Healthy Rice Consumption Behaviour in Nay Pyi Taw, Myanmar

[1*]Lwin, C.M., [1]Napasintuwong, O., and [1]Praneetvatakul, S.

Department of Agricultural and Resource Economics, Faculty of Economics,

Kasetsart University, Thailand

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Chan Myae Lwin*, Orachos Napasintuwong, Suwanna Praneetvatakul
Department of Agricultural and Resource Economics, Faculty of Economics, Kasetsart University, Thailand
Corresponding author Email:chanmyae.l@ku.th

Abstract

Myanmar is still facing challenges related to nutrition, including prevalent health issues like anemia, stunting, and wasting. Anemia, specifically, is acknowledged as a public health concern in the country. Simultaneously, the incidence of non-communicable diseases such as obesity, hypertension, and diabetes is on the rise, contributing to increased morbidity and mortality. Myanmar exhibits a high per capita consumption of rice, making healthy rice a culturally adaptable solution to address its nutrition-related health challenges. Therefore, this study seeks to investigate the factors influencing the choice of healthy rice among Myanmar rice consumers. Data for this study were collected from 481 rice consumers in Nay Pyi Taw, the capital of Myanmar, between September and October 2023. Descriptive statistics, t-test, chi-square test, and binomial logit model were employed to achieve the study objectives. Only 18% of rice consumers reported choosing healthy rice. Several factors drive rice consumers to choose healthy rice, including the education level of the respondent, the presence of children or elderly household members, household monthly income, knowledge score, and habitual health-related behaviour score. While knowledge significantly influences consumption, its impact is mediated by factors such as income. Therefore, targeted knowledge-sharing programs should prioritize medium-income group consumers with vulnerable households for optimal effectiveness. The habitual health-related behaviour score showed a highly significant association with healthy rice consumption, emphasizing the need to promote good health habits, such as exercise routines, by providing facilities and creating environments conducive to physical activities, given the currently limited access in Myanmar.

Introduction

Myanmar has a high per capita rice consumption of 155.14 kg/year (425.04 g/day) (Myint et al., 2016). Being a low-income Southeast Asian country with a population of approximately 51.47 million, Myanmar faces persistent nutrition-related issues. Anemia is a significant public health concern, particularly affecting children and women. According to the Myanmar Micronutrient and Food Consumption Survey (MMFCS) 2017, around 35.6% of children aged 6-59 months, 51% of children aged 5-9 years, 30% of adolescent girls (age 10-14), and 30% of women of reproductive age (age 15 to 49) are anemic (MoHS, 2019a). Stunting, which is indicative of chronic undernutrition in children under 5 years old, is also prevalent, with Myanmar classified in the high threshold level (20-<30%) at 27%. Additionally, acute undernutrition or wasting affects 7% of children (FAOSTAT, 2018).

In addition, non-communicable diseases (NCDs) are on the rise, contributing to increased morbidity and mortality (CSO, 2021; Swe et al., 2020). Conditions such as obesity, hypertension, and diabetes are becoming more prevalent, mainly due to factors like food quality, food safety, and dietary habits. The Myanmar Demographic and Health Survey (2015–2016) reported a high prevalence of overweight (28.1%) and obesity (13.1%) among women of reproductive age (Hong et al., 2018). Hypertension rates were found to be increasing from

23.5% in 2003-2004 to 30% in 2009-2010. Diabetes prevalence in Myanmar is notably higher than in other ASEAN countries, increasing from 8.1% in 2004 to 10.5% in 2014 among residents aged 25 to 64 years (Latt et al., 2019). These health issues are more prevalent in urban areas than in rural areas (Aung et al., 2018; Thapa et al., 2021).

