Prevailing Food Intake, Physical Activity and Health Beliefs in a Rural Agricultural Community in the Philippines: Factors to Consider Prior to a Diabetes Prevention Program

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Abstract

Objective. A diabetes prevention program is being proposed in the rural agricultural town of San Juan, Batangas, Philippines. This study aims to determine the prevailing level of food intake, physical activity, and health beliefs prior to any intervention.

Methodology. Adults were recruited via random sampling with proportional allocation. Interviews were done to determine food intake and physical activity. Small group discussions were held to determine prevailing health beliefs.

Results. The average energy intake (1,547 kcal/d) is only 72% of the recommended values for Filipinos. Only 12% of the respondents achieved the recommended energy intake. Carbohydrates comprise a large part (71%) of calorie intake. A majority (91%) already have moderate to high levels of physical activity. There are prevailing health beliefs that need to be considered when dietary modifications and physical activity interventions are to be done.

Conclusion. Internationally recommended diabetes prevention interventions such as reducing calorie intake and increasing physical activity may not be directly applicable here. We recommend that the features of a diabetes prevention program for this locale must include the following: 1) introduction of affordable plant sources of proteins; 2) decreasing the proportion of rice as a source of carbohydrates in the diet; 3) maintaining the level of physical activity; and 4) being sensitive to the prevailing health beliefs.

Key words: beliefs, diabetes prevention, diet, lifestyle, prediabetes, rural community

CASE

In the Philippines, the national prevalence of diabetes has increased from 4.6% in 2003 to 6.0% in 2008.[1,2] Given that the treatment of diabetes mellitus carries a high financial burden, interventions that will prevent its development are valuable in resource-poor communities and would have significant public health effects.

A large, multiphase study on diabetes is being conducted in San Juan, Batangas, Philippines. Phase I dealt with determining the knowledge, attitudes, and practices of patients with diabetes. It was found that the mean score on knowledge was just 43% reflecting a gap in diabetes knowledge and only 1% believed that it is a serious disease.[3] Diabetes, pre-diabetes, and metabolic syndrome were then identified to be important public health concerns during Phase II.[4] Prevailing socio-economic realities led to volunteer bias and an overestimation of the prevalence values, which demonstrated how socio-economic realities influence the conduct of scientific studies in the rural community. In Phase III, a diabetes self-management education program was implemented which resulted in lower levels of hemoglobin A1C (HbA1c) and a larger proportion of participants achieved HbA1c <7% among those who received the intervention.[5] In addition, there was a change in health behavior, as there were more diabetics in the intervention group who now perform regular foot examinations.

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The next phase is the implementation of a locally acceptable diabetes prevention program in the same community. The American Diabetes Association Standards of Medical Care states that lowering calorie intake and increasing physical activity help in diabetes prevention.[6] However, to come up with an effective diabetes prevention program, it is paramount to determine the level of food intake and physical activity prevailing in the community and if the recommendations of a foreign organization are applicable to our local setting.

OBJECTIVES

1. To determine the prevailing level of food intake of the adult population in San Juan, Batangas;
2. To determine the prevailing level of physical activity of the adult population in San Juan, Batangas;
3. To determine the prevailing health beliefs associated with food intake and physical activity among the adult population in San Juan, Batangas.

METHODOLOGY

Study design

Cross-sectional study

Study site

The study site is the municipality of San Juan, Batangas in the Philippines. It is an agricultural coastal town which is 120 kilometers away from the country's capital, Manila. This is the chosen site as there is already an existing partnership between the municipal government of San Juan and the University of the Philippines Manila.

Based on the then National Statistics Office (now Philippine Statistics Authority) Census of Population and Housing of 2010, San Juan had a total population of 94,232. It had an adult (20 years and above) population of 38,187, of which 23,498 (61.5%) were 20-39 years old, 10,964 (28.7%) were 40-59 years old, and 3,725 (9.7%) were 60 years old and above. There were 19,312 (50.6%) adult males and 18,875 (49.4%) adult females.[7]

The town is composed of 43 villages (barangays) divided into 12 geographical clusters. Table 1 shows the population per village cluster and its proportion to the total population.

