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CONTINGENT VALUATION METHOD FOR URBAN GREEN SPACE: CASE OF BUKIT KIARA, KUALA LUMPUR, MALAYSIA

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Urban green space plays an important role in mitigating negative externalities from rapid urban development. Issues such as urban heat, health concerns and pollution are commons problems that urban citizens need to hinder every day. Urban green space also functioned as a social, recreation and education space for urbanites. Bukit Kiara located in the heart of Kuala Lumpur serves as the lung of the metropolitan city. Alongside diminishing green areas issue and threatened by misused of land, an economic valuation is crucial to ensure the establishment of this space. This paper aims to study the visitor's willingness to pay for the conservation of Bukit Kiara, Kuala Lumpur, Malaysia as recreation resources. Two hundred seventy visitors to the park have been selected as respondents. Using the double-bonded contingent valuation method, the willingness to pay for the visitors in Bukit Kiara was RM2.17 per entry. The research findings can be used by policymakers to plan for the conservation of Bukit Kiara.

Keywords: Urban green space, public park, double bounded contingent valuation method, willingness to pay, conservation

INTRODUCTION

Green space is any vegetated territory directly next to an urban area, including bushland, nature reserves, school playgrounds, national parks, outdoor sports fields and rural or semi-rural regions immediately adjoining an urban area (Chong et al. 2013). Urban green space term was used to exhibit space within urban stretch that provide a wide range of benefits towards urban communities by providing important ecosystem services (Wolch et al. 2014). Urban green space also serve as a link between the city and the natural world (Bilgili & Gokyer 2012). As a setting that fosters involvement in physical activities, urban green space has the potential to create a major contribution to public health (Hunter et al. 2015). The availability of urban green space is a key indication for navigating urban complexity to enhance human health and welfare, as well as a component of the complex social-ecological interactions that take place inside cities (Kabisch et al. 2016). Urban green space is also vital to facilitate carbon sequestration and therefore climate change abatement (Niemelä et al. 2010). Urban noise pollution has numerous negative effects on both environmental as well as related to human health (WHO 2016). Negative externalities living in the city can be combated by increasing the availability of urban green space that act as a natural noise buffer (Koprowska et al. 2018).

The willingness to pay approach has been used to reflect people's willingness to protect the environment and retain their relationship with it (Nuva et al. 2009, Cheung et al. 2019, Kazeminia et al. 2016, Kahneman & Knetsch 1992). A previous study by Belay et al. (2020) explained that for long-term soil conservation on common lands in Ethiopia, the local people must be included at all stages of the conservation program by examining their willingness to pay. Calculation of willingness to pay will assist in revealing the respondent's willingness to contribute to achieving the desired goal and is important in order to increase the public's understanding of the value of urban ecosystems in cities widely (Xu et al. 2020), to improve the perception towards urban green space ecosystem services (Tian et al. 2020) and to assess the monetary value of urban green spaces (Lo & Jim 2010).

In line with the rising property value in Kuala Lumpur, visitors have voiced their concern about the possible future development project that will be carried out in Bukit Kiara. Bukit Kiara encompassed large-scale public park which is a major green area within the city of Kuala Lumpur. In this research, visitor participation was very important for conservation efforts in Bukit Kiara. Contingent valuation method is one of the approaches that have helped to assign dollar values to non-use values for non-market goods. The research used the double-bonded contingent valuation method to determine the willingness to pay of visitors to the Bukit Kiara conservation as recreation resources. Researchers have recently employed the contingent valuation technique and choice modelling method which are two common methodologies for environmental valuation in order to evaluate tropical forests in Southeast Asia (Matthew et al. 2019). The contingent valuation method approach was applied to this research that involved a forested area in an urban stretch. This park had free access and was open to the public every day for activities and events. It is the duty of private or government agencies to designate budget and resources for the establishment and maintenance of the facilities and services developed at recreation areas (Syamsul-Herman et al. 2012). The results obtained would be useful for the management to include conservation and preservation of the park. Supports especially from development project for the establishment of green space in confined areas in a city promotes a healthier lifestyle to the neighbourhood in the middle of rising housing costs and property value (Wolch et al. 2014).

