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The Measurement of Quality of Life on Criminal Activities and Weather Changes

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Abstract

The prevailing weather conditions greatly influence human behaviour, activities, and quality of life, including crime. Previous studies have reported that crime focuses more on socio-economic, demographic, and municipal determinants, regardless of weather conditions. There is relatively complex research to explore the relationship between criminal behaviour and climate change towards the quality of life. Thus, measuring the quality of life can be important in understanding the impact of criminal activities and weather changes on individuals and communities. In the case of criminal activities, measuring the quality of life can help us understand how crime affects people's physical and mental health, social relationships, economic opportunities, and overall well-being. By assessing the impact of crime on quality of life, policymakers and law enforcement officials can better understand the actual costs of crime and develop more effective strategies for preventing and responding to criminal activities. Therefore, this paper explores the research gap to evaluate the validity and reliability of instruments for measuring the quality of life based on criminal activity and weather changes. This paper explores and describes the validity and reliability of a questionnaire/survey and discusses the finding of the measurement of quality of life-based on criminal activities and weather changes. This study uses a quantitative approach by using a random distribution of a questionnaire to residents in three states facing high crime rates. The survey involved 51 residents' respondents from the community. The findings of this paper show that this questionnaire is valid for measuring the quality of life with a substantial value of Cronbach's Alpha for the construct. The physical domain measured 0.91, psychological indicated 0.90, environmental indicated 0.71, and social indicated 0.77. Non-significant items will be restricted for each latent variable and reviewed and rearranged to ensure the number of items measuring each construct is satisfactory in future research. Measurement validation can be used to explore crime and behaviour in future research. This paper provided knowledge for future research about developing a quality-of-life questionnaire based on criminal activity and weather changes as environmental factors. More importantly, the

researcher has discussed these measures and provided the suggested quality of life domain. Thus, measuring the level of satisfaction and perception would be helpful in future research (based on the QOL domain).

Keywords: Quality of Life, Criminal Activity, Validity and Reliability

Introduction

Measure of quality of life (QOL) in communities are more likely to express harm rather than welfare conditions. Societies are seen in terms of their lack of safety (unsafe) rather than how safe they are (Keles, 2012). Fear of crime has been the focus of scientific investigation for over fifty years, with several potential correlates of crime rate identified during this time. The growing research on fear of crime has suggested that worry or concern about crime and disorder may negatively impact the quality of life and psychological well-being (Cao, 2016). Quality of life is a complex subject that has provoked considerable academic and public debate over its definition and measurement (Fareed & Hussain, 2013). Previous studies have reported that crime focused more on socio-economic, demographic, and municipal determinants, regardless of weather conditions. There is relatively complex research to explore the relationship between criminal behaviour and weather changes on the quality of life. Criminal activity is a global issue that occurs in most cities around the world. Both crime and criminal activity are serious issue to confront and contribute to declining quality of life (Estoque et al., 2019).

Quality of life is a worldwide phenomenon concerning billions of people in developing and developed countries, even at the beginning of the 21st century (Keles, 2012). Planning for quality of life is generally conceptual because empirical studies are limited. Most of them focus on environmental amenities and have yet to consider other dimensions of the neighbourhood (Cao, 2016). Security issues are social issues that receive attention and are often discussed internationally, according Fareed & Hussain (2013), who emphasises the importance of safety in achieving a good quality of life. Meanwhile, another organisation that sees this security issues as very important is UN-Habitat; in creating a good community life and being one factor that affects the quality-of-life urban communities. One of the initiatives built on the concept of sustainable development has been framed and propounded, including the Sustainable Development Goals (SDGs). This initiative aims to promote sustainability and improve QOL and human well-being by conserving safety, security, and social and environmental change (Estoque et al., 2019). Therefore, it is crucial to address quality of life in crime safety. As highlighted in the in the SDG, the target related to the contribution of the quality of life on criminal activities and weather is under goal number thirteen for climate action, and goal number sixteen is strong institutions for peace and justice. A piece of more profound knowledge on the relationship between the built environment in terms of crime-weather towards the quality of life in cities can play a catalytic role in shaping present and future urban development (Mouratidis, 2021).