Participants

In 2013, the authors recruited the participants of this study via stratified random sampling of community residents. The strata for sampling were the village (barangay) cluster, age, and sex. There were 12 clusters and one village (barangay) was chosen per cluster. A proportionate number of participants were taken from each stratum. Hence, villages with larger populations were represented by a larger number of participants.

The following formula was used for the computation of sample size:

$$n = \frac{N}{(1 + Ne^2)} \; ;$$

where adult population size (N) = 38,187; margin of error (e) = 0.10

Based on this formula, the minimum sample size is 99.7, rounded off to 100 participants. To allow for a 20% drop out rate, we planned to recruit 120 participants.

Ethical considerations

The research design and objectives of this study were first communicated to the local health authorities. Written informed consent from all participants was secured. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional guidelines of the Research Implementation and Development Office (RIDO) of the College of Medicine and Research Ethics Board of the University of the Philippines Manila (UPMREB) [Study Code: GCS-IM-2010-001 (R-001TE)].

Table 1. San Juan, Batangas village (barangay) clusters and population

Cluster	Villages (Barangays)	Cluster Population	Proportion of the Town's Population
1	Poblacion, Maraykit, **Calicanto**, Janao-janao, Sico 1.0, Sico 2.0, Palahanan 1.0, Palahanan 2.0	16,928	18.51%
2	Pinagbayanan, Poctol, **Balagbag**, Catmon	6,713	7.34%
3	**Tipaz**, Calit-calit, Lipahan, Paling-owak	10,698	11.70%
4	Escribano, **Libato**, Muzon	7,873	8.61%
5	**Talahiban 1.0**, Talahiban 2.0, Mabalanoy	6,710	7.34%
6	Buhaynasapa, Ticalan, **Sampiro**, Sapangan	10,482	11.46%
7	Abung, **Subukin**, Calubcub 1.0, Calubcub 2.0	8,153	8.92%
8	**Putingbuhabngin**, Pulanbato, Quipot	7,251	7.93%
9	Nagsaulay, **Bataan**, Coloconto	4,225	4.62%
10	**Imelda**, Barualte	2,213	2.42%
11	**Laiya Ibabao**, Bulsa	5,185	5.67%
12	Laiya Aplaya, **Hugom**	4,999	5.47%
Total		91,430	100.00%

Note: Highlighted and underlined villages were the selected villages from where participants were recruited.

Data collection and analyses

Information on dietary intake was obtained through a 2-day 24-hour food recall, wherein participants were visited twice and asked about the food items and beverages they consumed for the said duration. The equivalent calorie and macronutrient content were then determined using the Food Composition Tables of the Philippine - Food and Nutrition Research Institute (FNRI).[8] Results of the dietary intake survey were then compared to the recommended intake as stated in the Recommended Energy and Nutrient Intakes (RENI) of FNRI.[9] The conduct of the 24-hour food recall was performed by endocrinologists and three registered nutritionist-dietitians in our team, while the determination of equivalent calorie and macronutrient content of the data collected from the food recall was done by three registered nutritionist-dieticians in the team.

Physical activity was assessed by making participants recall the duration and type of physical activity they performed in the past 7 days. The International Physical Activity Questionnaire,[10] an instrument designed for population surveillance of physical activity among adults, was administered. The amount of physical activity can be computed by weighing each type of activity by its energy requirements defined as metabolic equivalents (METs).[11] The average energy consumption as a continuous variable was estimated in MET-minutes per week. The level of physical activity was also expressed as categorical variables and classified into three categories: low (<600 MET-min/wk), moderate (600-3000 MET-min/wk) and high (>3,000 MET-min/wk).