MATERIALS AND METHODS

Study site

This research was conducted at Bukit Kiara whereby is located in the city center of Kuala Lumpur. The area was initially a part of a rubber estate from Ng Chiu Siu & Sins Rubber Estates Ltd and including other landowners where the government acquired the 1534 acres area for RM49.14 million in the year 1976. This place is one of the few remaining green lungs in urban Kuala Lumpur which is bordered by Taman Tun Dr Ismail residential area to the west, the Kuala Lumpur Golf and Country Club area in the south, the Equestrian Center and the SPRINT highway on the east and the Kiara View residential area as well as Penchala River Malay Reservation Land. Bukit Kiara falls under constituency of Segambut covering three major green areas such as Taman Persekutuan Bukit Kiara, Lembah Bukit Kiara and Taman Rimba Kiara. Bukit Kiara is a densely forested area in Kuala Lumpur and is very popular among hikers and mountain biking activities. This park was developed as a Federal park to accommodate the recreational needs for all levels of society in the Klang Valley. The development by maintaining the natural area features of this park was in line with the mission of raising the level and quality of life as well as public recreation park that not only accommodated the leisure needs of the society but also for research and nature education purposes.

Data collection

The study focused on non-probability sampling by using judgmental sampling. This technique consisted of a selected group of people based on a personal judgment aiming at the visitors in Bukit Kiara to participate in a questionnaire to fulfil the requirement of this study. The respondent was initially selected by asking about their willingness to participate in answering the question. The study covered the whole area of the park due to the presence of respondents at various recreational activities along of these areas. Roscoe indicated that sample size larger than 30 and less than 500 were applicable for most research and required sub-samples of at least sample size of 30 for each category (Sekaran 2003). Meanwhile, a sample size that was less than 100 was considered as a sample with a small size, 250 to 400 sample size was medium and for the large was more than 1000 sample size found by (Calia & Strazzera 2005) in their study on bias and efficiency of a single versus double-bound contingent valuation method model. The sample size in this research were estimated around 270 respondents from visitors at Bukit Kiara which consisted of 18 years old and above. The questionnaire consisted of three sections which were information on visitation of respondents, visitors' willingness to pay for recreation and socio-demographic characteristics (Table 1).

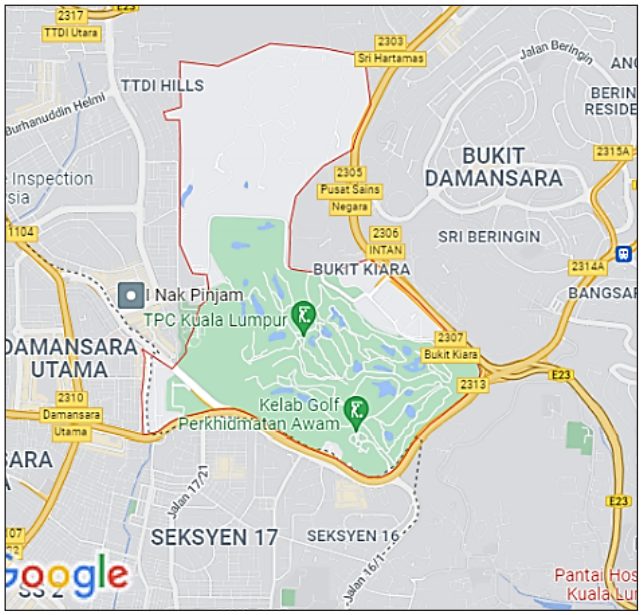

Figure 1 Map of Bukit Kiara

Table 1 Questionnaire section

Section	Details
Section A	Information on visitation of respondents
Section B	Visitor's willingness to pay (WTP) for recreation
Section C	Socio-demographic characteristic

Double-bounded dichotomous choice

In order to estimate willingness to pay, a dichotomous choice format was used whereby consisted of single-bounded and double-bounded dichotomous choice. For the study, double bounded dichotomous choice contingent evaluation was applied to determine willingness to pay for recreation from visitors. The double-bounded dichotomous choice evaluation was more efficient compared to the single-bounded. The evaluation was represented by respondent's response for the first bid, if they chose "yes", consequently the second bid value would be a higher than the value of the first bid, while if the respondents chose "no" for the first bid, subsequently the second bid value would be smaller for the second bid in order to improve the efficiency of the valuation (Hanemann et al. 1991). In addition, many researchers also agreed that double-banded dichotomous choice could develop the reliability of response (Barbara 1993). This approach was most popular in the study of contingent valuation method because it was more comprehensible when used in data collection (Calia & Strazzera 2005).

