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Assessment of the knowledge, attitude and practice on Paracetamol - food interaction among selected adults in selected provinces in the Philippines

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Abstract

The rising availability of Paracetamol to the public raises the concern of consumers experiencing drug-food interactions, due to their lack of knowledge in the area. This study aims to assess the knowledge, attitude and practice on Paracetamol - food interaction among selected adults in the Philippines, as these drug-food interactions may unknowingly lessen or increase the drug's effect. A quantitative cross-sectional survey was conducted, utilizing a convenience sampling on 384 Filipinos who have taken Paracetamol. A validated online questionnaire was used to gather data with regards to the respondents' socio-demographic characteristics and their knowledge, attitude and practices, that will measure that extent of their awareness on Paracetamol - food interaction. Mean, frequencies, Chi-square test, Spearman's rho and Kendall's tau-b were the statistical treatments and methods used in the study. The respondents showed Poor Knowledge, Neutral Attitude and Moderate Practices regarding Paracetamol - food interaction. The results of Chi-square test indicate that out of all the socio-demographic variables, only the Sex (p-value = 0.027) and Employment status (p-value = 0.006) showed a significant association with the respondents' Knowledge. On the other hand, the Attitude and Practices showed no significant association with the five socio-demographic variables. Thus, a heedful understanding on the significance of Paracetamol - food interaction is a must, where the role of pharmacists in terms of patient counseling should be highlighted.

Keywords: Paracetamol; Knowledge; Attitude; Practice; Food interaction; Adults

1. Introduction

Paracetamol, also known as Acetaminophen is an over-the-counter (OTC) analgesic and antipyretic medication used to ease pain and lower fever. Paracetamol exists in different dosage forms like tablets, capsules, solution, suspension, suppository, and parenteral injectables. Oral medicine, especially those that are in tablet form, should undergo liberation from its dosage form, absorption into the bloodstream, distribution to its target tissues or organs to exert its intended effect, metabolism, which occurs primarily in the liver, transforming the medicine into either its inactive or active form, excretion in the form of urine or feces inside the case of some medicine, or reabsorbed into the bloodstream if the medicine is still in its adipose form if the medicine is still in its active form.

As per the data collected about the best-selling OTC drug in 2021, Paracetamol, under the brand of Biogesic, tops the list [1]. The accessibility of Paracetamol empowers the public to manage self-limiting conditions and treat their illnesses without the need of consulting a healthcare professional. The absence of knowledge on the proper usage of such drugs

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can increase the occurrence of different adverse drug events, one of which is drug-food interaction. As much as drug-food interactions are of equal importance compared to drug-drug interactions, it is often neglected and undervalued by the majority due to unawareness about it.

Patients, along with health-care professionals, must be aware of the complexities of food-drug interactions (FDIs). In order to reduce the health hazards connected with food and drug interactions, the amount of information available must be increased, therefore it is vital that the general public is informed. By comprehending current knowledge and using it to enhance awareness of such interactions, people can be aided in selecting appropriate food choices while taking a given drug [2]. This study therefore aims to assess the knowledge, attitude, and practices of selected Filipino citizens who use Paracetamol.

2. Material and methods

A descriptive-correlational study design was utilized in this study. Using the Cochran formula, with the total population of 56,919,400 young and middle-aged adults, the computed sample size was 384 respondents wherein convenience sampling was utilized in selecting the respondents of the study. The respondents of the study are selected Filipino adult citizens, ages ranging from 20 to 59 years old, who take and use Paracetamol. To determine the scale or test item's dependability, Cronbach's Alpha was used. The reliability of the survey questionnaire was validated by conducting a pretest to 51 respondents prior to conducting a full-scale survey to the actual respondents. Three professionals from CEU-Manila have also ensured the validity of the questionnaire.