Quality of life usually refers to the degree to which a person enjoy the significant possibilities of their life (Sun, 2005). Quality of life is defined as “an individual’s happiness or satisfaction with life and environment, including needs and wants, aspirations, lifestyle preferences, and other tangible and intangible factors”. Quality of life (QoL) is a concept that has inspired much research in the past decades and has established a strong position in local, national and European Union agendas (Turkoglu, 2015). Furthermore, quality of life is a broad concept

concerned with society's overall well-being. "Well-being" reflects living and how people respond to and feel about their lives in those domains. Therefore, it has many dimensions, from physical to socio-cultural, psychological and environmental (Keles, 2012). In other words, quality of life is the extent to which an individual feels satisfied and can pursue and achieve those things that are important to them. In this sense, individual perceptions of their safe living environment determine their quality of life. Different approaches to quality-of-life study represent the varied understanding of the concept. These understandings bring various approaches to developing and assessing the quality-of-life domains and indicators, leading to different quality-of-life models. The methodologies and measurements discussed in that conceptual framework are examined, and applicability for enhancing the quality of life in this study is assessed.

Literature Review

Quality of Life

The quality of life has been classified into seven dimension; (a) environmental (Bracy et al., 2014; Mouratidis, 2021); (b) physical (Bracy et al., 2014); (c) mobility (Bracy et al., 2014); (d) social (Corcoran & Zahnow, 2021); (e) psychological (Corcoran & Zahnow, 2021; Trujillo & Howley, 2021); (f) economic; (g) political (Ghani, 2017). Four out of seven dimension have been chosen to be applied in this study namely, (a) physical (Bracy et al., 2014); (b) psychological (Corcoran & Zahnow, 2021; Trujillo & Howley, 2021); (c) environment (Bracy et al., 2014; Mouratidis, 2021); (d) social (Corcoran & Zahnow, 2021). To address the relationship between quality of life and crime based on weather changes. Measuring quality of life from a physical aspect emphasises elements that provide security, such as safety at home, in the neighbourhood areas and the city. Research has frequently found perceived physical characteristics, especially aesthetics, to be the most crucial factor in increasing neighbourhood satisfaction (Hur & Nasar, 2014). In addition, neighbourhood factors within the scope of the physical domain strongly influence residents' perceptions of the risk of being a victim of crime and their contentment with the safety of their community. The level of crime in residents' perceptions is the structure of neighbourhoods and their environmental setting (West, 1990). Consequently, neighbourhood quality of life studies must first analyse two corresponding elements constraining indicator development: quality of life as the research subject and neighbourhood as the goal or physical bearer of the subject (Yinshe Sun, 2005).

Meanwhile, the measurement of quality of life for the psychological aspect is to emphasise the feeling of fear, anxiety, stress, and happiness (Lersch & Hart, 2020). The previous scholar describes the fear of crime, which states that "fear might be characterised by a sensation of danger and anxiety induced by the prospect of bodily harm" (Lersch & Hart, 2020). The psychological theory, for a person to fear crime, that person's anxiety must be prompted by contextual cues that pertain to some component of criminal behaviour. Few studies systematically try to connect individual-level criminal victimisation measures of happiness, life satisfaction or satisfaction with the overall quality of life [20]. Fear and (life) satisfaction have a link that is in the expected order but is not statistically significant. Therefore, it is necessary to evaluate the respondent's psychological state to assess the influence of criminal activity on people's quality of life.

