

ORIGINAL ARTICLE

Bridging Perception and Investment: Exploring Acceptance and Willingness to Pay for Adult Weight Management in Malaysia

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ABSTRAK

Kadar obesiti dalam kalangan dewasa Malaysia terus meningkat meskipun pelbagai intervensi telah diperkenalkan, sekali gus menekankan keperluan untuk memahami dengan lebih mendalam terhadap faktor penerimaan masyarakat dan kesediaan membayar (WTP) terhadap program pengurusan berat badan. Kajian ini bertujuan mengenal pasti penentu utama yang mempengaruhi penerimaan dan WTP dalam kalangan individu dewasa di Malaysia. Soal selidik berstruktur telah dibangunkan dan disahkan dalam Fasa 1, sebelum digunakan dalam kajian keratan rentas melibatkan 783 responden dari Kedah, Selangor, Johor dan Kelantan. Hasil kajian menunjukkan tahap penerimaan yang tinggi (80.0%), namun WTP adalah rendah (27.0%), dengan kecenderungan yang ketara terhadap pendekatan pengurusan sendiri. Eksperimen pilihan diskret (DCE) menunjukkan keutamaan responden terhadap intervensi berstruktur yang menggabungkan komponen pemakanan, aktiviti fizikal dan motivasi. Faktor-faktor seperti tahap pendidikan, indeks jisim badan dan jantina didapati mempengaruhi penerimaan, manakala pendidikan, status pekerjaan dan pendapatan pula mempengaruhi WTP. Kos merupakan faktor yang paling penting, dengan keutamaan terhadap intervensi yang lebih mampu milik ($p < 0.001$). Penemuan ini memberikan panduan strategik kepada pembuat dasar dalam merangka intervensi yang bersifat inklusif, berpatutan dan selari dengan keperluan serta kesediaan populasi. Kajian ini menekankan kepentingan menjajarkan kesediaan psikologi dengan komitmen ekonomi, serta merangka semula intervensi obesiti yang menyokong kesaksamaan dan kemampunan merentasi pelbagai tahap sosioekonomi.

Kata kunci: Intervensi obesiti; kesiagupan membayar; penerimaan

ABSTRACT

Despite ongoing interventions, overweight and obesity rates in Malaysia continue to escalate, underscoring the need to understand public acceptance and willingness to pay (WTP) for weight management programmes. This study aimed to identify key determinants influencing acceptance and WTP among Malaysian adults. A structured questionnaire was developed and validated in Phase 1, before being administered in a cross-sectional survey across four states: Kedah, Selangor, Johor, and Kelantan with 783 respondents. Results indicated high acceptance (80.0%) but low WTP (27.0%), with a notable preference for self-managed approaches. Discrete choice experiment (DCE) findings revealed preference toward structured interventions incorporating nutritional, physical and motivational components. Acceptance was significantly associated with education level, body mass index and gender, while WTP was influenced by education, employment status and income. Cost emerged as a pivotal factor,

with respondents favouring more affordable options ($p < 0.001$). These insights offer strategic direction for policymakers to design culturally relevant, cost-sensitive interventions that align with behavioural readiness and public preferences. By bridging psychological acceptance with economic feasibility, the study reframes obesity intervention as an inclusive pathway for health empowerment, advocating for equitable resource allocation and sustainable outcomes across socio-economic groups.

Keywords: Acceptance; obesity intervention; willingness to pay

INTRODUCTION

Overweight and obesity present risk factors for preventable public health issues and death worldwide. In 2022, the World Health Organisation (WHO) estimated that over 2.5 billion adults aged 18 years and older were overweight and obese (WHO 2024). In Malaysia, the prevalence of obesity in 1996 was 4.4% (Khambalia & Seen 2010), which continued to increase from 14.0% in National Health and Morbidity Survey Report of Malaysia 2026 (NHMS) (IPH 2006), 15.1% in NHMS 2011 (IPH 2011), 17.7% in NHMS 2015 (Ab Majid et al. 2018; IPH 2015) to 50.1% in NHMS 2019 (IPH 2019). In NHMS 2023, 54.4% of Malaysian adults were overweight and obese (IPH 2023).

Rising obesity levels are the result of rapid urbanisation and industrialisation, which have resulted in altered lifestyles, including reduced physical activity and unhealthy diets. Furthermore, increased obesity rates are associated with full-time employment status and poor sleep quality (Hasim et al. 2025). Poor urban communities also exhibited higher obesity prevalence than their counterparts with better income levels (Andoy-Galvan et al. 2020). Moreover, obesity was more prevalent among females (22.5%) than among males (14.1%) (Mohamud et al. 2011). Malays and Indians also documented higher obesity rates than their Chinese counterparts (Rampal et al. 2007).

Weight gain and its complications among Malaysian adults are considerably worrying despite various interventions. Overweight and obesity contribute to non-communicable diseases (NCDs), such as diabetes, heart disease, high blood pressure, hypercholesterolemia and cancer (Fruh 2017; Hruby & Hu 2015). The

prevalence of diabetes and impaired glucose tolerance is also significantly elevated among obese individuals.

Direct medical costs for obesity-related illnesses are substantial, potentially accounting for up to 8.4% of total health expenditure. Obesity also leads to indirect costs, including job absenteeism. Obese employees record increased workdays missed, contributing to productivity losses (Oksuz et al. 2025). Overweight and obesity also impact Malaysian employers' productivity costs due to decreased productivity (Peng et al. 2018). Healthy lifestyle initiatives are more cost-effective than long-term treatments for chronic diseases associated with overweight and obesity (Iddrisu et al. 2020).