The research instrument utilized in this study was in the form of an online survey questionnaire through Google Forms. Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 25. The respondents were given enclosed choices in the questionnaire; there are no open-ended questions, therefore the data is measured. The prepared questionnaire was greatly influenced by previously conducted studies done by Abualhamail et al., and Elbur et al., [3,4] about the assessment of Knowledge, Attitude and Practice of adults in food interaction and proper use of medication use and safety, respectively. The online survey questionnaire consisted of four sections based on the research objectives. The respondents' extent of knowledge, attitude, and practice scale were influenced by a recent study conducted by Sultan et al. (2021) [5]. The first section comprises the respondent's socio-demographic profile, while sections two, three and four measured the knowledge, attitude and practices of the respondents regarding Paracetamol - food interactions respectively. The total scores of the respondents for the knowledge, attitude, and practice sections were each calculated and converted into percentages and means which are classified as follows: Poor knowledge (<50%), moderate knowledge (50%-74%) and good knowledge (75%<). Negative attitude ($\bar{x}$ = 1.00-1.49), neutral attitude ($\bar{x}$ = 1.50-2.24), and positive attitude ($\bar{x}$ = 2.25-3.00). Poor Practice ($\bar{x}$ = 1.00-2.49), moderate practice ($\bar{x}$ = 2.50-3.74), and good practice ($\bar{x}$ =3.75-5.00).

Descriptive statistics and mean were used to assess the research variables and chi-square test was utilized in this study. The mean represents the average value of a given group of data. Furthermore, the researchers used chi-square to test the relationship and determine whether two categorical variables are associated in some manner, while Spearman's rho and Kendall's tau-b was used for the non-parametric counterpart to correlate the socio-demographic profile of respondents as well as their knowledge, attitude, and practice on food-drug interactions among respondents.

3. Results and discussion

3.1. Socio-demographic Profile of the Respondents

The socio-demographic profile was used to put respondents into distinct groups, providing information about the research participants and establishing whether the study participants are a representative sample of the target population for generalization purposes. The socio-demographic profile also established an association between the respondents and the study's objectives. A total of 384 Filipino adult citizens who take Paracetamol were chosen using convenience sampling to participate in this study.

Table 1 shows that from the 384 respondents, the majority are female respondents (64.80%) between 20 to 30 years old (72.10%), most of which are college graduates (64.20%), unemployed (58.30%) and residing in Luzon (57.60%).

Table 1 Distribution of Respondents Based on their Socio-Demographic Profile

Demographic Variable	Parameter	n	Percentage (%)
Sex	Female	249	64.8
	Male	135	35.2
Age	20-30	277	72.1
	31-40	44	11.5
	41-50	41	10.7
	51-59	22	5.7
Highest Level of Educational Attainment	Elementary	0	0
	High School	56	14.6
	Vocational	2	0.5
	College	262	68.2
	Post-Baccalaureate	64	16.7
Employment Status	Self-Employed	13	3.4
	Employed	147	38.3
	Unemployed	224	58.3
Current Place of Residence	Luzon	221	57.6
	Visayas	80	20.8
	Mindanao	83	21.6

3.2. Respondents' Extent of Awareness on Drug-Food Interaction when taking Paracetamol

The Knowledge, Attitude and Practices (KAP) of the respondents serves as a representative of a target population; it aims to elicit what is known (knowledge), believed (attitude) and done (practice) by the respondents with regards to Paracetamol - food interaction. The respondents' KAP is an indicator of their extent of awareness and understanding.

The mean score obtained under knowledge was only 4.00 out of 10.00 points, which is equivalent to 40%, thus implying that the respondents have poor knowledge. Most of the studied sample ($\bar{x}$ = 2.02) has a neutral attitude implying that they have a collective neutral attitude in terms of the interaction of Paracetamol and food. On the other hand, the practices of the respondents ($\bar{x}$ =3.50) implied that they have moderate practices despite having poor knowledge and neutral attitude in terms of Paracetamol - food interaction. Table 2, 3 and 4 shows the Respondents' Extent of Knowledge, Attitude and Practice on Paracetamol – food interaction respectively.

Table 2 Data to Determine the Respondents' Extent of Knowledge on Paracetamol - food Interaction

Sr. No.	Knowledge Statement	Frequency (f)		Correct Mean Score	Verbal Interpretation
		Correct	Incorrect		
1	Which age group of patients have greater risk of developing drug food interaction?	128	256	0.33	Poor
2	When Paracetamol is taken with alcohol, which disease will most likely occur.	168	216	0.44	Poor
3	What is the right interval for taking Paracetamol after meals?	74	310	0.19	Poor