In this study, "healthy rice" refers to a combination of fortified rice, brown rice, rice berry rice, konjac rice, basmati rice, and parboiled rice; those that are polished white rice as alternative choices of staple food consumption considered healthy diets. These types of rice are found to be consumed in Nay Pyi Taw, the capital. Among them, fortified rice is an important choice to address anemia, one of the most significant health problems in Myanmar. It is a combination of normal rice grains with fortified grains, achieved by adding rice flour, six vitamins (vitamin A, B1, B6, B12, folic acid, and niacin) and two minerals (iron and zinc) based on the dietary patterns and nutritional status of Myanmar's population (MoHS, 2019b). Existing literature supports that fortified complementary foods are effective in preventing anemia (Csölle et al., 2022; WHO, 2018). As of 2022, nine countries globally mandate rice fortification through legislation, including Papua New Guinea, Solomon Islands, US, Costa Rica, Nicaragua, Panama, Peru, Philippines, and India. Additionally, studies indicate that other healthy rice varieties, such as brown rice, rice berry rice, and konjac rice, possess anti-obesity and anti-diabetes effects due to their high phytochemical content compared to white rice (Melini & Acquistucci, 2017; Ravichanthiran et al., 2018; Yoshizaki et al., 2014). Understanding choices of rice consumption is important to address nutrition-related health challenges in Myanmar as it is a staple food and culturally adaptable option. This study aims to explore the factors that drive Myanmar rice consumer to choice healthy rice.

Methodology
Data Collection
A total of 481 rice consumers aged 18 years and older were interviewed during September to October 2023. The survey took place in Nay Pyi Taw Council Territory, the administrative capital of Myanmar. Among the eight townships in Nay Pyi Taw, four townships, namely Zabuthiri, Pyinmana, Pobbathiri, and Zeyarthiri, were selected based on the highest urban population percentage.

The sampling procedure for this study aimed to include consumers from different income groups and households with children under 5 years old. This consideration took into account the varying affordability and purchasing behavior based on household income, as well as the prevalent use of fortified rice as a baby supplement in Myanmar. To ensure the inclusion of these household types, participants were selected from open markets, modern trade stores, and parents visiting playgrounds/preschools.

The total sample size of 481 was allocated proportionally across the four selected townships based on their total urban population. As Zabuthiri township has the highest urban population among the four townships, 41% of the total sample (197 participants) was selected from there. Approximately 136 participants (28% of the total sample) were selected from Pyinmana, 84 (17% of the total sample) from Pobbathiri, and 64 (14% of the total sample) from Zeyarthiri townships, based on their respective urban population numbers.

The selected samples from each township were evenly distributed among three locations: open markets, modern trade stores, and preschools/playgrounds as shown in Table 1.

Table 1. Sample size allocation by township and market places

Township	Urban population[a]	Percent of Population	Number of Respondents				Percent of Respondents
			Open market	Modern trade store	Preschool/ Playground	Total	
Zabuthiri	104,596	41	68	64	64	197	41
Pyinmana	72,010	28	48	44	44	136	28
Pobbathiri	44,437	17	28	28	28	84	17
Zeyarthiri	35,106	14	24	20	20	64	14
Total	256,149	100	168	156	156	481	100

[a]Source: Department of Population (2015)

Data Analysis

Descriptive analysis was performed to present the socio-demographic characteristics of the respondents. A t-test and chi-square test were utilized to determine whether the difference between the healthy rice and normal rice groups is statistically significant. The contribution of selected variables to consumer choices to consume healthy rice was tested using binary logistic regression model.

The binary response variable y, was denoted as y=1 if a consumer chose to consume healthy rice and y=0 if otherwise. Assuming that the probability of y=1 is P, the function of y is as follows:

$$f(y) = P^y (1 - P)^{1-y}, y=0,1 \qquad (1)$$

This paper employed the maximum likelihood estimation method to compute for the regression parameters. The basic form of the logit model is given by:

$$\text{Prob}(y_i = 1) = P_i = \frac{1}{1+e^{-z_i}}, \text{ where } z_i = \beta_0 + \sum_{j=1}^{8} \beta_j X_{ij} + \mu_i \qquad (2)$$

The probability of $y_i=0$ is given by:

$$\text{Prob}(y_i = 0) = 1 - P_i = 1 - \frac{1}{1+e^{-z_i}} = \frac{1}{1+e^{z_i}} \qquad (3)$$

Here, P_i is the probability of consumer i, β_0 is the intercept, β_j is the regression parameter of influencing factor j, X_{ij} is the independent variable representing influencing factor j in sample i, μ_i is the error term.