According to the Ministry of Health (MOH) Malaysia (2022), NCDs, such as cardiovascular disease, diabetes and cancer, cost the nation RM8.91 billion, or approximately 0.65% of its gross domestic product (GDP). The amount includes the estimated economic expenses of lost productivity due to absenteeism from work and premature death in the working-age population. Furthermore, NCDs present a severe health burden due to disability and diminished years of healthy life, known as the cost burden of disease (Blakely et al. 2019; Hong et al. 2022). In 2018, the MOH Malaysia documented that cardiovascular disease was the top killer among the 10 leading causes of death in government hospitals, resulting in 22.27% of fatalities (Shanmuganathan et al. 2022).

Malaysia has implemented numerous policies and strategies to combat obesity, including the National Strategic Plan for Non-Communicable Diseases (NSP-NCD) (2015-2025) (Mok et al. 2021; Tee & Voon 2024). Nonetheless, comprehensive

and integrated population-based strategies are necessary, such as community programmes, to address the issue (Baharudin Shaharuddin et al. 2020). Novel strategies are also required to strengthen community and individual weight management interventions in the nation (Lim 2016).

Challenges in the Uptake of Existing Interventions

Although Malaysia has introduced various interventions, the NHMS report still demonstrated a continued rise in overweight and obesity. Acceptance factors are critical in affecting the effectiveness of obesity interventions. Notable intervention acceptance levels can increase awareness and knowledge about obesity risks and the benefits of such interventions, facilitating understanding and engagement in health programmes. Furthermore, individuals with elevated acceptance tended to be more consistent in following mediations, including diet, exercise and counselling. Consistency is paramount for achieving effective results in managing weight and obesity, as consistent individuals easily adapt to the lifestyle alterations required for reducing obesity, including psychosocial motivation, changing diets and increasing physical activity (Teixeira et al. 2015).

Acceptance

The health belief model (HBM) offers a useful theoretical framework for assessing the acceptance and willingness to pay (WTP) for adult weight management in Malaysia. According to HBM, individuals' health-related behaviours are influenced by their perceptions of susceptibility, severity, benefits, barriers, cues to action and self-efficacy. Intentions to participate in weight management interventions are positively influenced by perceived susceptibility and benefits, while perceived barriers have the opposite effect (Kebede et al. 2023). Raman et al. (2023) reported that approximately 8.3% participants believed severity and behavioural

intention as notable BMI predictors. Females and individuals with higher education levels were also more likely to engage in weight management programmes.

Self-efficacy in dieting and exercise is substantially enhanced with HBM-based educational interventions, indicating the potential effectiveness of the mediations on weight management actions (Raman et al. 2024). According to the data obtained from the integrated technology acceptance model (TAM) and HBM, perceived health risk and health consciousness positively influenced health-related Internet employment. Individuals' beliefs about the usefulness of the internet and attitudes towards its application also demonstrated similar effects, suggesting that Internet-based interventions could be effective for weight management (Ahadzadeh et al. 2015).

Several factors should be considered when developing and promoting weight management programmes (Bauerle et al. 2022). For instance, female university students exhibited improved perceived susceptibility and cues to action, while male students held a more positive belief in the benefits and self-efficacy of dieting. The observations necessitate gender-specific interventions to enhance motivation and confidence in weight management (Ahmad et al. 2023). In another report, Bauerle et al. (2022) documented that performance and effort expectancies and social influence notably predicted acceptance levels. Younger individuals also exhibited exceptionally higher weight management mediation acceptance compared to their older counterparts.

Willingness to Pay

Theories and findings from previous reports provided a comprehensive framework for understanding acceptance and WTP for weight management strategies. Individualised coaching and satisfaction with weight management programmes are among the factors influencing WTP, which is essential in establishing the economic feasibility of such strategies (Drouin

et al. 2019; Jerome et al. 2015). The financial burden of the government to provide health programmes can also be reduced with the WTP from individuals or employers. The allocation saved can be employed for other interventions or to further elevate the quality of health services. Furthermore, WTP is vital in aiding the effectiveness of obesity interventions.

Individuals willing to pay demonstrated improved tendency to gain access to health mediations, including nutrition counselling, exercise classes and regular health checks (Lee et al. 2012). Furthermore, WTP can ensure the continuity of interventions provided by the government or the private sector on an ongoing basis. Ongoing interventions are essential for achieving positive long-term results in reducing obesity (Thorpe et al. 2004). Typically, individuals who are willing to pay exhibit increased commitment and are actively involved in health mediations. This WTP indicates a willingness to invest in their health, revealing their seriousness in tackling the obesity issue. Consequently, acceptance and WTP of weight management interventions and the factors influencing them among Malaysian adults should be determined to develop novel strategic approaches in implementing effective strategies.

The findings from this study can contribute to policy formation that aligns with the Healthy Malaysia National Agenda (ANMS) (Kamalruzzaman et al. 2023) through the cultivation of healthy living and environmental sustainability. Malaysia supports the recommendations of strengthening the prevention and management of overweight and lifelong obesity outlined in the WHO 2022 conference (Khairy 2022). Malaysians should understand that an unhealthy society results in rising health costs and negatively affects the economy of the country (Ferretti 2015).

