

# Leisure Sports Facilities Make Urban Residents Healthier? Exploring the Benefits of Leisure Sports Facilities in the View of Healthy City in Taiwan

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**Abstract**—The World Health Organization in 1981 began promoting Healthy City and Healthy Community vision to promote the healthy behavior of protection and improvement of the quality of life and maximize the protection of the natural environment to reduce the impact of disasters, such as losing exercise, nutrient surplus, obesity, the accumulation of pressure, depression, hypertension, and metabolic syndrome. They really caused great impact of physical and mental health. One of indicators of Health City is the Leisure Sports Facilities, and exercise indeed helps reduce stress, anxiety symptoms and mood improvement and improvement of quality of life. However, the benefits of healthy city programs and the importance of leisure sports facilities are rarely been explored in the past, so the study aims to use Contingent Valuation Method, CVM method to realized the benefit of citizen opinion and then gain a better understanding of the relationship between leisure sports and physical and mental health. Finally, this study has the following conclusions: (1) the implementation of healthy city program can enhance the health of residents; (2) often use the ice rink, gym, more times of leisure exercise and using leisure sports facilities can effectively improve their self-evaluation of health; (3) different backgrounds, living habits and health levels have a significant influence on the willingness to pay of leisure sports facilities.

**Keywords**—*healthy city; leisure sports facilities; contingent valuation method*

## I. INTRODUCTION

The World Health Organization in 1981 began promoting Healthy City and Healthy Community vision to promote the healthy behavior of protection and improvement of the quality of life, and maximize the protection of the natural environment to reduce the impact of disasters. Diversified by local environmental conditions and changing factors, the vision of a Healthy City is relatively too comprehensive for pragmatic implementation, and setting forth strategic suggestions is equally impossible. As a result, the World Health Organization (WHO) held its first International Conference on Health Promotion in 1986 in Ottawa, the capital of Canada, where the Ottawa Charter for Health Promotion was proposed to set forth the concept of Healthy Communities, as the benchmark for implementation by governments and local authorities [1].

Throughout the years, researches have defined Healthy Communities as a purpose of promoting healthy deeds to protect and improve the quality of life, with which not only the direct impact factors are generally defined, the environmental impact on health is also taken seriously. In this context, a diversified community environment involves a variety of health elements, including decent walk surroundings and pedestrian streets, vehicle speeds, illumination, crime rate, public transport, social connectivity, and cultural diversity, all of which are closely related to and dependent on one another, to make the environmental features of local communities [2]. Therefore, in the course of urbanization, it's been a world trend to improve environmental factors through healthy communities, allowing the community environment to get away from the vicious cycles, and develop into a healthy community that is low-carbon and eco-friendly.

Because of the process of urbanization, the lifestyle of people become refined, high salt and high oil food, steam locomotive popularity, working hours growth, life stress, mental stress, busy, convenient pace of life and way. They caused people do not want to do exercise, nutrient surplus, obesity, the accumulation of pressure, so that residents are modern civilization diseases. They really caused great impact of physical and mental health. argued that issues of community environments and residents' health were more important than the abstract topics such as climate change, because in the course of health implementation, the residents' everyday behaviors would change through the participation in the improvement of community environment, leading to active involvement in making a safer, more convenient and multi-purposed walking environment in the neighborhood, equipped with outdoor facilities for sports and leisure [3]. One of indicators of Health City is the Leisure Sports Facilities, and exercise indeed helps reduce stress, anxiety symptoms and mood improvement and improvement of quality of life. However, the benefits of healthy city programs and the importance of leisure sports facilities are rarely been explored in the past, so the study aims to use Contingent Valuation Method, CVM method to realized the benefit of citizen opinion and then gain a better understanding of the relationship between leisure sports and physical and mental health.