In the case where P_i is strictly between 0 and 1, the method involves transforming P_i to obtain Logit (y)= $\ln(\frac{P_i}{1-P_i})$. The odds ratio was calculated as:

$$\text{Odds Ratio} = \frac{P_i}{1 - P_i} = \frac{1+e^{z_i}}{1+e^{-z_i}} = e^{z_i} \qquad (4)$$

The logit (y) is expressed as:

$$\text{Logit (y)} = \ln\left(\frac{P_i}{1-P_i}\right) = \ln e^{z_i} = \beta_0 + \sum_{j=1}^{8} \beta_j X_{ij} + \mu_i \qquad (5)$$

Logit, the log of the odds ratio, is not only linear in X, but is also, from the estimation view point, linear in the parameters. The description of dependent and independent variables used in the model are presented in Table 2.

Table 2**.** Description of variables used in the logit model

Symbol	Name	Description	Unit of measurement
y	Consumer's consumption behavior for healthy rice	This variable indicates whether the respondent has consumed healthy rice in the past three years (1) or has not consumed healthy rice in the past three years (0).	Binary (1 or 0)
X_1	Respondent's age	The age of the respondent	Years
X_2	Education of respondent	The number of schooling years completed by the respondent	Years
X_3	Household size	The count of individuals living in the respondent's household (defined as the same housing unit for at least six months, sharing meals and expenses)	Count
X_4	Existence of children in household	Indicates whether there are children in the respondent's household.	Dummy (1 for Yes, 0 for No)
X_5	Existence of elderly household member	Indicates whether there is an elderly member in the respondent's household.	Dummy (1 for Yes, 0 for No)
X_6	Household monthly income	The monthly income of the respondent's household	Million MMK (Myanmar Kyat)
X_7	Knowledge score	A numerical score representing the respondent's knowledge about anemia, diabetes, and nutrition based on 24 questions (1 point for each correct answer)	Numeric score
X_8	Habitual health-related behavior score	A numerical score representing the respondent's habitual health-related behaviors, including exercise routine, fruit and vegetable consumption, etc. (1 point for each healthy habit, assessed through 8 questions)	Numeric score

Results and Discussion
Healthy rice consumption
The fact that healthy rice is mainly found on the shelves of modern trade stores suggests limited healthy rice consumption, as rice trade in Myanmar typically occurs in retail or wholesale shops rather than modern trade stores. Despite efforts to include a diverse population for the purpose of comparing healthy rice consumers and non-consumers, only 88 out of 481 respondents (18% of total sample) reported consuming healthy rice. Among these, 22 respondents are current consumers, while the remaining 66 have tried healthy rice in the last three years. Fortified rice stands out as the most popular choice among healthy rice consumers, making up more than half

of the total (57%). This could be because of the efforts of various organizations like the Ministry of Health and Sports, Ministry of Social Welfare, Relief and Resettlement, LIFT, PATH, and the World Food Programme. These groups have worked together on different activities, such as providing technical assistance to fortified rice producers, incorporating fortified rice in schools' lunch program, distributing fortified rice to vulnerable populations and making effort for demand generation (Thi, 2017; WFP, 2019). Brown rice comes in as the second most consumed type, accounting for 27%. Basmati rice takes the third position in terms of consumption. Other varieties of healthy rice, such as rice berry rice, konjac rice, and parboiled rice, show negligible usage, each accounting for less than 1% as shown in Figure 1.

The reasons for consuming healthy rice include the presence of vulnerable household members such as children and elders, anemic individuals, diabetes patients, and cancer patients. It is also chosen for achieving target weight and during family weak times, such as the COVID period, or simply as an experiment. On the other hand, reasons for discontinuing consumption include a dislike for the taste, high prices, difficulty in purchasing, achieving target weight, and the necessity of preparing separate meals for patients.