Model specification

The probit regression was adopted to determine the value according to the value involving more than two variables. This method was able to predict related variables to determine the relationship between dependent which was the maximum value of willingness to pay and factors that influenced the willingness to pay (WTP) for conservation as an independent variable. In this study, probit regression was used to explain these two variables' relationship.

$$WTP = \alpha + (\beta_1 \text{ Bid Price} + \beta_2 \text{ Gender} + \beta_3 \text{ Age} + \beta_4 \text{ Education} + \beta_5 \text{ Income} + \varepsilon)$$

where, WTP = willingness to pay = dependent variable with 1 if respondent is willing to pay for the amount asked or 0 otherwise, bid price = bid

price levels set out in the contingent valuation method question (dichotomous choice format), gender = 1 for male or 0 for female, age = age of respondents (years), education = education years of respondents, income = income of respondents (RM/month), ε = random error.

RESULTS AND DISCUSSION

Socio-demographic information and characteristics of respondents

The percentage of respondents for the study was equally distributed among males (49.3%) and females (50.7%) (Table 2). Most of the respondents were in early adulthood groups from 25–34 years old (32.6%) and the majority of the respondents were married (70.7%) and Malays (64.4%) was the highest number of respondents. More than half of the respondents were Bachelor's Degree holders (58.1%) and the income was between RM2000 and RM5999 (47.8%).

Visitation characteristics

The majority of the respondents (73.7%) were first-timers to this park and 75.9% said that Bukit Kiara was their first choice among other recreational parks. The study also discovered that travel distance (26.3%) and the natural environment (28.9%) were the main motivation to visit Bukit Kiara and mostly with their family (31.5%). Most of the respondents visited Bukit Kiara for jogging (43.7%) and followed by other recreational activities such as nature walk (17%), sightseeing (15.6%) and mountain biking (14.4%) (Table 3).

Table 2 Socio-demographic of the respondents

Variable	Item	Frequency	%
Gender	Female	137	50.7
	Male	133	49.3
Age	18–24	19	7.0
	25–34	88	32.6
	35–44	76	28.1
	45–54	34	12.6
	More than 55	53	19.6
Marital status	Single	79	29.3
	Married	191	70.7
Race	Malay	174	64.4
	Chinese	75	27.8
	India	10	3.7
	Others	11	4.1
Education level	Primary school	3	1.1
	Secondary school	22	8.1
	STPM / Certificates / Diploma	59	21.9
	Degree	59	58.1
	Master	21	7.8
	PhD	8	3.0
Income per month	Less than RM2000	29	10.7
	RM2000–RM3999	69	25.6
	RM4000–RM5999	60	22.2
	RM6000–RM7999	35	13.0
	RM8000–RM9999	36	13.3
	More than RM10,000	41	15.2

Table 3 Visitation characteristics of Bukit Kiara visitors

Variable	Item	Frequency	%
First time visit to Bukit Kiara	No	199	73.7
	Yes	71	26.3
Bukit Kiara as first choice	No	65	24.1
	Yes	205	75.9
Motive of visit to Bukit Kiara	Travel distance	71	26.3
	Less crowded	23	8.5
	Location easy to reach	34	12.6
	Facilities	15	5.6
	Variety of recreational activities	47	17.4
	Natural environment	78	28.9
	Others	2	0.7
Types of accompaniments among visitors at Bukit Kiara	Alone	68	25.2
	Couple	52	19.3
	Family	85	31.5
	Friend	53	19.6
	Group	12	4.4
Main activities at Bukit Kiara	Nature walks	46	17.0
	Hiking	19	7.0
	Mountain biking	39	14.4
	Sightseeing	42	15.6
	Jogging	118	43.7
	Others	6	2.2

Regression analysis

Analysis from the 270 questionnaires distributed, 197 (73%) respondents were willing to pay and 73 (23%) respondents were not willing to pay. The questionnaire was equally distributed with 5 different initial bids (RM4, RM6, RM8, RM10 and RM12) to reduce partialities.