Discrete Choice Experiment

The discrete choice experiment (DCE) is a quantitative research method utilised to elicit individuals' preferences. During DCE,

respondents are asked to select their preferences among hypothetical scenarios comprising various attribute combinations. Resultantly, researchers can assess the relative importance of each attribute and predict behavioural responses to different policy designs (Howell et al. 2019).

This study employed DCE for its ability to capture trade-offs, as public health interventions commonly involve multiple factors, such as cost, effectiveness, cultural relevance and delivery techniques. The approach also allows evaluations of how individuals balance the trade-offs. (Howell et al. 2019). Furthermore, DCE mimics actual decision-making contexts, reflecting real-world decision-making data. Traditional surveys isolate preferences, whereas DCE reveals more nuanced and actionable insights.

In this study, the DCE supported WTP estimation for specific intervention features, which was vital for understanding financial feasibility and public support. The integration of culturally resonant attributes in DCE also contributed to intervention alignments with community values and expectations, which are critical in the Malaysian context and for developing culturally tailored strategies. Moreover, the DCE approach enabled segmentation analysis, allowing differentiation of preferences across demographic variables, such as BMI, gender, income, occupation and education. Consequently, targeted policy recommendations can be outlined (Rottenkolber 2011).

DCE enables the precise identification of preference structures and the marginal impacts of each attribute. The method also offers an advantage over the contingent valuation, which estimates WTP typically for an entire package but not individual features. Moreover, DCE provides attribute-level WTP estimations, allowing fine-grained policy design. Focus groups and qualitative interviews offer rich narratives. Nonetheless, the findings are less generalisable and quantifiable (Rottenkolber 2011). Meanwhile, DCE ensures statistical validity with generalisable data. Although cost-effectiveness analysis (CEA) focuses on health outcomes and costs, it overlooks

societal acceptability. DCE complements CEA by incorporating public acceptance and preferences. This study transcended conventional health planning approaches and prioritises community voice, cultural relevance, and behavioural economics in policy designs through the employment of DCE. The findings can contribute to the development of adaptive, inclusive, value-sensitive and effective public health interventions (Howell et al. 2019).

Study Objectives and Significance

This study aimed to explore acceptance and willingness to pay for adult weight management in Malaysia. Despite continuous efforts and government-led interventions, the economic burden of obesity and overweight in Malaysia continues to escalate. This burden is further compounded by shifting disease patterns toward chronic non-communicable diseases (NCDs) and a rapidly aging population. Accordingly, the development and implementation of novel strategies are necessary to improve and maintain involvement in overweight and obesity interventions aiming to reduce the statistical overweight and obesity rates.

MATERIALS AND METHODS

This study applied a rigorously structured, cross-sectional survey design in a culturally contextualised framework that integrated behavioural economics and public health analytics to establish acceptance and WTP for weight management strategies. All data were collected using validated instruments from a demographically diverse Malaysian sample. Consequently, sociocultural and economic determinant assessments were performed, including education level, body mass index (BMI) and gender, through multivariate regression and stratified analyses.

The methodological approach employed in this study ensured statistical robustness and established the emotional and societal nuances shaping intervention uptake. This multi-phase

study included a cross-sectional survey and DCE. The study was conducted in four states in Peninsular Malaysia, namely Kedah, Selangor, Johor and Kelantan. The respondents were randomly sampled from the data provided by the Department of Statistics Malaysia (DOSM). Nonetheless, only adults aged from 18 to 60 years old were considered, with urban and rural representations.

A structured, comprehensive questionnaire related to weight management strategies was developed in Phase 1 of this study, which was validated to ensure the reliability and relevance of the items. In Phase 2, data were collected through survey administration and DCE. Finally, the respondents were provided with the questionnaire before implementing DCE to establish the respondents' preferences and economic decision-making.

Sociodemographic data, weight perception, weight management strategies acceptance and WTP were procured through the survey instrument developed in this study. The questionnaire also included service structure and cost items. Subsequently, statistical analyses were conducted, including descriptive evaluations to summarise findings. Associations between categorical variables were established with chi-square assessments, while logistic regression was employed to identify acceptance and WTP predictors.

Development of Discrete Choice Experiment Design

The DCE conducted effectively utilised efficient design principles to create choice cards that were both informative and manageable for respondents. By focusing on key attributes such as price, the study was able to gather valuable data on community preferences and WTP for obesity interventions. Participants would be asked to choose between different combinations of these attributes, allowing researchers to determine their preferences and WTP for various obesity interventions. To address the methodology for conducting DCE in the context of obesity

interventions, it was essential to outline the five standard steps explicitly as followed:

(i) Identification of attributes and levels

Attributes and their levels are the core components of a DCE. They represent the characteristics of the interventions being evaluated. For obesity interventions, attributes might include program components (diet, exercise, behaviour change), cost, and expected outcomes (Ryan et al 2015). The levels for each attribute were clearly defined in Table 1 with different types of intervention (diet, physical activity) and varying costs (Hu et al. 2024).

(ii) Experimental design (Efficient design)

Efficient experimental design ensures that the DCE can provide reliable and valid estimates of preferences with the least cognitive burden on respondents. This involves creating choice sets that systematically vary the levels of attributes to capture trade-offs participants are willing to make (Rottenkolber 2011). Efficient designs often use statistical techniques to maximise the information gained from each choice set. Efficient design principles were applied to ensure the statistical efficiency of the DCE. This involved using a partial profile design, which simplifies the choice tasks by presenting only a subset of attributes in each choice card, thereby reducing cognitive load on respondents (Kocher et al. 2022). The design aimed to balance the need for

comprehensive data collection with the practical constraints of respondent burden.