## II. LITERATURE REVIEW

### A. *Healthy City and Healthy Community*

In his research, Shen (2015) argued that folks engaged in community's health activities had higher recognition on "I'm conscious of my own health", "I watch for my feeling about my own health", "I often check my own health", "I usually know my own health status", "I'm highly focused on my own health" than those who didn't get involved, and also had significantly higher total health consciousness [4]. The result of this research resonates with the motivation of this project, i.e. through the perception of healthy environment, people are guided to take part in the arena and consequently change their everyday living patterns; in other words, unfriendly community environment can largely reduce residents' desire to go out, and in turn, such a self-enclosed living pattern will eventually hamper the community cohesion and the individuals will gradually be isolated, so they'll lose their own identify with the community and become indifferent to the living environment, even the entire society. Therefore, in the course of urbanization, it is an important topic of how to use healthy community to improve the environmental factors, so that the community environment can get away from vicious cycles and develop into a healthy community that is low-carbon and eco-friendly.

In Taiwan, the healthy city movement is gradually unfolding. The City of Tainan, the first implementing healthy city based on the WHO criteria, established the NGO "Tainan City Healthy City Promotion Association" in July 2005, and joined WHO's Western Pacific Regional Office Alliance for Healthy Cities, making it the first Taiwan city as the member of the union Tainan city referenced WHO-recommended 20 steps and international indicators to implement healthy city. However, in the course of implementation, it was found that the indicators were not fully fit for Taiwan, and as a result, the city developed its own local indicators based on the WHO criteria. Later on, the Ministry of Health and Welfare arranged the international and Taiwan local healthy city indicators into the following Table 1.

### B. *Healthy City Sports & Leisure Indicators*

To facilitate quantifiable assessment on healthy city, WHO has established 32 healthy city indicators that can be quantified for countries to build their own healthy city profile, as the basis to evaluate their own implementation efficacy. The 32 indicators include four major categories: health, health services, environment, and socioeconomics. Limited to the available resources, this research focused on the environment-related leisure sports facilities for the main measuring indicator, with which the current health level and residents' demand on sports facilities were explored, in order to facilitate government healthy city programs and encourage civil participation.

Taiwan already has many cities taking the sports & leisure indicator of Healthy Cities set by WHO as a reference to develop their own localized indicators. However, the local indicators used in some areas, including Nantou County,

Taitung County, and New Taipei City's districts of Shuangxi, Pingxi, and Pinglin, are not available, due to incomplete publication or other considerations by the competent authorities.

## III. RESEARCH ANALYSIS AND RESULTS

### A. *Community Contingent Valuation Method (CVM)*

This method, often referred to as a "stated preference" model, is based on "hypothetical scenarios" in raising hypothetical questions. Through questionnaires or direct interviews, interviewees give the price of their willingness to pay (WTP) for specific facilities, environment or non-economic goods, or the price of compensation of their willingness to accept (WTA), and the results are used to evaluate use value as well as non-use value and existence value of goods or environment. The CVM has been mature and widely developed for comprehensive applications in many countries around the world. Ciriacy-Wantrup (1947) was the first to propose this method to measure the value of natural resources [5], and it was not until 1963 that scholar Davis pioneered to apply this method to evaluate effects of leisure resources, by using questionnaires to evaluate the efficacy of outing to the remote forest areas in Maine, U.S.A. Different price enquires have distinct pros and cons, while the payment card method takes the hypothetical questions, payment method and amount to a clear description, so that the interviewees can easily check (tick) the amount they'd like to pay. The merit of this method is to keep open price enquiry and avoid deviation error resulted from different starting points of the progressive price escalation method [6]. The CVM aims to use hypothetical questions through a questionnaire or experiment to induce interviewees' preference for or comment on certain non-marketable goods, so as to determine the value of the goods; Meanwhile the hypothetical questions are based on hypothetical conditions for the interviewees. Accordingly, this research took the payment card method for price enquiry, and hypothetical scenarios were prepared for the 16 leisure sports facilities explored in this research, so as to find out the maximum amounts the interviewees would like to pay.

### B. *Data Survey Results*

Researches on healthy cities at home are mostly focused on promotional projects and community building, with a few engaging in environment factors, even though the relationship between leisure sports facilities and residential users matters more. Therefore, this research was structured by taking the local residents as the base to explore the relationship among their facilities-related use habit, level of depth in use, demand, and self-evaluated health level. The sports & leisure facilities compiled by this research through literature reviews were examined to see whether the residential background had significant impact on the residents' choices of the facilities. Based on the stated purposes, the research hypotheses and research structure were set forth, as shown in the following Figure 1.