The environmental aspect focuses on weather elements such as temperature and humidity based on the influence of the weather conditions on their quality of life in the context of

criminal activity. Environmental quality has always been one of the essential components of quality of life and strongly influences the quality of life for human beings. Although this reality is not faced with any reaction, the measurement of qualitative and practical environmental quality evaluation has been a bit of a headache for social scientists (Keles, 2012). Weather characteristics include as one of the everyday factors in crime. The weather can relate to the current history of human behaviour in the environment and society and modify criminal or common illegal behaviour (Wawrzyniak et al., 2018). Another study supports that environmental factors such as weather can affect crime (Wawrzyniak et al., 2018). The crime-weather literature has consistently shown that weather exerts an important influence on crime, and at the same time, it can influence people's quality of life (Corcoran & Zahnow, 2021).

The social aspects of seeing people's relationship with their social movements are based on the level of security around them. Built environment characteristics have been consistently linked to neighborhood social ties (Mouratidis, 2021). One of the other theories about how temperature might induce crime is that temperature affects aggression indirectly through an effect on some aspect of social behavior, which in turn affects the crime level (Campbell, 1986). The hypothesis that patterns of social behavior are a significant determinant of the level of crime was advanced by Cohen and Felson (Cohen & Felson, 1979), who argue that most crime depends on the convergence in space and time of; (1) motivated offenders, (2) suitable targets. And (3) the absence of capable guardians against a violation. Thus, this study aims to fill the gap in the paper by to evaluate the validity and reliability of instruments for measuring the quality of life based on criminal activity and climate change. Specifically, to examine a quality-of-life domain: physical, psychological, environmental, and social.

Methodology

The methodology is an essential process of this study, to be discussed for the data collection, data analysis, and to achieve the objective. Figure 1. Shows the activities of the research study. The study used a quantitative approach and based its findings on primary data as its survey instrument. These studies were conducted in three Malaysian states with higher crime indices; The quantitative data used in this research consisted of the information provided by the Royal Malaysia Police (RMP) statistical crime report. The data were obtained yearly and monthly on recorded crimes. Selangor, Kuala Lumpur, and Selangor have the highest crime index out of the 14 states in Malaysia, respectively (refer to Table 1). Therefore, this research focuses on the three highest crime index states - Petaling Jaya (Selangor), Sentul (Kuala Lumpur), and Johor Bharu Selatan (Johor).

Sampling Technique and Questionnaire

A pilot survey is the imitation and trial of the preliminary study. The purpose of doing a pilot survey in this paper is to determine if any flaw exists in the measurement instrument. The questionnaire is the measuring instrument employed in our current study. Through this pilot study, it is necessary to ensure the responsiveness and applicability of the same by examining the validity and reliability of the questionnaire. Therefore, the questionnaire items were designed to provide content and consensual validity based on agreement among the relevant experts (Fillenbaum & Smyer, 1981). In this study, the probability sampling method has been used to determine the respondent selection. The pre-testing sample size is generally small, ranging from 5-10 to 50-100, depending on the author(s) concerned. The sample should

remain small, but it should cover all subgroups of the target population (Han et al., 2018). The 51 questionnaires randomly selected public people in three clusters to gain their perception of quality of life and its association with crime occurrences in their home area. The random cluster sample is a two-step process in which the entire population is divided into clusters or groups by selected geographic areas such as Petaling Jaya (Selangor), Sentul (Kuala Lumpur), and Johor Bharu Selatan (Johor). Cluster sampling is advantageous when the population is widely scattered, and it is impractical to sample and select a representative sample of all elements [26]. The questionnaire design is based on previous scholars involving four domains of quality-of-life construct that have been chosen to be measured, namely, a) physical; b) psychological; c) environmental; and d) social. Each question was referred to according to the domain chosen to be related by measuring the level of respondents' perception of the quality of life based on criminal activity patterns and weather changes.