All recruited community residents participated in small group discussions held in their respective village health centers. The number of participants in a group ranged from 6 to 21 participants. Discussions were conducted in the Filipino language. These were facilitated by an endocrinologist assisted by a community organizer who was more familiar with the local dialect. An open-ended question was asked to start the discussion: *Here in your village, do you have any specific beliefs regarding food intake, such as what food items should be consumed, and which should not be consumed for whatever reason?*

A similar question was asked when the discussion moved to physical activity. Participants were reminded that there are no wrong answers. Responses were then listed. If the belief was mentioned by at least one participant, it was included in the list of gathered health beliefs. The responses were then arranged according to similar themes.

Statistical analysis

Continuous variables were presented as mean or median with standard deviation and interquartile ranges. Categorical variables were presented as percentages.

To determine whether the variables follow a normal distribution, the Kolmogorov-Smirnov test for normality was performed. A p-value greater than 0.05 indicates that there is no sufficient evidence to say that the normality assumption is violated.

To determine any significant differences between males and females (two groups being compared), an independent samples t-test was performed for variables with a normal distribution. Student's independent samples t-test was done if the variables had equal variances. Welch's independent samples t-test was done if the variables had unequal variances. Levene's test, which determines whether variances are equal, was done to determine which of the two – Student's or Welch's independent samples t-test – is appropriate to perform. For variables that do not have a normal distribution, Mann-Whitney's test was performed instead.

To determine any significant differences between the age groups 20-39, 40-59, and 60+ y/o age groups (more than two groups being compared), a one-way analysis of variance (ANOVA) was performed for variables with a normal distribution. To check for normality, we used the Kolmogorov-Smirnov test. To determine if variances are equal, Levene's test was done. If normally distributed and with equal variances, Fisher's one-way ANOVA (with Tukey's as a post hoc test) was used. If normally distributed and with unequal variances, Welch's one-way ANOVA (with Games-Howell as a post hoc test) was used. If not normally distributed, the Kruskal-Wallis test was done regardless if the variances are equal or not (with the Dwass-Steel-Crutchlow-Fligner pairwise comparison test as post hoc test).

Computations were performed using Jamovi Version 2.3. (The jamovi project (2022). *jamovi*. (Version 2.3) [Computer Software]. Retrieved from https://www. jamovi.org. Jamovi is based on R. R Core Team (2021). *R: A Language and environment for statistical computing*. (Version 4.1) [Computer software]. Retrieved from https:// cran.r-project.org. (R packages retrieved from MRAN snapshot 2022-01-01).

RESULTS

A total of 139 adults (70 males and 69 females) were recruited for this study, more than the required minimum sample size of 100. The overall mean age was 42 years, with the youngest at age 21 and the oldest at age 79. Fifty-one percent (51%) are in the 20- to 39-year-old age group, 31% in the 40- to 59-year-old age group, and 18% in the 60-year-old and above age group. The mean body mass index (BMI) is 22.68 kg/m^2 (mean weight = 57.49 kg; mean height = 1.59 m).

Participants were recruited from 12 villages (barangay) clusters, with the number recruited per village being in proportion to the cluster's population (Table 2).

Table 3 shows the mean food intake expressed as total calories and grams of macronutrients. Likewise, calorie intake expressed as a proportion of the RENI is stated, and the proportion of participants achieving their corresponding RENI. Overall, the mean energy intake is only 1,547 kcal/d. Carbohydrates comprised 71% of the total energy intake, while proteins and fats accounted for 14% and 13%, respectively. The mean energy intake is only 72% of RENI and only 12% of the participants achieved recommended energy intake levels.

As presented in Figure 1 and Table 3, males had a higher energy intake (1,741 vs. 1,351 kcal/d, p <0.001), higher carbohydrate intake (305 vs. 241 g/d, p <0.001), and higher protein intake (64 vs 46 g/d, p = 0.001) compared with females. Fat intake and energy intake as % of RENI were similar for males and females. Comparing age groups, the 20-39-year-old age group recorded a higher energy intake than the 60-year-old and above age group (1,664 vs. 1,308 kcal/d, p = 0.005).