Single-bound contingent valuation method

The probit regression analysis (Table 4) showed the pseudo r^2 was 0.0523 for the single-bound contingent valuation method, which indicated that only 5.2% of the bid variables were explained by the dependent variables in this model. A negative coefficient for bid value found in single-bound contingent valuation method implied a negative relationship between the amount of bid and the willingness to pay which was consistent with the demand theory. For example, the higher the bid value, the higher the probability for the respondent to disagree with willingness to pay.

Double-bound contingent valuation method

In the double-bound contingent valuation method, the pseudo r^2 was found to be greater at 13.15% (Table 4). According to the coefficient of determination (R^2), all regressors explained 14.2% of the visits each year for a travel cost analysis of the value of adventure tourism of Kampar, Malaysia (Mohamed et al. 2020). Hence, the following discussion would be based on the latter. For the double-bound contingent valuation method, all the tested variables, age, education and income were found to be significant.

A positive coefficient for age implied that this factor had more influence on the decision of the respondents towards willingness to pay. Thus, when age increased, the higher the probability of saying yes to willingness to pay. Such a positive relationship was observed by Akbar et al. (2010) and Mojiol et al. (2017). Apart from that, education also showed a positive influence on the probability of saying yes to willingness to pay. It indicated the higher the education level, the

Table 4 Single-bound and double-bound contingent valuation methods (CVM)

Single bound CVM				Double bound CVM			
Variable	Coefficient	Std. Error	Significance	Variable	Coefficient	Std Error	Significance
Constant	-0.1173829	0.2794822	0.406	Constant	-3.984057	5.805642	0.493
Bid1	-0.2322131	0.0363428	0.001	Gender	-0.1574023	0.8610506	0.855
				Age	0.0712692	0.0323241	0.027
				Education	0.3502379	0.1756352	0.046
				Income	0.0002019	0.0001008	0.045
R^2	0.0523				0.1315		

Table 5 Estimation of willingness to pay (WTP) of visitor per entry

WTP estimation single bound			WTP estimation double bound		
Coefficient	Standard error	Significance	Coefficient	Standard error	Significance
1.978253	2.961774	0.504	2.177745	0.5617972	0.000

higher chance for the visitor willing to contribute to conservation as Kamri et al. (2017) figured out at Santubong National Park. Income also played an important part in determining the willingness to pay of the visitors and turned significant in double bounded contingent valuation method analysis. Hassin et al. (2020) mentioned that the higher the level of income of the responder, the greater their capacity and willingness to pay a higher amount than a low-income level responder.

Estimation of willingness to pay

The findings indicated that using the double bound contingent valuation method, the estimation of willingness to pay household was RM2.17, while the single bound contingent valuation method was RM1.97 (Table 5). The estimated median for willingness to pay for conservation fee was RM3.00 for improved coral reef management scenario in Melaka (Faizan et al. 2016). Puncak Janing Forest EcoPark management utilized the information from the willingness to pay to set a reasonable conservation charge for their visitors (Nurin et al. 2021). While a study in Jiaxing city of China assessed the public perception and willingness to pay to improve management strategies ecosystem services of urban wetland parks and addressed problems faced by the city (Hu et al, 2022). As a result, policymakers were advised to use the best model with the highest r^2, which was the willingness to pay estimation based on the double bound contingent valuation method in this study. Currently, Bukit Kiara consisted of public parks with no entrance fees or ticket for the visitors, so it was challenging to anticipate the visitor to pay more than the mean willingness to pay, especially to those who came frequently to utilize the facilities in that area.

CONCLUSION

The result of the analysis would be able to assist the Bukit Kiara parks management to provide management policies that could address the market failure issue in valuing public properties like Bukit Kiara. The study showed, the visitor was willing to pay RM2.17 in estimation per individual per visit. The economic value of Bukit Kiara could be evaluated from the amount of willingness to pay per individual by multiplying with the number of visitors per year. The finding showed the recreation economy value of Bukit Kiara for the year 2021 was at RM1,642,950.40. It indicated that Bukit Kiara had beneficial attributes in recreational activities in terms of monetary value through the willingness to pay of the visitors. As a conclusion, the sustainability of Bukit Kiara park in the long run could be retained if the stakeholders were willing to incorporate the economic value of Bukit Kiara in decision making process which in turn will surely give advantages to the users.

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