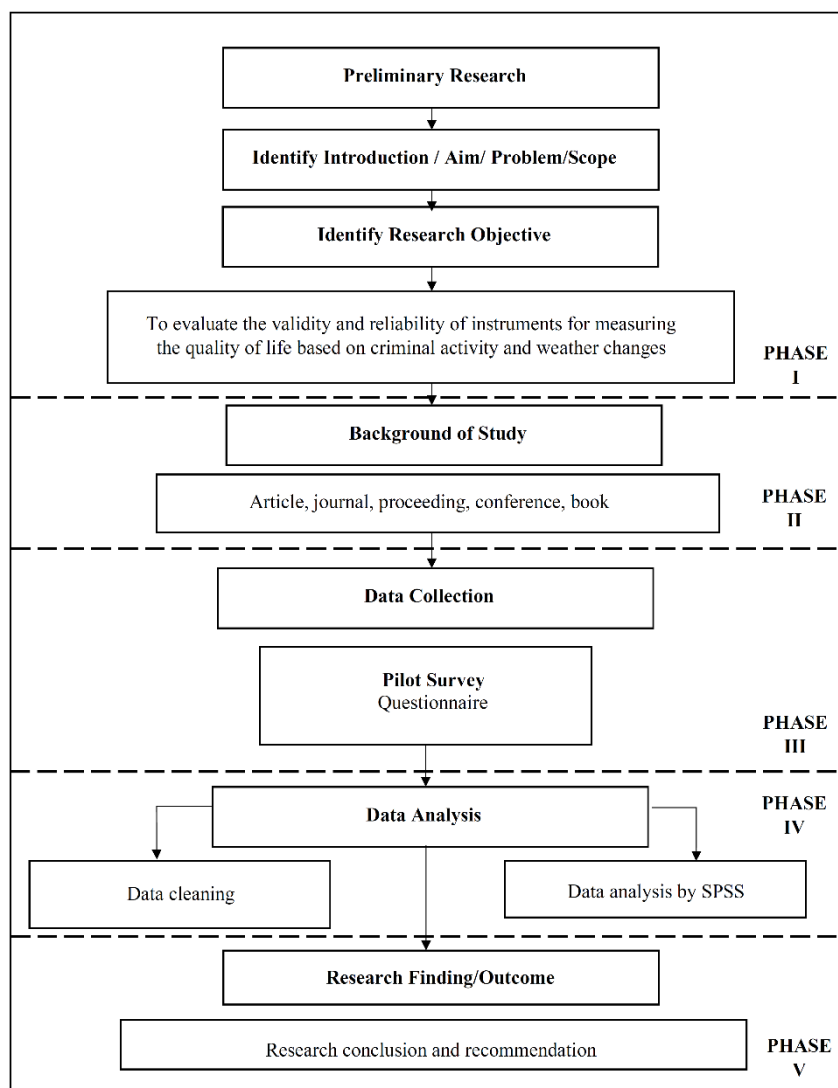


Figure 1. Research Framework Process

Table 1

The crime index in Malaysia

State	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Johor	20970	19068	17105	15082	13480	12941	11307	10338	9870	7350
Kedah	10667	10100	8636	8028	7817	7440	6759	6221	5615	4131
Kelantan	6199	6053	5737	5603	5031	4548	4520	3987	3545	2531
Kuala Lumpur	25002	23022	22319	18293	15946	16989	13482	12127	11172	8301
Melaka	4830	4764	4186	3675	2948	3664	3097	2800	2561	1794
Negeri Sembilan	6050	6563	5993	5495	4787	4474	3973	3673	3327	2431
Pahang	5994	5619	5257	5085	4257	3777	3607	3584	3271	2331
Perak	9869	8545	7429	6860	6228	5841	5326	5128	4912	3388
Perlis	1113	974	831	814	741	655	603	563	527	493
Pulau Pinang	9758	8399	7936	7491	6697	6116	5551	5017	5218	3853
Sabah	-	3489	5772	5210	5176	5367	6236	6151	5745	3799
Sarawak	-	6202	9191	7556	7230	6826	6381	5830	6023	5850
Selangor	44302	40629	43060	36165	32547	31222	26069	21420	19800	17272
Terengganu	3841	3505	3610	3213	2659	2494	2257	1823	1870	2099

Source: Royal Malaysia Police (2021)