The physical activity of the study population in mean metabolic equivalents is presented in Figure 2 and Table 4. The mean level of physical activity is 4,829 MET-min/wk, which corresponds to a high level of physical activity. The median is 2,844 MET-min/wk. High (>3,000 MET/min/wk), moderate (600-3,000 MET-min/wk), and low (<600 MET-min/wk) levels of physical activity were reported by 47%, 44%, and 9% of participants, respectively. Males had a higher level of physical activity than females (6,557 vs. 3,076 MET-min/wk, p = 0.003). There are no differences in the level of physical activity across the various age groups (Figure 2).

With regards to the beliefs on food intake, the responses were categorized into the following themes: (a) food and their nutritional value; (b) food and specific medical

Table 2. Proportional allocation of recruited participants stratified according to sex, age, and village (barangay) cluster

Cluster and Barangay	20-39 years old		40-59 years old		60 years old and above		Total	Proportion
	Male	Female	Male	Female	Male	Female		
1 - Calicanto	6	6	3	3	2	1	21	15.11%
2 - Balagbag	3	3	2	2	1	1	12	8.63%
3 - Tipaz	4	4	2	2	1	1	14	10.07%
4 - Libato	3	3	2	2	1	1	12	8.63%
5 - Talahiban 1.0	3	3	2	2	1	1	12	8.63%
6 - Sampiro	4	4	2	2	1	1	14	10.07%
7 - Subukin	3	3	2	2	1	1	12	8.63%
8 - Putingbuhangin	3	3	2	2	1	1	12	8.63%
9 - Bataan	2	2	1	1	1	1	8	5.76%
10 - Imelda	1	1	1	1	1	1	6	4.32%
11 - Laiya Ibabao	2	2	1	1	1	1	8	5.76%
12 - Hugom	2	2	1	1	1	1	8	5.76%
							139	100.00%
Total for the age group	72		42		25			
Proportion	51.80%		30.22%		17.99%			

Table 3. Nutritional data from food intake of adult residents in the rural community of San Juan, Batangas

Category	N	Carbohydrates (g) Mean (SD), % of total calories	Protein (g), Mean (SD), % of total calories	Fats (g), Mean (SD), % of total calories	Energy (kcal), Mean (SD)	% of RENI, Mean (SD)	Partcipants above RENI, n (%)
Overall	139	273 (93), 71%	55 (36), 14%	23 (18), 13%	1547, (558)	72%, (25)	16 (12%)
Sex							
Males	70	305 (105), 70%	64 (46), 15%	24 (22), 12%	1,741 (649)	69% (25)	7 (10%)
Females	69	241 (65), 71%	46 (20), 14%	23 (13), 15%	1,351 (358)	76% (25)	9 (13%)
p (males vs females)		**<0.001***	**0.001***	0.312	**<0.001***	0.072	
Statistical test performed		Welch's independent t-test	Mann-Whitney test	Mann-Whitney test	Welch's independent t-test	Student's independent t-test	
Age group (y/o)							
20-39	71	291 (99), 70%	55 (24), 13%	26 (20), 14%	1,661 (630)	72% (27)	9 (13%)
40-59	43	259 (84), 69%	60 (56), 16%	23 (18), 14%	1,493 (461)	68% (22)	2 (5%)
60+	25	247 (82), 76%	45 (18), 14%	15 (10), 10%	1,308 (399)	81% (26)	5 (20%)
p (20-39 vs 40-59 vs 60+y/o)		0.057	0.15	**0.029***	**0.007***	0.133	
Statistical test performed		Fisher's one-way ANOVA	Kruskall-Wallis test	Kruskall-Wallis test	Welch's one-way ANOVA	Fisher's one-way ANOVA	
p (20-39 vs 40-59 y/o)		N/A	N/A	0.59	0.221	N/A	
P (20-39 vs 60+ y/o)		N/A	N/A	**0.023***	**0.005***	N/A	
p (40-59 vs 60+ y/o)		N/A	N/A	0.192	0.199	N/A	
Post hoc statistical test performed		N/A	N/A	Dwass-Steel-Crutchlow-Fligner pairwise comparison	Games-Howell test	N/A	

*p <0.05, statistically significant

conditions; (c) food intake among pregnant women; (d) food intake among women who have just given birth; (e) food intake during the wake of a deceased relative; and (f) food intake on special occasions. These beliefs are arranged and categorized in Table 5, whether they agree or not with the generally accepted health recommendations.