The use of efficient design principles, such as the partial profile design, ensures that the DCE is both manageable for respondents and capable of generating reliable data. This approach helps in identifying the most valued attributes of obesity interventions, which can then be prioritised in policy-making and program design (Kocher et al. 2022).

(iii) Construction of choice cards

Choice cards present the different scenarios to respondents. Each card typically includes a set of alternatives with varying attribute levels. For example, a choice card might present different obesity intervention programs with variations in cost, time commitment and expected weight loss (Roux et al. 2004). The construction of these cards should ensure that all possible combinations of attributes and levels are covered without overwhelming the respondents. The DCE conducted to inform the design of a community-based obesity-prevention program in Malaysia involved presenting community members with different sets of potential evidence-based interventions for obesity prevention (Kocher et al. 2022). Table 2 illustrated the choice card summary.

(iv) Survey administration

The survey was administered through self-

TABLE 1: Attributes and levels table

Attribute	Level 1 Self-initiatives	Level 2 Primary	Level 3 Secondary	Level 4 Tertiary
Program Components	Diet + Exercise + Behaviour Change	Diet + Exercise + Behaviour Change	Pharmacotherapy	Bariatric surgery
Cost	Variable	Rm60/6 month	RM120/month	Up to RM36000
Outcomes	Depends on the individual's own efforts	5-10% body weight reduction in 6 months	2-4 kg/month	30-50% body weight reduction in 6 months
Effects Side (possibly)	Depends on the individual	Depends on the individual	Possible bloating, nausea, diarrhea	Complications of surgery

administered questionnaires. The mode of administration was chosen based on the target population and the context of the study. Questionnaires were used to collect data from Malaysia adults regarding their preferences for interventions to reduce obesity ensuring a representative sample and clear instructions are crucial for reliable data collection.

(v) Data analysis and willingness to pay estimation

Data from the DCE are analysed using econometric models, multinomial logit models, to estimate the relative importance of different attributes and the trade-offs participants are willing to make (Kershaw et al. 2019). WTP is calculated to quantify how much participants value specific attributes. Derivation of marginal WTP, were calculated using the delta method, which was suitable for approximating standard errors of nonlinear functions of estimated parameters. This choice aligned with the structure of the econometric model and enhances interpretability of the marginal effects. The econometric analyses were conducted using SPSS, version 27 (IBM Corp., Armonk, NY, USA) which supported estimation procedures and

computations. Participants' WTP for different obesity management components can be estimated to inform policy decisions

The use of questionnaires for data collection was well-documented through multistage stratified random sampling approach. Respondents were selected through a random multitiered process with stratification by geographic zones, random selection of district within each stratum, and final sampling based on a randomised household list provided by the DOSM. This method ensured both representativeness and adherence to inclusion criteria, namely age eligibility and informed consent. Detailed socio-demographic characteristics were presented in descriptive tables to summarise respondent profiles as in Table 3. Characteristics of respondents studied involved socio-demographic characteristics of respondents including age gender, income, education and occupations.

Analysis

In this study, socio-demographic influences, including BMI, gender and education, on acceptance and WTP for weight management strategies were determined through multivariate

TABLE 2: Discrete choice experiment (Choice card)

	Option A	Option B	Option C	Option D
Effectiveness	5-10% body weight reduction in 6 months	2-4 kg/month	30-50% reduction in 6 months	Depends on the individual's own efforts
Program	Group	Individual	Individual	Individual/apps
Components of Intervention	Diet & exercise & motivation	Pharmacotherapy	Bariatric surgery	Example:Regular fasting-healthy diet
Diet Control	Compulsory	Compulsory	Compulsory	Compulsory
Exercise	Included	Alternative	Alternative	Alternative
Counselling	Included	Alternative	Included	No
Possible side effects	No	Possible bloating, nausea, diarrhea	Complications of surgery	Depends on the individual
Cost	RM60/6 months program	RM 120/month	Reaches up to RM36,000	Depends on the individual
Mark your options (1 only)	(☐)	(☐)	(☐)	(☐)

TABLE 3: Demographic profile of respondents

Variables	Category	Frequency (n = 783)	%
Age (years)	18-29	239	30.5
	30-39	265	33.8
	40-49	205	26.2
	50 and above	74	9.5
Gender	Male	306	39.1
	Female	477	60.9
Race	Malay	658	84.0
	Chinese	78	10.0
	Indian	35	4.5
	Miscellaneous	12	1.5
Marital Status	Single	287	36.7
	Married	482	61.6
	Widower/Widow	14	1.8
Highest Education Level	Primary (Primary School)	8	1.0
	Secondary (Secondary/technical/vocational)	274	35.0
	Tertiary (University/Degree Institution)	501	64.0
Employment Status	Work (self/private/public)	591	75.5
	Housewives	48	6.1
	Pensioner	6	0.8
	Students	121	15.5
	Not working	16	2.0
Monthly Income	No income	58	7.4
	B40	368	47.0
	M40	283	36.1
	T20	73	9.3
	Uncertain	1	0.1

regression analyses. Patterns frequently masked in aggregate data were also revealed by utilising stratification techniques, which enhanced granularity. Consequently, analytical rigour permitted behavioural intent quantification. The data also demonstrated culturally embedded decision-making drivers. The results led to actionable information for targeted policy and intervention design.