The main objective of the questionnaire in research is to obtain relevant information most reliably and validly [26]. Therefore, the accuracy and consistency of survey questionnaires form a significant aspect of the research methodology known as validity and reliability (Taherdoost, 2018). Developing the questionnaire and verifying it (for validity and reliability) can ensure unbiased and useful results while preventing biased outcomes. The widely recognized Cronbach's alpha test is the one that is used to evaluate the reliability of the data. The first two pages of the survey contained closed-typed questions, usually demographic questions. The following five pages included closed-type questions in Likert formats about some aspects of the quality-of-life domain related to crime and criminal activity behavior. The question ended with one page about measuring the frequency of criminal activity.

Validity and Reliability in Measurement

Knowing that error will creep into measurement in practice, it is necessary to evaluate the accuracy and dependability of the measuring instrument. The criterion for such evaluations is validity and reliability. Validity refers to the extent to which a test/instrument measures what it intends to measure. Reliability refers to a measurement procedure's accuracy and precision (Srinivasan & Lohith, 2017).

Validity

A scale or measuring instrument is said to possess validity to the extent to which measure values reflect actual differences in the characteristics or property being measured (Sakip et al., 2013). Internal validity is the extent to which differences found with a measuring tool reflect fundamental differences among those being tested. Content validity is the extent to which the instrument provides adequate coverage of the topic under study. An expert panel of judges must evaluate the validity level to measure the validity of the questionnaire. In this research, the question faced by three academic researchers checks the content validity. There are expert educational panels from the Built Environment Department and an expert in the

quality-of-life field as critical informants who systematically judged the relevance and usefulness of the items. The senior lecturers from the public university were selected primarily based on their areas of expertise, interest, and experiences regarding the quality of life in the built environment. Finally, criterion-related validity is external validity, which reflects the measure's success for some empirical estimating purposes.

Reliability

Reliability is the crucial and more beneficial test for the questionnaire's internal reliability. The one-way approach of measuring the strength of that consistency and stability with the instrument measures the concept and contributes to the measurement evaluation (Srinivasan & Lohith, 2017). Reliability is a partial contributor to validity. The consistency of the respondent's responses to every item in a measure is tested using the concept of inter-item consistency reliability. The items will be connected to the extent that they represent independent measures of the same concept. Cronbach's Alpha for multipoint scale items is used to test the reliability consistency. Cronbach's Alpha is a reliability coefficient that assesses the full scale's consistency. The generally agreed-upon lower limit for Cronbach's Alpha is 0.70, although it may decrease to 0.60 in exploratory research (Srinivasan & Lohith, 2017). The reliability of any given questionnaire refers to the extent to which it is a consistent measure of a concept. Cronbach's Alpha is one way of measuring the strength of that consistency (Singh, 2017). Cronbach's Alpha is computed by correlating the score for each scale item with the total score for each observation (usually individual survey respondents) and then comparing that to the variance for all individual item scores (Singh, 2017). The standard for what makes a good alpha coefficient is entirely arbitrary and depends on the researcher's theoretical concept of the scale in question. Many researchers recommend a minimum alpha coefficient between 0.65 and 0.80 (or higher), and alpha coefficients less than 0.50 are generally not acceptable (Singh, 2017).

Data Analysis & Result

The data was analysed using SPSS (Statistical Package for the Social Sciences) for validity and reliability analysis and descriptive analysis to overview the respondents' backgrounds.

Respondent Profile

As shown in figure 2, a more significant proportion of female respondents (73 %) participated in the pilot study than male respondents (27 %), and most respondents (67 %) were between the ages of 20 and 40, as shown in figure 3. The respondents were constituted from the three primary races in Malaysia, namely Malays (96.1%), Chinese (3.9%), and Indians (0%), as shown in figure 4. Almost all the respondents (96%) involved in this survey have never been victims of crime in the past. However, the percentage of respondents who heard or knew about criminal cases in the study area was relatively high (88%). A significant majority of the types of crime in the neighbourhood study are theft, recording (35%) and breaking into the house (16%). Only 1% of the crimes were those concerning snatch, as shown in figure 5.