4	When taking Paracetamol with food, how will it affect the absorption rate?	172	212	0.45	Poor
5	Food interferes with the action or effectiveness of Paracetamol.	147	237	0.38	Poor
6	At what period will Paracetamol produce its effect faster?	87	297	0.23	Poor
7	Paracetamol-food interaction can lead to severe or life-threatening event/s if not taken into consideration.	237	147	0.62	Moderate
8	There is a higher risk of a drug-food interaction in the elderly when taking Paracetamol.	227	157	0.59	Moderate
9	Which of the following foods should NOT be taken with Paracetamol?	15	369	0.04	Poor
10	Which of the following should be taken with Paracetamol?	375	9	0.98	Good
	OVERALL Total Points: 10			4.00	Poor

*Scale for Verbal Interpretation: (<50%) 0-0.49 = Poor Knowledge; (50%-74%) 0.50-0.74 = Moderate Knowledge; (≥75%) 0.75-1.00 = Good Knowledge

Table 3 Data to Determine the Respondents' Extent of Attitude on Paracetamol - food Interaction

Sr. No.	**Statement**	**Frequency (f)**			**Mean**	**Verbal Interpretation**
		3	**2**	**1**		
1	I believe that Paracetamol renders its effect faster on an empty stomach.	99	209	76	2.06	Neutral
2	I think food does not interfere with the effects of Paracetamol.	100	187	97	2.01	Neutral
3	I think that Paracetamol can be taken with food without considering its potential side effects.	105	206	73	2.08	Neutral
4	I think that Paracetamol can be taken regardless of the food you consume.	121	182	81	2.10	Neutral
5	I believe that Paracetamol can be taken regardless of the beverages you drink.	37	318	29	2.02	Neutral
6	I think the occurrence of Paracetamol-food interaction is unlikely when I consume fruits such as apples, bananas and oranges.	115	119	150	1.91	Neutral
7	I think the occurrence of Paracetamol-food interaction is unlikely when I consume vegetables such as potatoes, carrots and green beans.	137	99	148	1.97	Neutral
8	I believe that receiving patient counseling from my pharmacist about the possible drug-food interaction of Paracetamol is NOT important.	35	312	37	1.99	Neutral
	OVERALL				2.02	Neutral

*Legend for responses: 1 = Yes; 2 = Maybe; 3 = No, **Verbal Interpretation: 1.00-1.49 = Negative Attitude; 1.50-2.24 = Neutral Attitude; 2.25-3.00 = Positive Attitude

Table 4 Data to Determine the Respondents' Extent of Practice on Paracetamol - food Interaction

Sr. No.	Statement	Frequency (f)					Mean	Verbal Interpretation
		5	4	3	2	1		
1	I take over-the-counter (OTC) medicines such as Paracetamol according to my friends' and/or relatives' suggestions.	97	98	101	56	32	2.55	Moderate
2	When I have a headache, I buy over-the-counter (OTC) medicines such as Paracetamol in the community pharmacy.	139	102	71	38	34	3.71	Moderate
3	When I have a fever, I buy over-the-counter (OTC) medicines such as Paracetamol in the community pharmacy.	195	96	62	19	12	4.15	Good
4	When I feel pain, I buy over-the-counter (OTC) medicines such as Paracetamol in the community pharmacy.	106	75	104	51	48	3.36	Moderate
5	I take Paracetamol before meals.	30	41	101	69	144	2.34	Poor
6	I experience discomfort whenever I take Paracetamol before meals.	24	36	82	69	173	3.86	Good
7	I take Paracetamol after meals.	185	95	70	23	11	1.91	Poor
8	I experience discomfort whenever I take Paracetamol after meals.	14	19	63	86	202	1.85	Poor
9	I take Paracetamol before or after eating potatoes	24	27	94	86	153	3.83	Good
10	I take Paracetamol before or after eating sweet potatoes	20	31	90	82	161	3.87	Good
11	I take Paracetamol before or after eating tomatoes	18	26	94	91	155	3.88	Good
12	I take Paracetamol before or after eating carrots	19	23	106	92	144	3.83	Good
13	I take Paracetamol before or after eating apple	18	41	103	85	137	3.73	Moderate
14	I take Paracetamol before or after eating banana	27	49	107	83	118	3.56	Moderate
15	I take Paracetamol with water	324	32	15	8	5	4.72	Good
16	I take Paracetamol with juice.	19	38	92	59	176	3.87	Good
17	I take Paracetamol with alcohol.	7	10	32	46	289	4.56	Good
18	I take Paracetamol with carbonated drinks (soft drinks).	7	16	44	62	255	4.41	Good
19	When I purchase Paracetamol, I consider receiving and/or I have already received patient counseling or any advice from the pharmacist.	74	71	104	73	62	3.06	Moderate
20	I consult the Pharmacist whenever I experience any discomfort and/or side effects after taking Paracetamol.	72	61	102	67	82	2.93	Moderate
	OVERALL						3.50	Moderate