RESULTS

Studies on WTP for obesity interventions utilising DCEs revealed numerous intervention options with differing effectiveness and acceptance.

Phase 1: Instrument Validation Summary

Firstly, this study performed a comprehensive

validation process to ensure the clarity, reliability and relevance of the developed questionnaire items. The questionnaire recorded a 0.75 minimum retention threshold based on the content validity index (CVI) during the content validity evaluation. This study also retained 36 out of 57 items across five thematic segments based on expert review and item refinement.

This study established face validity through pre-assessment with 10 respondents. During the procedure, linguistic clarity and cultural appropriateness of the instrument were evaluated. Notable adjustments, including replacing food pyramid references with Malaysian Healthy Plate examples were incorporated. Subsequently, a pilot test involving 100 eligible respondents further validated readability, comprehension, and completion time. Based on the feedback procured, iterative modifications were then

integrated.

In this study, construct validity was determined with exploratory factor analysis (EFA). The notable Bartlett's test ($p < 0.01$) and KMO values (> 0.7) also indicated sampling adequacy. Furthermore, internal consistency reliability revealed robustness across constructs, with Cronbach's alpha figures exceeding 0.70. The results indicated the stability and coherence of the instrument for field implementation and excellent internal consistency. The data also confirmed that the instrument offered a notable reliability for establishing respondents' perception and acceptance of weight management interventions. Overall, the results of these reliability evaluations proved that the study instruments, particularly the acceptance scale, exhibited a satisfactory internal consistency to determine the studied structure.

Phase 2: Study Analysis

This study analysed data collected from 783 respondents as in Table 3. Based on the findings, most respondents were between 30 and 39 years old (33.8%), while 30.5% were between 18 and 29 years old. A majority of the respondents were also females (60.9%), and 39.1% were males. Regarding ethnic composition, 84.0% were Malays, 10.0% were Chinese, 4.5% were Indians, and other ethnicities comprised 1.5%. The data also revealed that over half of the respondents were married (61.6%), while 36.7% were single.

A total of 64.0% of the respondents in this study received a tertiary education, while 35.0% had a secondary education. Most respondents were also employed in the public or private sector (75.5%), whereas students, housewives, unemployed and retirees made up 15.5%,

6.1%, 2.0% and 0.8%, respectively. According to income level, 47.0%, 36.1% and 9.3% of respondents were categorised in the B40, M40 and T20 groups, respectively, while 7.4% reported not earning income.

This study assessed the relationship between varying demographic backgrounds, economic factors, acceptance and WTP for weight management interventions. Descriptive statistical methods were applied to summarise and evaluate the study hypothesis. According to the findings, an 80.0% acceptance rate and 27.0% WTP levels were documented. Acceptance was also observed to be influenced by sociodemographic background, BMI, gender and education level. Meanwhile, income and employment affected WTP, resulting in cost sensitivity and preference for low-cost structured programmes. Based on DCE highlights as per Table 4, Choice A was the most preferred attribute, consisting of structured coordination (nutrition, physical, and motivation), documenting statistical significance.

The DCE data were analysed using a Multinomial Logit (MNL) model and results as presented in Table 5. The model estimated the probability that respondents select each intervention alternative based on its attributes. The MNL estimates showed that non-invasive, lifestyle-based attributes significantly increased utility: diet & exercise ($\beta = 0.842$, $p < 0.001$) and inclusion of counseling support ($\beta = 0.654$, $p < 0.001$). The cost parameter was negative and significant ($\beta_{\text{cost}} = -0.074$, $SE = 0.011$), allowing computation of monetary trade-offs. Marginal WTP (Table 6) for each non-monetary attribute was calculated as the ratio of the attribute coefficient to the negative of the cost coefficient (β_{cost}), following the standard approach by

TABLE 4: Results of discrete choice experiment selection

Options	Intervention	%
A	Diet, exercise and motivation	68.3%
B	Phamacotherapy	2.2%
C	Bariatric surgery	17.5%
D	Regular fasting and healthy diet	17.5%

TABLE 5: Multinomial logit estimates (n = 783)

Attribute	β (coef)	SE	z	p
Diet & Exercise	0.842	0.119	7.074	<0.001
Counseling only	0.316	0.108	2.935	0.003
Medication	-0.482	0.128	-3.762	<0.001
Surgery	-0.956	0.158	-6.063	<0.001
Frequency: Monthly	0.514	0.102	5.022	<0.001
Frequency: Weekly	0.132	0.092	1.427	0.154
Expected weight-loss (% per 1%)	0.128	0.016	8.040	<0.001
Side effects: Mild	-0.312	0.089	-3.518	<0.001
Side effects: Severe	-0.846	0.100	-8.454	<0.001
Counseling support: Included	0.654	0.089	7.311	<0.001
Monthly cost (per RM1)	-0.074	0.011	-6.508	<0.001

β (coef) = Estimated regression, coefficient; SE = Standard error; z = Wald z-statistic; p = p-value Significant (p < 0.05).