Health beliefs on physical activity and exercise (Table 6) were categorized into (a) health benefits of exercise; (b) physical activity during the Lenten Season; (c) physical activity among women; and (d) physical activity during the wake of a deceased relative; and (e) exercise and work.

DISCUSSION

Elements of diabetes intervention programs include a reduction in calorie intake and an increase in the level of physical activity.[6] The results of this study show that the calorie equivalent of the average food intake in this community is suboptimal. This suggests that decreasing the total calorie intake is an inappropriate intervention since it could worsen malnutrition.

Carbohydrates contribute a large part of the calorie intake, larger than the usual 50%-60% that is generally recommended. This is not surprising since locally available carbohydrate-rich food, mainly rice, is the affordable one. Participants find meat and fruits expensive; hence, these do not form part of their usual diet. The ideal intervention to be conducted should focus on not lowering the total calorie intake but decreasing the proportion of carbohydrates and increasing that of proteins. If meat is not affordable, consumption of eggs and plant-derived proteins such as beans and tofu can be emphasized as alternatives.
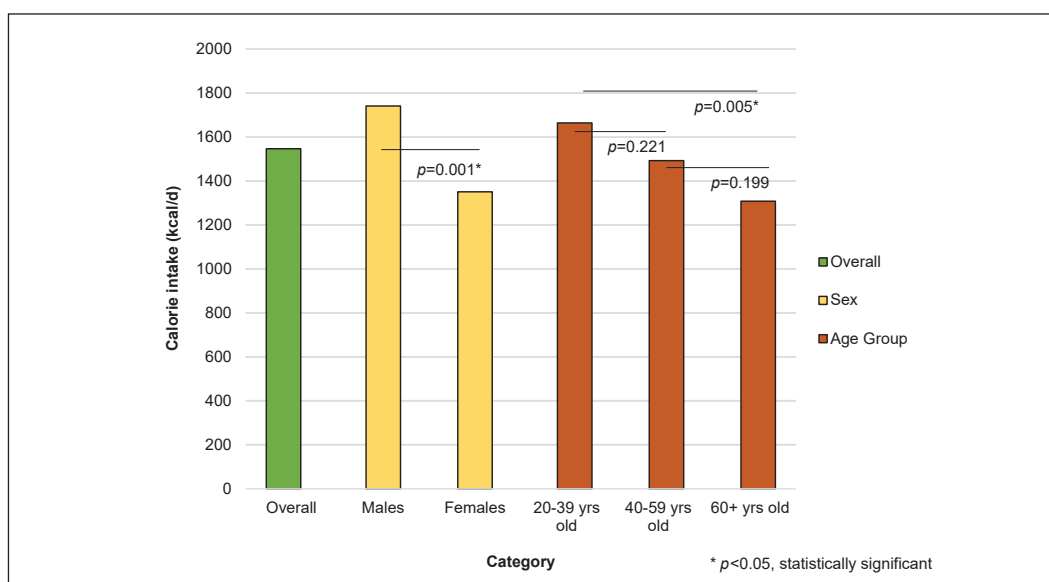
Figure 1. Calorie equivalent of average daily food intake of adult residents in the rural community of San Juan, Batangas.
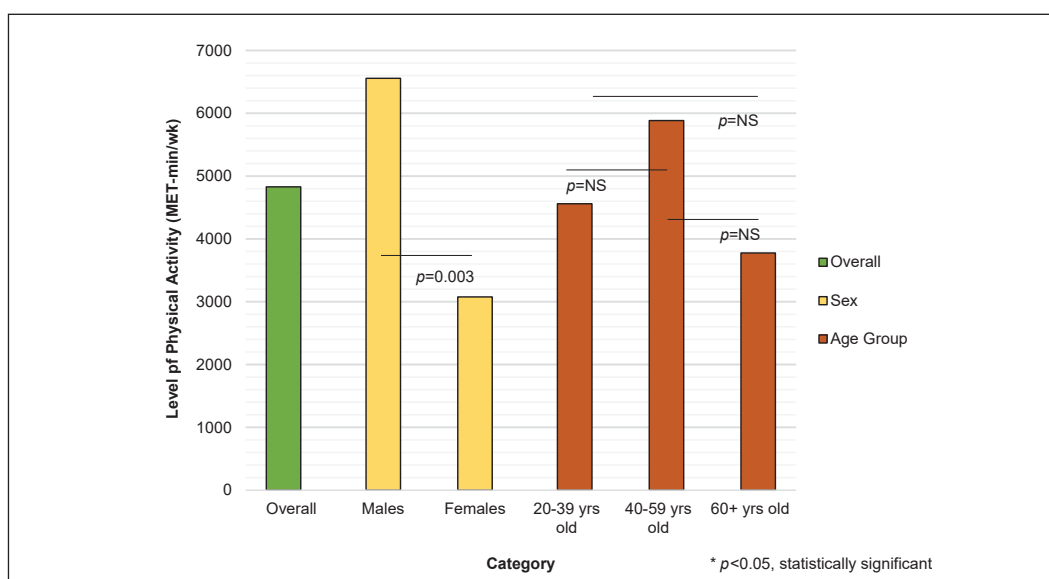
Figure 2. Level of physical activity of adult residents in the rural community of San Juan, Batangas.

