Tin Shui Wai was HK\$ 13,750 which was 20% lower than the mean monthly income of Hong Kong at HK\$ 17,250.²⁶ This low income causes deprivation resulting in poor health status of the residents in Tin Shui Wai.

Education was another predictor of poor health status in the present study. Income and education levels have a close association as people with higher education level generate greater income.⁶² In the present study, the negative association between education level and poor health status remained substantial and significant even after controlling for income level. This suggested that education level was a significant predictor for SRH.

The mechanisms for the negative relationship between education level and poor health status are indicated in some

early studies. Education can provide individuals with better access to information and health care system, critical thinking skills and greater consciousness and awareness regarding health matters.^{52,62} In addition, the more educated are believed to have greater social networks. People with greater social networks can find financial, physical and emotional support more easily which in turn has a causal effect on health.⁶³ However, some argue that education level may not be a crucial factor in affecting people's accessibility to and understanding of health information. Most individuals, no matter what their education level is, can get health information through the mass media and the internet which is very user friendly.⁶⁴

Further, education can help determine and change one's relative position in the society which then enhances health. It is believed that people of the lowest level of the social hierarchy constantly face arbitrary demands by others and have little control over their lives. These stressful lives subsequently result in stress-related illnesses.^{65,66} Contrarily, more educated people are less likely to report negative emotions, anxiety and hostility. The more educated are less emotionally responsive and report a higher sense of control and greater self-esteem when face with negative life events.^{67,68}

Cho¹⁶ showed an opposite pattern, that people with only a high school diploma were less likely to be in poor health than college educated counterparts. This result was due to the tendency of somatization among those with collage education. This group of people might, in fact, be in good health but just tend to believe that they had health problems. However, further studies are needed to clarify these findings.

CONCLUSION

Findings of the current study revealed that people's perception of the physical living environment; service environment and social environment of the neighborhood, as well as their income and education levels were significantly associated with their health status. These results suggest that health policies should target both 'neighborhood' and 'people'. Here 'neighborhood' includes both physical, service and social environment while 'people' means residents in this context. Policies and strategies that improve and strengthen these aspects of the neighborhood should be implemented.

The present study is a pilot attempt to explore the association of perception of neighborhood environments and health in Hong Kong. Although the findings of the current

study are correspondent with those of the previous studies, some limitations should be highlighted. First, the health status of the respondents was self-reported. It is possible that respondents may be unable to assess their health status correctly. Many health outcomes are difficult to diagnose and may not manifest themselves for many years. Second, difference between neighborhoods in Hong Kong is not great since Hong Kong has a small area of about 1100 km². Thus, effects of locality on perception of neighborhood and health status may not be accurately reflected as the differences in term of physical and living and service environment are not prominent enough. Thus, neighborhoods in different regions with distinct characteristics are recommended for further study. Lastly, the present study excluded the ethnic minorities, who should be included in future studies.

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