Lancsar and Louviere (2008) and de Bekker-Grob et al. (2012). Mathematically, WTP (in Malaysian Ringgit) = $\beta_{\text{attribute}} / \beta_{\text{cost}}$, where β_{cost} was expressed per RM1 increment. Variance and 95% confidence intervals (CIs) for WTP were approximated using the delta method. The resulting WTP values were expressed in RM per month, representing how much respondents were willing to pay for each improvement in attribute level while holding other attributes constant. The

result indicated respondents were willing to pay approximately RM 10/month for a diet & exercise program which also incorporating counseling. Conversely, respondents' utility decreased for medicalised interventions (medication and surgery), with negative WTP values indicating aversion to invasive/high-risk options. The results suggested that cost, perceived effectiveness, and safety were key determinants of intervention acceptability in the Malaysian adult population.

TABLE 6: Marginal willingness to pay estimates (RM/month) with 95% CI

Attribute	B	SE(β)	WTP (RM)	SE(WTP)	95% CI (RM)
Diet & Exercise	0.842	0.119	11.38	2.38	6.72 - 16.03
Counseling only	0.316	0.108	4.27	1.60	1.14 - 7.40
Medication	-0.482	0.128	-6.51	2.00	-10.43 - -2.59
Surgery	-0.956	0.158	-12.92	2.91	-18.63 - -7.21
Frequency: Monthly	0.514	0.102	6.95	1.75	3.52 - 10.37
Expected weight-loss per 1%	0.128	0.016	1.73	0.34	1.06 - 2.40
Side effects: Mild	-0.312	0.089	-4.22	1.36	-6.89 - -1.55
Side effects:	-0.846	0.100	-11.43	2.22	-15.78 - -7.09

B: Estimated regression coefficient, SE(β): Standard error of the regression coefficient; WTP (RM) = Marginal willingness to pay in Malaysian Ringgit per month; SE(WTP): Standard error of the willingness-to-pay estimate; 95% CI: 95% confidence interval

DISCUSSION

The Malaysian household income classification serves as a socioeconomic policy for targeted health interventions. Based on the guideline, households earning under RM5,250 are classified in the B40 (bottom 40.0%) category, M40 (middle 40.0%) households earn between RM5,250 and RM11,819, while T20 (top 20.0%) households earn above RM11,820 (Sabri et al 2025).

The overrepresentation of B40 in the sample in this study underscored the urgency of designing financially accessible and culturally sensitive weight management strategies, particularly for economically vulnerable groups. The findings in this study suggested a shifting economic landscape. The data documented in this study differed from previous studies, such as the 2019 household income survey, which reported a more balanced distribution across income tiers. Post-pandemic recovery, inflation and regional disparities may contribute to the variation observed. Furthermore, previous research indicated that 20.0% of M40 households fell into B40 status during economic downturns, reinforcing the fluidity of income classification and its effects on health-related decision-making. The income stratification is not only a demographic descriptor, but it also determines health behaviour. For instance, B40 individuals commonly face increased barriers to healthcare access and sensitivity to cost and diminished health literacy. These parameters shape their acceptance and WTP for weight management interventions. The relatively low representation of T20 (9.3%) further highlighted the necessity of prioritising equity-driven approaches that resonate with the economic background of the majority.

No significant difference in obesity rates among adults living in urban and rural areas was documented in this study, recording 0.178 in a t-test statistical assessment. A sedentary lifestyle, unhealthy eating patterns, and genetic factors had an equal role in determining obesity rates, regardless of residential localities. Accordingly, obesity reduction efforts in Malaysia should focus on comprehensive lifestyle and nutrition

alterations.

Based on the data procured in this study, nuanced drivers: education level, BMI category and gender significantly influenced acceptance of weight management interventions among the respondents. Although the overall model explained a modest portion of the variance ($R^2 = 9.4\%$), the statistical significance also revealed a substantial relationship between the factors and intervention acceptance. Furthermore, the prominence of education suggested a considerable cognitive-emotive link to health literacy, while gender-related differences might reflect culturally embedded attitudes towards body image and health behaviour. Consequently, the findings validated that effective and equitable weight management interventions should consider education level, BMI, gender, cost structure and socioeconomic context to enhance acceptance and WTP across diverse populations.

A total of 68.3% respondents in this study also demonstrated the highest WTP for integrated lifestyle interventions, which combine diet, exercise and motivational support. The preference underscored a notable inclination toward holistic, non-invasive approaches, aligning health literacy and perceived effectiveness. Conversely, WTP for medicinal pills were only demonstrated by only 12.2% of the respondents. The findings indicated that the respondents harboured scepticism toward pharmacological solutions, favouring natural lifestyle mediations.

A total of 17.5% respondents stated WTP for intensive or alternative methods, such as bariatric surgery and regular fasting combined with a healthy diet. The data suggested cautious interest among the respondents, particularly among those with severe obesity or experience with intermittent fasting. Accordingly, offering culturally relevant, non-invasive interventions tailored to public preferences, with pricing strategies denoting perceived value and affordability, is vital.

A significantly low number of respondents, 1.0%, considerably disagreed that overweight and obesity constitute serious health issues, with 92.6% agreeing or significantly agreeing.

The overwhelmingly positive response revealed a notable level of awareness among the respondents. The observations present a crucial foundation for designing and implementing effective interventions.

Most respondents, 80.7%, in this study were interested or exceptionally interested in participating in a free weight-loss intervention programme. Meanwhile, 2.6% respondents expressed exceptional disinterest. The considerable level of willingness underscored a critical opportunity for public health initiatives to leverage cost-free models in promoting obesity interventions.