Table 4. Level of physical activity of adult residents in the rural community of San Juan, Batangas

Category	N	Mean Level of Physical Activity (MET-min/wk)	Number (%) of participants within a category of the Level of Physical Activity		
			High (>3,000 MET-min/wk)	Moderate (600-3,000 MET-min/wk)	Low (<600 MET-min/wk)
Overall	139	4,829	65 (47%)	61 (44%)	13 (9%)
Sex					
Males	70	6,557	43 (61%)	22 (31%)	5 (7%)
Females	69	3,076	22 (32%)	39 (57%)	8 (12%)
p value (males vs females)		**0.003***			
Statistical test performed		Mann-Whitney test			
Age group (y/o)					
20-39	71	4,560	32 (45%)	32 (45%)	7 (10%)
40-59	43	5,885	21 (49%)	20 (47%)	2 (5%)
60+	25	3,776	12 (48%)	9 (36%)	4 (16%)
p (20-39 vs 40-59 vs 60+ y/o)		0.545			
Statistical test performed		Kruskall-Wallis test			

*p <0.05, statistically significant

Men had a higher energy intake than women. This is understandable since men engage in more laborious activities. This is corroborated by our finding that men do engage in a higher level of physical activity than women. Energy intake was likewise higher in the 20-39-year-old age group compared to those aged 60 years and above since the younger age group belongs to the labor force. Almost half (47%) have a high level while an almost similar number (44%) have a moderate level of physical activity. It can be inferred that the locale already has a physically active population. Improvement in physical activity is no longer needed but should just be maintained.

Part of a healthy diet is the consumption of fruits and vegetables. However, probing into their health beliefs (Table 5), it has been shown that there are social situations wherein consumption of vegetables is not acceptable. For example, pregnant women are advised not to eat eggplant to prevent their baby from getting dark-skinned. Also, when the family is observing a wake in honor of a deceased relative, they believe that eating vegetables from plants that crawl such as vines (i.e., chayote, gourd, squash, bitter gourd), shed leaves and blossoms (i.e., banana and horseradish "malunggay", or exude sap (i.e., papaya, okra, chayote, star apple) bring bad luck to the family.