	International indicators	Local indicators	
		Cities, counties, towns	Additional indicators for cities under governance by province and county
<b>Environmental indicators</b>	C1: Atmospheric pollution C2: Water quality C3-1: Percentage of water pollutants removed from total sewage produced C4: Household waste collection quality index C5: Household waste treatment quality index	TE1: River quality TE2: Public toilet check pass rate	C6: Relative surface area of green spaces in the city C7: Public access to parks and green spaces C9: Sports and leisure C10: Pedestrian streets C11: Cycling in city C12: Number of seats of public transport C13: Public transport network coverage TE3: Percentage of arranged idle land TE4: Ratio of sidewalk space TE5: Improvement rate of sidewalks and arcades

FIGURE I. INTERNATIONAL AND TAIWAN LOCAL HEALTHY CITY INDICATORS

	Social interaction		Mental health	
	$\beta$	$p$	$\beta$	$p$
Indoor/outdoor swimming pool	.083	.078	.055	.252
Rhythm and aerobics room	.051	.273	.007	.878
Table tennis court	.064	.187	.072	.143
Badminton court	-.029	.546	.050	.296
Basketball court	-.105*	.026*	-.044	.357
Rock climbing ground	.081	.093	.067	.167
Skating rink	.141**	.003**	.106*	.027*
Sports park	-.008	.861	.016	.735
Children's playground	.065	.168	-.041	.385
Croquet (gateball) field	-.042	.372	-.072	.134
Gymnasium	.092	.054	.118*	.015*
Middle school small sports field	.042	.363	.078	.097
University stadium	-.109*	.023*	-.089	.067
Municipal gymnasium	-.055	.242	.047	.325
Leisure sports center	-.013	.779	.002	.973
Sports club	-.054	.258	-.080	.096
R2	.090		.070	
Adj R2	.058		.037	
F	2.779***		2.116**	
p	< .001		= .007	

N = 467  
\*p < .05 \*\* p < .01 \*\*\* p < .001

FIGURE II. LINEAR REGRESSION ANALYSIS OF MOST FREQUENTLY USED LEISURE SPORTS FACILITIES AND RELATED SELF-EVALUATED HEALTH

By taking the purposive sampling method, the public squares, parks and other leisure venues in Taoyuan City and Yilan County were chosen to give the questionnaires to the residents, and long-stay students and workers. The job was carried out from March thru May 2017, and in this three-month period, a total of 500 questionnaires were sent out, with 243 valid copies received in Taoyuan City, and 224 valid copies received in Yilan County, making a total of 467 valid copies returned, i.e. 93% validity rate. The received samples were then analyzed with SPSS.18.

C. WTP prices of Taoyuan vs. Yilan

With descriptive statistics, the WTP prices of Taoyuan and Yilan were analyzed and then sorted to explore the differences

of demand for facilities between the two areas. The highest WTP price of both cities went to gyms, indicating that both cities needed well managed quality indoor leisure sports venues; meanwhile the second highest WTP price of Taoyuan City went to facilities more like outdoor and with open space, different from Yilan's which was sports clubs similar to gyms. As for the rest facilities of both areas, some were similar in precedence, while others were a bit different. Notably, whatever the leisure sports facilities, Yilan had higher WTP prices than Taoyuan, indicating Yilan residents are willing to pay more for leisure sports. As a result, hypothesis "H2: Healthy Cities programs affect the willingness to pay (WTP) for leisure sports facilities." was justified.

#### D. Most Frequently Used Facilities and Related Health Level

To justify hypothesis H3, the most frequently used facilities and their impact on self-evaluated health were identified and analyzed through linear regression. The result showed that under the overall regression model, the most frequently used facilities didn't have significant impact on physiological health, i.e.  $F=1.281$ ,  $p=.204$ , and therefore further explanation is not needed herein.