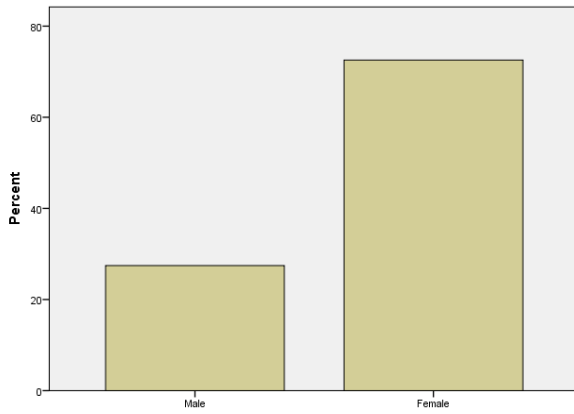


Figure 2. Gender

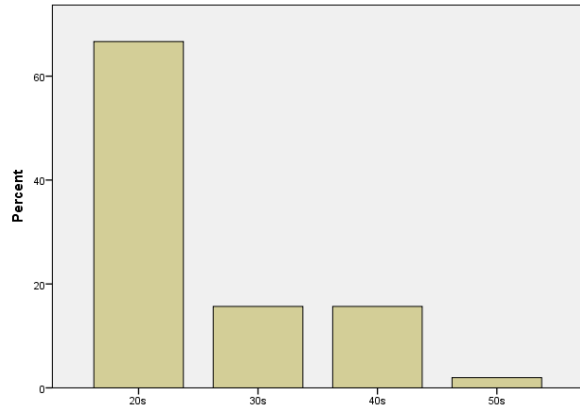


Figure 3. Age

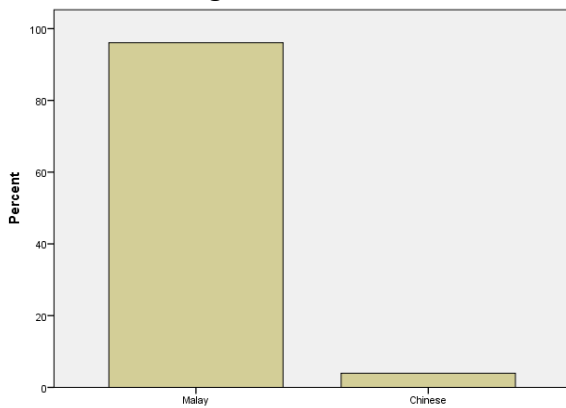


Figure 4. Race

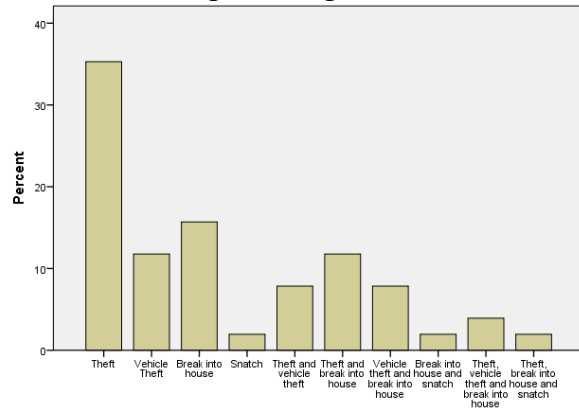


Figure 5. Type of crime

Figure 2. Gender

Validation of Quality-of-Life Construct Reliability

The result of the pilot study presents an overview of the reliability of the questionnaire survey, which evaluates the quality of life and indicates that crime rate and weather conditions contribute predominantly to people’s perception of their lives. The output for the reliability quality of life domain is shown in Table 2. Table 2 illustrates the output of the reliability test for the quality-of-life domain. It measures four construct variables, namely, physical, psychological, environmental, and social. The outcome for each construct involved Cronbach’s Alpha value.