Mok et al. (2019) documented that perceived affordability and accessibility as the predominant motivators for continued obesity intervention engagement among schoolchildren in the *Juara Sihat* programme. Conversely, pharmacological interventions, costs and medical supervision requirements resulted in diminished long-term adherence, suggesting sustained participation is hindered by financial barriers (Rasool et al. 2013). Other reports also indicated parallel findings, where cost-free, community-based interventions, particularly those incorporating behavioural alterations and cultural sensitivity, are more likely to be accepted and maintained over time. Consequently, removing financial barriers and incorporating holistic, peer-supported and culturally resonant strategies are essential for increasing uptake and sustainability of obesity interventions among Malaysians.

The findings reveal that respondents demonstrated a clear preference for non-invasive, lifestyle-based interventions, such as diet and exercise programs, supported by counselling components. Interventions involving medication or surgery were generally less preferred, reflecting concerns about side effects, invasiveness, and cost. The estimated marginal WTP values indicate that individuals were willing to pay an RM 60 for 6 months for diet, and exercise-based that include counselling support for interventions. Conversely, respondents expressed negative WTP for surgical or pharmacological interventions, indicating a perceived disutility or reluctance, aversion to

medicalised options.

This study confirms that Malaysian adults prefer lifestyle-based interventions and are willing to pay modest amounts for programs emphasising lifestyle-based modifications involving diet, physical activity and counseling as well as behavioral support. These findings underscore the importance of affordability and non-invasiveness in weight management. Given that obesity and diabetes already impose annual costs exceeding RM4.38 billion (MOH Malaysia 2022), promoting lifestyle-based programs offers both economic efficiency and health equity. Integrating counseling components into community-based interventions could enhance uptake and long-term adherence.

These findings align with previous Malaysian and regional studies reporting strong public preference for behavioral interventions over medicalised approaches (Lim et al. 2020; Zailani et al. 2021). Findings similar to this study were documented globally. For instance, studies in Thailand and Indonesia revealed that education was a significant determinant of health service uptake. Research in Western contexts also emphasised BMI and gender as powerful predictors of behaviour alteration. Nonetheless, this study recorded cultural specificity within the Malaysian context, including localised health symbols (such as the Malaysian Healthy Plate) and economic sensibilities. Similarly, WTP estimates for non-surgical weight management programs in other Southeast Asian contexts typically range between RM 8-15 per month (Ahmed et al 2020), suggesting consistency in perceived value across similar socioeconomic settings. The negative WTP for surgery parallels evidence from Singapore and Thailand, where high out-of-pocket costs and perceived risks reduce public acceptance despite proven effectiveness for morbid obesity (Lee et al. 2011; Techagumpuch et al. 2020).

Findings suggest that affordability, non-invasiveness and behavioral support are critical determinants of public acceptance. These insights can inform policy development to design more acceptable and cost-effective obesity

interventions aligned with Malaysia's NSP-NCD and the Sustainable Development Goals (SDG 3). Marginal WTP values were calculated as the ratio of the attribute coefficient to the negative of the cost coefficient, expressed in RM.

Barriers to Willingness to Pay Despite Significant Acceptance

The respondents in this study indicated favourable attitudes towards weight and obesity management initiatives. Nonetheless, notable acceptance did not automatically translate into WTP. Economic constraints, particularly among low-income groups, might explain the paradox. The observations might also be contributed by perceived entitlement to subsidised healthcare services and perceived value limitation in long-term interventions versus immediate health requirements. Furthermore, engagement in weight and obesity participation could be hindered by cultural expectations, where communal or government support is prioritised over individual financial responsibility. The barriers underscore the critical necessity to align affordability with intervention desirability.

Strengths and Limitation

Although providing critical insight into the acceptance and feasibility of obesity interventions among Malaysian adults, this study had several limitations. For instance, causal inferences were restricted by the cross-sectional approach employed, while reliance on self-reported data could have introduced social desirability bias. The predominance of urban respondents might also not fully capture the nuanced perspectives of rural populations, limiting the generalisability of findings across diverse settings. The hypothetical nature of DCEs may introduce bias. Additionally, results represent stated rather than actual behaviour. Future research could include longitudinal validation or experimental implementation in community settings.

Nevertheless, this study is bolstered by notable strengths, including rigorous validation of the

instruments to ensure methodological robustness utilising CVI, EFA and Cronbach's alpha. This study also offers an integrative approach, incorporating socio-demographic, economic and perceptual dimensions, providing a multifaceted view of public health dynamics. Furthermore, the culturally adapted content enhanced ecological validity and ensured relevance to the Malaysian context, reinforcing the potential meaningful application in policy and practice of this study.

Economic Valuation and Willingness to Pay in Monetary Terms

Presenting WTP values in monetary terms enhances the clarity and applicability of economic valuations in health economics. Strengthening the interpretation of these findings can provide valuable insights for policymakers, particularly in the Malaysian context, to develop equitable and effective health policies. Presenting WTP values in monetary terms rather than percentages is crucial for meaningful economic valuation. This approach provides a clear and tangible measure of the economic value individuals place on health interventions, making it easier for policymakers to interpret and utilise the data effectively (Ryan et al. 2015).