Interestingly, some respondents mentioned that they are concerned about the suitability of these rice varieties for children. The rationale provided by some respondents is that they did not seem to notice the apparent benefits of consuming healthy rice. This lack of awareness may be attributed to the fact that the benefits of healthy rice may not be immediately apparent and may necessitate a more prolonged period of consumption, as opposed to the brief trial periods some respondents have undertaken. For instance, in the case of fortified rice, continuous consumption for at least six months is recommended to observe the benefits, which may not be as immediately noticeable as with certain medications.
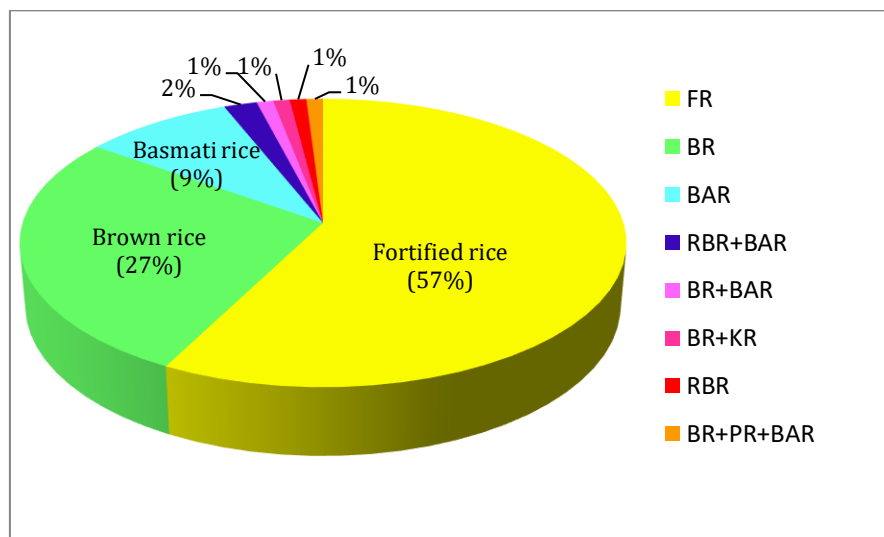

Figure 1. Type of healthy rice consumed by the respondents (n=88)
Note: FR=Fortified rice, BR=Brown rice, BAR=Basmati rice, RBR=Rice berry rice, KR= Konjac rice, PR=Parboiled rice

Socio-demographic profile of the respondents

The socio-demographic characteristics of respondents are presented in the Table 3, divided into two groups: (a) those who had consumed any healthy rice in the past three years (healthy rice group: 88 respondents, i.e., 18%); and (b) those who had never consumed any healthy rice in the past three years (normal rice group: 393 respondents, i.e., 82%). The share of women consuming healthy rice is much higher than that of men, possibly because women often play a major role in household purchase decisions. The gender proportion is nearly identical in both the healthy rice and normal rice groups.

For respondents who chose normal rice, the ages skewed towards an older group (above 35 years old), while for respondents who chose healthy rice, the ages varied between 26 and 35 years old.

Half of the respondents have a bachelor's degree or above, and half have a high school education or below. While respondents who chose healthy rice show a higher educational level, with more than 70% having completed a bachelor's degree and above, only above 40% is in the normal rice group. The results of chi-square tests revealed a significant difference in education levels between the normal and healthy rice-consuming respondent groups ($\chi 2$ = 25.764, p-value = 0.000).

Income sources also significantly differ between the healthy rice group and normal rice group. Unskilled workers make up a large part of the normal rice group at 36%, while the healthy rice group is dominated by government staff, self-employed enterprises, and skilled workers.

Income groups of normal and healthy rice consumers are also differ significantly. More than 70% of healthy rice consumers are in medium and high income groups, however, nearly half of normal rice consumers (47%) are in low income group.

About half of the respondents (52%) have three or four family members and 39% have more than 5 household members and 9% have less than 2. The number of household members is not different between healthy rice and normal rice groups. Interestingly, healthy rice groups have more vulnerable household members of children and elder members, and the significant difference is supported by chi-square results. The existence of anemic and diabetic household members is also different between healthy rice and normal rice groups, showing significant results with chi-squared tests. About 31% of the healthy rice group and 17% of the normal rice group has a diabetic member.