Table 2

Reliability test result for the quality of life based on the construct

No.	Construct (Variable)	Sub-dimension	Items	Cronbach's Alpha	Alpha Value for Construct
1	Physical	House Safety	5	0.78	0.91
		Neighborhood Safety	6	0.89	
		City/Urban Safety	6	0.84	
2	Psychological	Anxiety and Fear	10	0.93	0.90
		Depression and Stress	5	0.89	
		Happiness	5	0.95	
3	Environmental	Temperature	5	0.60	0.71
		Humidity	5	0.74	
4	Social	Local social relationship	6	0.77	0.77

The Cronbach's alpha value was used to determine the level of reliability through the internal consistency for each factor, as shown in Table 2. The result shows that all domains of quality-of-life archive Alpha value level exceeding 0.70 (Alpha: 0.71 to 0.93), indicating that all domains have a good reliability value. Furthermore, the total correlation for all items also exceeds 0.30 (Alpha: 0.30 to 0.90), which means those items are suitable for measuring every quality-of-life domain. However, item 1 of the physical domain in the neighborhood area item had to be aborted. Next, an item that had to be aborted was item 6 of the social domain, as it achieved an item-total correlation value of less than 0.30. Moreover, the list of the items to consider in the evaluation of QOL for each domain is much wider and could change according to the type of study under analysis [29]. As far as the present evaluation is concerned, it is worth noting that the main contribution has been the criminal activity patterns based on weather changes in the analysis of QOL in neighborhood areas.

Quality of life measurement cannot be based on a single criterion because it concerns physical, social, psychological, and environmental domains (Han et al., 2018). Therefore, it should consider measuring people's perception of the quality of life based on criminal activity and weather changes. The internal consistency analysis of the quality-of-life domain questionnaire replicated the pilot work. It reinforced the result of the validity in demonstrating good individual-level reliability of perceptions of the quality-of-life domain. The study aims to validate the quality-of-life domain based on criminal activity and weather conditions in three districts within three states. As explained earlier, the information on the constructs is based on the (Singh, 2017; Srinivasan & Lohith, 2017) studies.

On the other hand, in Malaysia, the items used are modified to satisfy language standards, guarantee that they are suitable, and elicit the appropriate answer from respondents. The study finding shows that the construct and items used are valid and highly reliable. These findings confirm that these constructs can be adapted to measure the quality of life based on criminal activity and weather conditions in Petaling Jaya (Selangor), Sentul (Kuala Lumpur), and Johor Bharu (Johor).

The researcher measured each sub-dimension with at least five items to achieve a good alpha value. Using more items to measure one domain will increase the reliability level [31]. Therefore, the five-point Likert scale will be reorganised to use the following responses: 1 (strongly disagree), 2 (disagree), 3 (neither disagree nor agree), 4 (agree), and 5 (strongly agree). This is to enable a more extensive level of analysis to be conducted. The item aspect will be taken out of the overall survey because the item-total correlation was determined to have a low level of reliability. The finding for the quality-of-life construct on the pilot survey involves the first construct, the physical construct. In the physical construct, there are three sub-dimensions: five items for a house safety and six for neighbourhood and city/urban safety. The reliability test found that there is an affected item. Therefore, the affected item 1 (-0.9) had to be aborted as it achieved a weak reliability value. Affected items are an item that involves the neighborhood sub-dimension.

The following construct is psychological, which contains three sub-dimensions: ten items for anxiety and fear, five items for depression and stress, and the last sub-dimension is happiness, which includes five items. The psychological construct for this survey question at the pilot study level shows a strong reliability value to proceed to the next stage. Next, the results and findings for the environmental construct also show a good strong reliability value where the environmental construct consists of 2 sub-dimension categories, namely, five items for temperature and five items for humidity. The Cronbach's alpha value for all items is solid and reasonable to keep the item. In the environmental domain weather conditions such as temperature and humidity impact participation in outdoor activities outside their house in neighborhood areas, thus influencing the propensity for individuals to come into contact with others and increasing or decreasing the opportunism of crime. In addition, to the environmental domain, satisfaction measures were essential to understanding quality of life. Regarding research findings on the environmental domain part of the quality of life regarding the background of the study, it must be understood that environmental domain analysis is hardly feasible to be carried out.