It can also be seen in their beliefs (Table 5) that consumption of carbohydrate-rich foods is encouraged depending on the social context. Sticky rice cakes are encouraged to be partaken of during local festivities and All Souls' Day. Likewise, rice cakes are given by a newly wedded couple to their principal sponsors since they expect to be given money in return. Also, married couples are encouraged to eat sticky rice and noodles, so they stick together and have a long-married life. This habit of eating rice cakes is a potential obstacle if limiting carbohydrate intake is needed for diabetes prevention.

There are also health beliefs that discourage physical activity in certain situations (Table 6). It is believed that women should not engage in strenuous activity during their menstrual period. Also, physical activities are frowned upon during religious events such as during Holy Week.

These social norms should be taken into consideration when recommending increasing vegetable consumption, lowering carbohydrate intake, and increasing physical activity. Implementers of health programs must be sensitive to these local health beliefs.

We recommend that the features of a diabetes prevention program for this particular locale must include the following: 1) introduction of affordable plant sources of proteins; 2) decrease the proportion of rice as a source of carbohydrates in the diet; 3) maintain the level of physical activity; and 4) being sensitive to the prevailing health beliefs.

The strength of this study is the random selection of participants using proportional allocation. The data gathered could be considered truly representative of the adult residents of this town. Determination of prevailing food intake and level of physical activity before the implementation of any health intervention shows that recommendations from other countries may not always be applicable in local settings. Additionally, knowing the prevailing health beliefs before the implementation of any health program is an expression of respect toward the locale's social norms. To have a successful program, any health intervention must not contradict prevailing beliefs.

Making use of food recall and physical activity questionnaires may be a limitation of this study since the actual food intake and level of physical activity were not measured. However, it can be argued that the use of questionnaires is considered acceptable in public health settings. The IPAQ is valid and reliable in various geographic settings.[11] The performance of more accurate methods like food measurements in their homes might be intrusive. Likewise, actometers may be accurate tools for measuring physical activity but they are too costly.

CONCLUSION

The average calorie intake in this rural agricultural town is suboptimal. The energy intake is only 72% of the recommended value for Filipinos. Only 12% of the respondents achieve the recommended energy intake.

Table 5. Health beliefs of adult residents regarding food intake

In Agreement with Generally Accepted Health Recommendations	Not in Agreement with Generally Accepted Health Recommendations
Food and their nutritional value	
1. Vegetables are nutritious. 2. Fish is rich in protein. 3. Meat is high in cholesterol. 4. Fish and vegetables are healthy to eat. 5. We should eat vegetables as these are both delicious and nutritious.	
Food and specific medical conditions	
1. Pork is bad for people with high blood pressure. 2. Persons with diabetes should limit their food intake. 3. Soft drink consumption can cause diabetes. 4. Excessive rice intake can cause diabetes. 5. Sweet foods are bad for people with diabetes. 6. Bitter gourd (locally known as ampalaya, *(Momordica charantia)* is good for people with diabetes. 7. Beans are bad for people with painful joints. 8. Pork and fatty foods are bad for the elderly.	1. Salty junk foods can cause urinary tract infections
Food intake among pregnant women	
1. Drinking milk is good for pregnant women. 2. Salty foods such as salted shrimp paste ("bagoong") are bad for pregnant women.	1. Pregnant women should not eat eggplant to avoid their baby from being dark-skinned. 2. While pregnant and after giving birth, women should not eat fish with red meat to avoid having postpartum bleeding. 3. Eat the "makabuhay" plant *(Tinospora rumphii)* as a means of birth control to avoid getting pregnant.
Food intake among women who have just given birth	
1. Deer meat is good for these women so they can regain their strength faster. 2. Mushrooms are good for these women so they will not experience "binat" (loosely translated as "relapse"). 3. "Malunggay" (horse radish, *Moringa oleifera*) is good for enhancing breastmilk production. 4. Postpartum mothers should take a bath using water in which sour leaves (i.e. tamarind *Tamarindus indica*, locally known as "sampalok") have been boiled. 5. For postpartum mothers, it is good to eat banana heart before taking their first bath to avoid the uterus from prolapsing. 6. Eating seafood is healthy for postpartum mothers.	1. Carabao meat should be avoided so as not to experience "binat" (loosely translated as "relapse.")
Food intake during the wake of a deceased relative	
1. Fish should be eaten when there is a deceased family member. 2. Avoid sticky foods such as rice cakes when there is a deceased family member.	1. Do not eat vegetables that grow on crawling vines such as squash, chayote or gourd to avoid death from crawling or spreading in the family. 2. Do not eat vegetables that shed, like banana heart blossoms and "malunggay" leaves, to avoid another death in the family. 3. Avoid vegetables that come from plants which exude much sap such as papaya, okra or star apple lest the family members will not stop crying.
Food and special occasions	
1. People who have their foreheads applied with ash during Ash Wednesday should not eat food that has been prepared with blood ("dinuguan" or pork blood stew.).	1. During All Souls' Day, partake of sticky rice cakes. 2. Newlyweds are encouraged to give sticky rice cakes to their wedding sponsors since it is expected that they will be given money in return. 3. The bride and groom should eat cake and noodles so their life together would be sweet and long. 4. Sticky rice cakes should be partaken of during feasts.