Table 3 Socio-demographic characteristics of the respondents and type of rice consumed

Characteristics	Mean and Std. Dev	Number of Sample and (%)	Respondent Group (%)		Chi-Square	Sig.
			Healthy Rice	Normal Rice		
Number of respondents		481 (100%)	88 (18%)	393 (82%)		
Gender	-				0.024	0.876
Male		57 (12)	11	12		
Female		424 (88)	89	88		
Age (years)	38.84 (10.77)				7.245	0.064*
18-25		33 (7)	5	7		
26-35		177 (37)	49	34		
35-50		201 (42)	36	43		
51$^+$		70 (15)	10	16		
Education level	11 (4)				25.764	0.000***
Did not complete primary		16 (3)	-	4		
Completed primary school		39 (8)	1	10		
Completed middle school		105 (22)	11	24		
Completed high school		72 (15)	14	15		
Completed bachelor degree		213 (44)	64	40		
Completed master degree and above		36 (7)	10	7		
Household Monthly income in million MMK[a]	6.9 (7.9)				30.819	0.000***
<0.5		202 (42)	22	47		
0.5-1		185 (38)	40	38		
>1		94 (20)	39	15		

Characteristics	Number of Sample and (%)	Respondent Group (%)		Chi-Square	Sig.
		Healthy rice	Normal rice		
Main occupation of household				32.899	0.000***
Government staff	176 (37)	47	34		
Self-employed enterprise	96 (20)	26	19		
Skilled worker	46 (10)	17	8		
Unskilled worker	146 (30)	7	36		
Other	17 (3)	3	3		
Household size (number)				2.440	0.295
≤2	42 (9)	6	9		
3-4	252 (52)	59	51		
≥5	187 (39)	35	40		
Children household member below 5				8.524	0.004***
Yes	233 (48)	63	45		
No	248 (52)	38	55		
Elder household member above 60				4.9679	0.026**
Yes	190 (40)	50	37		
No	291 (61)	50	63		
Anemic household member				2.8385	0.092*
Yes	85 (18)	24	16		
No	396 (82)	76	84		
Diabetes household member				8.4995	0.004***
Yes	94 (20)	31	17		
No	387 (80)	69	83		

Note: Figure in the parentheses represents percentage; ***, ** and * are significant at 1%, 5% and 10%; [a]1USD=2,100 MMK as of September, 2023

Nutritional knowledge

Nutritional knowledge among respondents was assessed in four categories: anemia, diabetes, nutrient sources, and food sources. Given the association between the consumption of healthy rice and non-communicable diseases like anemia and diabetes, the respondents' understanding of the causes, symptoms, preventions, treatments, and complications related to these health conditions was examined. To measure nutrition-related knowledge, questions were posed regarding the roles of essential nutrients in various aspects of health and their food sources.

The questions were structured with predefined choices in a closed-ended format. Each correct response received a score of 1, while incorrect or "Do not know" answers had a score of 0. The assessment was for a total of 24 questions, with 5 questions each for anemia and diabetes knowledge, 6 questions on nutrient sources, and 8 questions on food sources. As a result, the knowledge score for the 24 questions ranged from 0 to 24. Knowledge scores were classified into three levels using Bloom's cut-off points (Abeje et al., 2016; Thandar et al., 2019): low level (59% or below), moderate level (60-80%), and high level (81-100%).

The results are presented in Table 4. Almost all respondents exhibited a low to moderate level of knowledge, with a mean knowledge score of 10.87 and a standard deviation of 4.03. However, healthy rice consumers had a higher mean knowledge score (12.27) compared to normal rice consumers (10.56). Nearly half of healthy rice consumers (43%) had a moderate level of knowledge, while only 25% had a moderate level among normal rice consumers.

The knowledge score varied among different income groups (Table 5). The low-income group had the lowest knowledge score among the three income groups, with a mean value of 10.45. The medium-income group consumers had the highest knowledge score at 12.65, while high-income group consumers had a slightly lower knowledge score (11.66) than the medium-income group. These results align with (Thandar et al., 2019), which found that pregnant women in Myanmar belonging to the second, middle, and fourth quintiles of the wealth index had higher knowledge scores compared to those in the lowest and highest quintiles. This is attributed to the risky health behaviours such as stress, unbalanced diet, and physical inactivity observed among the poorest and richest groups.