The result from analysis of social interaction vs. mental health is shown in Table 2. Using skating rink has significantly positive impact on social interaction, with  $\beta=.141$ ,  $p=.003$ , and more frequent use of skating rink brings higher social interaction capability; meanwhile the basketball court with  $\beta=-.105$ ,  $p=.026$  and university stadium with  $\beta=-.109$ ,  $p=.023$  has significantly negative impact on social interaction capability, and more frequent use of basketball courts and university stadiums brings about lower social interaction capability. On the mental health analysis, the skating rink with  $\beta=.106$ ,  $p=.027$  and gym with  $\beta=.118$ ,  $p=.015$  have significantly positive impact on mental health, and more frequent use of skating rinks and gyms brings about higher level of mental health. Other variables do not make significant impacts.

As a result, hypothesis "H3: Different leisure sports facilities make significantly distinct impact on health" was partially justified, where "skating rink" has significantly positive impact on social interaction and mental health, and "gymnasium" has significantly positive impact on mental health, while "basketball court" and "university stadium" have significantly negative impact on social interaction.

According to the analysis result, "social interaction" has significantly negative impact on the WTP for indoor/outdoor swimming pool, rock climbing ground and municipal gymnasium, while "physiological health" has significantly positive impact on the WTP for indoor/outdoor swimming pool. As a result, "H5: Different levels of health make significantly distinct impact on the WTP price" was partially justified.

#### E. Analysis of Residents' Background vs. WTP

The result showed that neither the overall regression model nor individual factors of the croquet fields, municipal gymnasiums and gymnasiums reached significant level; therefore the relevant figures are ignored herein. The figures shown in Table 2 below reveal that education has significant impact on WTP for indoor/outdoor swimming pool, where higher education presents higher WTP. The residential conditions have significant impact on WTP for rhythm room and aerobics room, where living with family members or companions presents higher WTP for the facilities. Sex, age, occupation, marital status and education has significant impact on WTP for table tennis court, where females have higher WTP than males; the higher the age, the lower the WTP; living with a family member or companion has higher WTP; the divorced, widowed, and higher-educated have higher WTP. Age, occupation, marital status and education have significant impact on WTP for the facilities, where the higher the age, the lower the WTP; the higher the education, the higher the WTP;

and those engaged in industries, commerce, services as well as those living with a family member or a companion present higher WTP. Age presents significant impact on WTP for basketball court, where the higher the age, the lower the WTP. Residential conditions have significant impact on WTP for rock climbing ground, where those who live with a companion have a higher WTP than those who don't. Residential conditions and level of education have significant impact on WTP for skating rink, where those living with a companion and those with higher education present higher WTP. Sex and education have significant impact on WTP for children's playground, where females and those with higher education present higher WTP. Age has significant impact on WTP for middle school small sports fields and university stadiums, where the higher the age, the lower the WTP. Finally, education has significant impact on WTP for sports club, where higher education brings about higher WTP.

Based on the above results, the hypothesis "H4: Different residential backgrounds make significantly distinct impact on the WTP price" was partially justified.

#### IV. CONCLUSION AND SUGGESTIONS

Implementation of healthy cities programs has brought about impact on the residential demand for leisure sports facilities. The statistics shows that the demands for the facilities by Taoyuan City and Yilan County are a little bit different. However, the top facilities demanded demonstrate that residents of both areas are no longer solely focused on physiological workout; instead, leisure sports such as skating, rock climbing, exercises in sports club, rhythm dance and aerobics, croquet, that usually require companions to play with or build interaction with others, are getting more and more popular, so that the residents' mental health and social interaction can be further enhanced. Meanwhile, the three constructs of physiological, mental and social aspects are the essence to build an all-aspect healthy city. Another finding from this research is that from the perspective of WTP, residents of Jilan County has higher WTPs for all the facilities than residents of Taoyuan City, and the difference of WTPs between the two areas for some facilities of same precedence (e.g. gymnasium) can be greater than 1. The overall WTP of Yilan is 4.52, higher than Taoyuan's 4.08. The figures show that residents of Yilan pay great attention to health and have a strong desire for leisure sports facilities, thus leading to higher WTPs.

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