Table 6. Health beliefs of adult residents regarding physical activity.

In Agreement with Generally Accepted Health Recommendations	Not in Agreement with Generally Accepted Health Recommendations
Health benefits of exercise	
1. Exercise is good to strengthen the body and to control blood pressure. 2. It is not good if we do not sweat or perspire, thus we should exercise.	
Physical activity during the Lenten Season	
	1. Do not use a "palo-palo", a wooden implement, when doing the laundry during Holy Week. 2. It is prohibited to take a bath or to swim during Holy Week. 3. We should refrain from working during Holy Week.
Physical activity among women	
1. For women, it is alright for a married woman to engage in ballroom dancing with another man other than his husband.	1. For men, married women will be frowned when engaged in ballroom dancing with men other than their husbands. 2. Women who have just given birth should not do the laundry nor clean the house to avoid experiencing "binat" (loosely translated as "relapse"). 3. Women who currently have their menses should avoid carrying heavy objects.
Physical activity during the wake of a deceased relative	
	1. It is prohibited to sweep the floors during the wake of a deceased relative.
Exercise and work	
1. Farming and tending fields is already a form of exercise.	1. We can only exercise when we are on vacation or holiday. 2. Exercise is only for those who do not work. 3. We do not have time for exercise. Working and walking are already exercise for us.

Carbohydrates comprise a large part (71%) of the calorie intake. A large majority (91%) already have moderate to high levels of physical activity. There are prevailing health beliefs that need to be considered when dietary modifications and physical activity interventions are to be done.

Internationally recommended diabetes prevention interventions such as reducing calorie intake and increasing physical activity may not be directly applicable in the studied rural agricultural community. We recommend that the features of a diabetes prevention program for this particular locale must include the following: 1) introduction of affordable plant sources of proteins; 2) decrease the proportion of rice as a source of carbohydrates in the diet; 3) maintain the level of physical activity; and 4) being sensitive to the prevailing health beliefs.

Statement of Authorship
All authors certified fulfillment of ICJME authorship criteria.

CRediT Author Statement
MAS: Conceptualization, Methodology, Formal analysis, Investigation, Resources, Writing – original draft preparation, Writing – review and editing, Visualization, Project administration; **EPP:** Conceptualization, Methodology, Resources, Writing – review and editing, Supervision, Project administration; Funding acquisition; **EC:** Investigation, Writing – review and editing; **PP:** Investigation, Writing – review and editing; **MTCC:** Investigation, Writing – review and editing; **FLLA:** Conceptualization, Methodology, Writing – review and editing, Supervision; **EP:** Conceptualization, Methodology, Writing – review and editing, Supervision; **NJ:** Conceptualization, Methodology, Writing – review and editing, Supervision; **CJ:** Conceptualization, Methodology, Writing – review and editing, Supervision

Author Disclosure
Dr. Pacheco is the Editor-in-Chief of JAFES. Dr. Jimeno is the Vice Editor-in-Chief of JAFES.

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