Knowledge scores were statistically significant between healthy and normal rice consumers in the medium-income group, although no significant effect was found in the low and high-income groups. For low-income consumers, despite having sufficient knowledge, price barriers may pose a significant obstacle to consumption. For middle-income consumers, having enough knowledge influences their decision to move towards consumption.

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Table 4. Distribution by level of knowledge and average knowledge score by type of rice consumed

Knowledge Level	Respondent Group					
	Healthy Rice (n=88)		Normal Rice (n=393)		Total (n=481)	
	No.	%	No.	%	No.	%
Low (0-13 scores)	48	55	296	75	344	72
Moderate (14-19 scores)	38	43	94	24	132	27
High (20-24 scores)	2	2	3	1	5	1
Average knowledge score (standard deviation)	12.27 (3.98)		10.56 (3.98)		10.87 (4.03)	
t value	-3.711					
Sig.	0.000***					

Note: *** denotes significance at 1%

Table 5. Knowledge scores of respondents by income group and type of rice consumed

Knowledge Level	Low Income						Medium Income						High Income					
	Healthy Rice (n=19)		Normal Rice (n=183)		Total (n=202)		Healthy Rice (n=35)		Normal Rice (n=150)		Total (n=185)		Healthy Rice (n=34)		Normal Rice (n=60)		Total (n=94)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Low	13	68	148	81	161	80	14	40	104	69	118	64	21	62	44	73	65	69
Moderate	6	32	34	19	40	20	20	57	44	29	64	34	12	35	16	27	28	30
High	-	-	1	1	1	0.5	1	1	2	2	3	2	1	3	-	-	1	1
Average score	11		9.89		10.45		13.80		11.49		12.65		12.00		11.32		11.66	
t value	-1.117						-3.086						-0.854					
Sig.	0.265						0.002***						0.395					

Note: *** denotes significance at 1%

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Habitual health related behaviour

Habits are a valuable construct in social psychology, significantly influence eating behaviour (van't Riet et al., 2011; Verplanken et al., 2018). Therefore, this study aimed to include habitual health-related behaviours such as exercise routines, weekly exercise hours, fruit consumption, and vegetable consumption, limiting sugary or processed foods, and reading nutritional information labels, to understand the behaviour of consumers choosing healthy rice. A total of eight questions were used to obtain a self-reported healthy habit score. A score of one was assigned for each healthy habit in response to each question, resulting in a total of eight scores for individuals with fully established healthy habits. The average score of all respondents is 4.69, but for healthy rice consumers, it is 5.44, which is higher than for normal rice consumers at 4.27. The difference between the healthy and normal rice groups is statistically significant under the t-test.

Table 6. Distribution by level of habitual health-related behaviour score and average knowledge score by type of rice consumed

Level	Respondent Group					
	Healthy Rice (n=88)		Normal Rice (n=393)		Total (n=481)	
	No.	%	No.	%	No.	%
Low (0-3 scores)	19	22	148	38	167	35
Moderate (4-6 scores)	48	55	191	49	239	50
High (7-8 scores)	21	24	54	14	75	16
Average score (out of 8)	5.44		4.27		4.69	
t value	-2.4627					
Sig.	0.0156**					

Note: ** denotes significance at 5%

Determinants influencing healthy rice consumption

The binary logistic model was employed to determine the factors influencing healthy rice consumption. The estimates in Table 7 reveal that education level of the respondent, existence of children in the household, presence of elderly household members, household monthly income, knowledge score, and habitual health-related behaviour score significantly contribute to the likelihood of consuming healthy rice. Conversely, the age of the respondent and household size do not exert a significant impact on consumption behaviour.

The educational background of respondents exhibits a highly significant association with the probability of consuming healthy rice. This finding is consistent with studies (Fard et al., 2021; McIsaac et al., 2015), which observed that individuals with higher educational attainment are more likely to maintain a healthier diet. Specifically, women with higher educational attainment exhibit greater control over their dietary choices, have more supportive partners, place value on the long-term health benefits of healthy eating for the entire family, experience fewer concerns regarding cost and waste, and draw upon more positive food-related experiences (Lawrence et al., 2009). The presence of vulnerable household members, such as children or the elderly, is also highly associated with the consumption of healthy rice.