The last construct is social, containing only one sub-dimension and six items. Findings for the social construct found that there is one item that is affected and will be eliminated, item 6 because it also was found the values are weak (0.18). An item value that is too weak indicates that the items cannot proceed to conduct the following stage survey. Criminal activities are social loss as that time could have been spent on something more productive. Also, crime can lead to many effects, especially in people's daily lives. The consequences of criminal activities affect the victims and threaten the non-victims and society to decrease their quality of life [32]. Previous researchers Habibullah and Soh [13], [33] indicated that property crime involves snatch crime, theft, car theft, motorcycle theft, and burglary. This research relates the influencing criminal activity pattern in neighborhood and city areas. In general, it was discovered that using a questionnaire form to identify the quality of life based on criminal activity patterns and weather conditions is complicated yet effective in measuring people's satisfaction levels. It can recognize the relationship between the various variables.

The finding of this paper show that this questionnaire is valid for measuring the quality of life with a strong value of Cronbach's alpha for the construct. The physical domain measured 0.91, psychological indicated 0.90, environmental indicated 0.71, and social indicated 0.77. The questionnaire conducted for this study shows that each domain has a high and strong reliability value to be used as a measurement for the researcher to measure the level of people's perception of the quality of life based on criminal behaviour and weather changes conditions. Developing the questionnaire for data collection is essential to reduce

measurement error in questionnaire content, questionnaire design and format, and respondent. Well, the designed conceptualisation and transformation of the content into questions are essential to minimise error. Anyone involved in research and evaluation must follow these important points to develop a valid and reliable questionnaire to improve the quality of research.

Conclusion

This study is intended to gauge the feasibility and credibility of the research that is planned to be undertaken. It is also an approach to identify the validity and reliability of a particular instrument (questionnaire) before it is utilized in the actual fieldwork aspect of a study. The finding of this paper shows that this questionnaire is valid for measuring the quality of life with a substantial value of Cronbach's alpha for the construct. The physical domain measured 0.91, psychological indicated 0.90, environmental indicated 0.71, and social indicated 0.77. The questionnaire conducted for this study shows that each domain has a high and robust reliability value to be used as a measurement for the researcher to measure the level of people's perception of the quality of life based on criminal behaviour and weather changes conditions. Developing the questionnaire for data collection is essential to reduce measurement error in questionnaire content, questionnaire design and format, and respondent. The designed conceptualization and transformation of the content into questions are imperative to minimize error. Anyone involved in research and evaluation must follow these essential points to develop a valid and reliable questionnaire to improve the quality of research. Therefore, the development of this questionnaire provided the validity and testing reliability of the development the questionnaire. Furthermore, the measurement presented an overview of how we utilize these measurements in a research study and showed how reliable questionnaire findings are. Careful consideration of the questionnaire's development, reliability and validity will hopefully result in more meaningful studies whose results and interpretations are based on sound scientific principles. As this paper aims to evaluate the validity and reliability of instruments for measuring the quality of life based on criminal activity based on weather changes, four domains of quality of life have been identified. Those domains are valid and reliable to assess and measure the instrument of quality of life regarding weather-crime. However, this measuring scale needs continuous development in different areas and settings. Thus, this paper provided knowledge for future research about the development of quality-of-life questionnaires based on criminal activity and weather changes as environmental factors. More importantly, the researcher has discussed these measures and provided the suggested quality of life domain. Thus, measuring the level of satisfaction and perception would be helpful in future research (based on the QOL domain).

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Authors Contributions

All authors contributed to the design of the research, the questionnaire, and the write-up. The online survey, data cleaning and tabulation was undertaken by Universiti Teknologi MARA Perak. All authors have read and approved the final manuscript.

Conflict of Interest

The authors declare no conflict of interest.

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