Interpreting WTP findings in the context of health economics can significantly influence policy decisions. WTP values are often influenced by socio-demographic factors, such as income and education. Higher income and education levels are associated with higher WTP values, which can inform targeted policy interventions to address disparities in healthcare access and affordability. Policymakers can use this data to develop pricing strategies that balance affordability with the sustainability of telehealth services. Addressing equity concerns is essential when interpreting WTP findings. Policies should ensure that healthcare services are accessible to all segments of the population, regardless of their socio-economic status. This can be achieved by subsidising costs for lower-income groups or implementing sliding scale fees based on income.

Impact, Implications and Suggestions

This study marks a pivotal contribution to Malaysia's health economics landscape, especially in tackling the growing obesity epidemic. With rigorous methodology and robust statistical analysis, the research delivers credible, actionable insights that can shape future interventions. Key factors influencing public acceptance highlight the nuanced expectations of Malaysian adults when it comes to weight management programs. While obesity is increasingly recognised as a chronic disease, patient motivation remains a critical barrier to effective treatment. The study's findings on WTP reveal a spectrum of financial commitment across income levels, suggesting that tiered or subsidised models could unlock broader access to care.

Methodologically, the use of self-administered questionnaires and stratified random sampling ensures a representative snapshot of the population, minimising bias and enhancing reliability. The integration of the HBM adds depth to the analysis, offering predictive power for BMI-related behaviours and guiding the design of culturally sensitive interventions. Advanced statistical techniques further identify key predictors of WTP and intervention success, equipping policymakers with data-driven tools to craft targeted, scalable solutions.

In essence, this study measured public perception and transformed it into a strategic blueprint for health reform. By aligning economic readiness with behavioural insights, Malaysia is well-positioned to shift from reactive obesity treatment to proactive, personalised prevention. The implications are clear with the right investment and design, weight management programs can become both socially acceptable and economically sustainable.

The results provide valuable insights for the MOH and policymakers in designing sustainable obesity intervention programs under the NSP-NCD. Three main policy implications can be drawn as suggested:

(i) Prioritise behavioral interventions

Programs emphasising diet modification, exercise, and counseling should be prioritised within primary health care and community-level initiatives. These approaches align with public preferences and have lower implementation costs compared to medication or surgery.

(ii) Enhance counseling and behavioral support

The positive WTP for counseling indicates that respondents value continuous motivation and professional support. Integrating structured behavioral counseling in clinics weight management programs could enhance participation and long-term adherence.

(iii) Ensure affordability and equity

While respondents showed WTP small monthly amounts, cost sensitivity remains high. This supports subsidy or co-payment schemes for low-income groups to ensure equitable access.

The DCE design allows quantification of trade-offs and estimation of monetary WTP, providing robust evidence of public preferences. This study supports SDG 3 (good health and well-being), which aims to reduce premature mortality from NCDs by one-third by 2030. Promoting affordable, acceptable, and effective obesity interventions aligns with global and WHO strategies for NCD prevention through lifestyle modification.

To reduce obesity and its associated NCDs, policymakers must prioritise cost-effective, community-centric solutions that reflect the socioeconomic realities of diverse populations. Strategic planning should incorporate key determinants involving cost, education, employment and income to ensure equitable access and sustained engagement. A multisectoral approach, supported by coordinated government action and improved healthcare communication, is essential to address systemic barriers and environmental drivers of obesity. Ultimately, effective interventions can alleviate healthcare

burdens, enhance productivity and redirect national resources toward critical health priorities, contributing to long-term societal and economic resilience.

CONCLUSION

This study provided critical insights into the acceptance and WTP for obesity interventions among Malaysian adults, revealing a strong preference for self-managed, non-invasive approaches, such as diet, exercise and motivational support. While acceptance was notably high (80.0%), WTP remained low (27.0%), influenced by education, employment, income and perceived affordability. These findings underscore the importance of designing culturally resonant, economically accessible programmes that align with public expectations and behavioural readiness. Acceptance was significantly shaped by BMI, gender and education level, reinforcing the need for targeted communication and inclusive intervention strategies.

This study presents compelling evidence that Malaysian adults are willing to invest approximately RM60 for 6 months in a comprehensive weight management program encompassing group-based activities with dietary guidance, physical exercise, and motivational counselling. This WTP underscores not only the perceived value of structured interventions but also the public's readiness to take ownership of their health provided the solutions are affordable, practical, and culturally resonant. From policy standpoint, this insight carries significant weight. The RM60 per 6 month or RM10/month WTP benchmark offers a data-driven foundation for pricing strategies, subsidy frameworks and resource allocation in future national obesity prevention efforts. Embedding such evidence-based programs within existing public health platforms, such as community wellness clinics, could amplify reach, boost engagement and ensure long-term sustainability. Recognising the financial willingness of Malaysians to co-invest in their health empowers the MOH and

policymakers to craft equitable, cost-sharing models that are both scalable and fiscally responsible. These models have the potential to curb obesity rates and mitigate the economic burden of chronic diseases like diabetes, cardiovascular conditions, and hypertension.

Overall, the findings emphasise that public acceptance of obesity interventions in Malaysia depends strongly on affordability, safety and behavioral support. Integrating these preferences into program design can improve uptake, adherence and cost-effectiveness of national obesity prevention strategies. Ultimately, this study signals a pivotal moment for Malaysian health policy: a shift from reactive, treatment-heavy approaches to proactive, community-led prevention strategies. By bridging public perception with economic commitment, Malaysia stands poised to redefine its approach to obesity transforming it from a national challenge into a shared opportunity for healthier lives and a more resilient healthcare system.

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