Unsurprisingly, income demonstrates a highly significant association with the consumption of healthy rice, potentially due to affordability concerns. Currently, the prices of healthy rice variants, such as rice berry rice and basmati rice, are nearly double that of normal high-quality rice, while Konjac rice is considerably more expensive. Even brown rice and fortified rice, though beneficial, come at a moderately higher cost than normal medium-quality rice.

The coefficient for the knowledge score is statistically significant and positive suggesting that consumers with good nutritional knowledge are more likely to consume healthy rice. This finding supports the empirical evidence of several studies (Jayne et al., 2018; Wardle et al., 2000) indicating that knowledge is an important factor in explaining variations in food choices. Knowledge was significantly associated with healthy eating, and the effect persisted after controlling for demographic variables (Wardle et al., 2000) and barriers such as availability and price (Amore et al., 2019).

The habitual health-related behaviour score is also highly significant in relation to the consumption of healthy rice. This result aligns with the findings of (Jayne et al., 2018) that fostering a healthy eating identity is more effective in promoting healthy food choice behaviours than nutrition education alone among U.S. Army Soldiers.

Table 7 Estimated logit model for consumers' healthy rice consumption

Variables	Coefficient	Std. err.	z	P>z	Marginal effect	P>z
Age of respondent (years)	-0.019	0.014	-1.310	0.192	-0.002	0.190
Education of respondent (years)	0.139	0.043	3.240	0.001***	0.018	0.001
Household size (number)	-0.018	0.080	-0.220	0.825	-0.002	0.825
Existence of children household member (Dummy)	0.738	0.282	2.620	0.009***	0.094	0.008
Existence of elder household member (number)	0.592	0.291	2.030	0.042**	0.076	0.040
Household monthly income (million MMK)	0.045	0.017	2.730	0.006***	0.006	0.005
Knowledge score	0.060	0.035	1.720	0.086*	0.008	0.084
Habitual health related behaviour score	0.219	0.070	3.120	0.002***	0.028	0.001
Constant	-5.096	0.948	-5.370	0.000		

Number of observations = 481   Pseudo R2 =0.149
LR chi2 (13) = 68.06   Log likelihood = -194.848
Prob>Chi2 = 0.000

Note: ***, **, * denotes significance at 1%, 5% and 10%, respectively

Conclusion

The adoption of healthy rice in Myanmar remains limited. The level of education of respondents and the presence of vulnerable household members significantly influence healthy rice consumption. Income emerges as a crucial factor determining the consumption of healthy rice, with accessibility skewed towards wealthier households. Currently, the prices of healthy rice variants such as rice berry rice and basmati rice are nearly double that of normal high-quality rice, while Konjac rice is considerably more expensive. Even brown rice and fortified rice, though beneficial, come at a moderately higher cost than normal medium-quality rice.

Nutritional knowledge exhibits a significant positive correlation with consumption, with a majority of individuals falling within the moderate knowledge range or below. However, other factors, notably income, play a mediating role in the relationship between knowledge and consumption. For the medium-income group, knowledge significantly influences consumption as they possess some affordability, and their decision-making is more influenced by knowledge. Conversely, for low-income groups, despite having knowledge, affordability becomes a limiting factor. Therefore, targeted nutritional programs should prioritize the medium-income group with vulnerable households to achieve effectiveness.

Examining the reasons for discontinuing the consumption of healthy rice reveals that even some healthy rice consumers are unaware of its benefits. Therefore, nutrition education programs should address this gap in awareness. Additionally, habitual health-related behaviours show a strong correlation with consumption. Individuals with good health behaviours are more likely to be aware of the benefits of consuming healthy rice, making them regular consumers. To promote healthier behaviours, it is essential to provide facilities and create environments conducive to exercise and physical activities, given the current limited access in Myanmar.

Acknowledgement

Ethical approval and consent to participate

Ethical approval was given by Kasetsart University Research Ethics Committee, Thailand (Serial number COA66/042).

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