*Legend for Responses: 5 = Always; 4 = Often; 3 = Sometimes; 2 = Seldom; 1 = Never**Verbal Interpretation: 1.00-2.49 = Poor Practice; 2.50-3.74 = Moderate Practice; 3.75-5.00 = Good Practice

3.3. Association of the Respondent's Knowledge, Attitude and Practice on Paracetamol – Food Interaction and their Socio-Demographic Profile

Using the chi-square test, it revealed that only knowledge regarding the Paracetamol - food interaction has an association with the respondents' socio-demographic profile, specifically their sex and employment status, with the obtained p-values of 0.027 and 0.006, respectively which is less than the desired significant threshold (p-value < 0.05). Furthermore, no significant association was found between the socio-demographic variables and the respondents' attitudes and practices on Paracetamol - food interaction, given that they go beyond the desired significant threshold (p-value < 0.05). Table 5, 6 and 7 shows the association of the respondents' knowledge, attitude and practice on Paracetamol - Food Interaction and their socio-demographic Profile

Table 5 Association of the Respondents' Knowledge on Paracetamol - Food Interaction and Their Socio Demographic Profile

Socio-Demographic Variable	χ^2	p-value	Interpretation of association
Sex	7.204	0.027*	With significance
Age	4.996	0.554	No significance
Highest Level of Educational Attainment	9.060	0.170	No significance
Employment Status	14.465	0.006*	With significance
Current Place of Residence	6.834	0.145	No significance

*Legend: χ^2 = chi-square values; **Significant at 0.05 level (p value = <0.05)

Table 6 Association of the Respondents' Attitude on Paracetamol - Food Interaction and Their Socio Demographic Profile

Socio-Demographic Variable	χ^2	p-value	Interpretation of association
Sex	1.515	0.469	No significance
Age	7.195	0.303	No significance
Highest Level of Educational Attainment	11.514	0.074	No significance
Employment Status	8.171	0.086	No significance
Current Place of Residence	3.079	0.545	No significance

*Legend: χ^2 = chi-square values; **Significant at 0.05 level (p value = <0.05

Table 7 Association of the Respondents' Practice on Paracetamol - Food Interaction and Their Socio Demographic Profile

Socio-Demographic Variable	χ^2	p-value	Interpretation of association
Sex	0.645	0.724	No significance
Age	4.391	0.624	No significance
Highest Level of Educational Attainment	3.304	0.770	No significance
Employment Status	0.894	0.925	No significance
Current Place of Residence	1.070	0.899	No significance

*Legend: χ^2 = chi-square values; **Significant at 0.05 level (p value = <0.05

4. Discussion

The study assessed the Knowledge, Attitude, and Practices on Paracetamol - food interaction among selected adults in the Philippines. The surveyed questionnaire showed that the majority of the respondents are females. This could possibly be due to the fact that most females made use of OTC analgesics such as Paracetamol to ease the pain caused by dysmenorrhea [6]. In terms of age, Paracetamol consumption is higher among young adults, given the fact that they are at less risk compared to geriatric consumers [7]. For highest educational attainment, the data shows that the majority of the respondents are college graduates, supporting a previous study stating that college graduates and those with post-baccalaureate degrees are more likely to participate in study surveys [8]. As from the gathered data of the

employment status of the respondents, most of them are unemployed which corresponds to the statistics obtained from the Philippine Statistics Authority. And due to the limitations brought by the pandemic majority of the respondents are residing in Luzon.

The respondents' extent of knowledge on Paracetamol - food interaction showed a poor remark. Majority of the respondents still believes that Paracetamol should be taken on an empty stomach and only 3.91% (15) respondents were knowledgeable about the foods that should not be taken concomitantly with Paracetamol. The media's continuous advertisements that Paracetamol is best taken on a full stomach can possibly draw increased attention to the inaccurate time of interval taking this OTC drug. In terms of attitude, majority of the respondents obtained a mean score of 2.02 as all the statements acquired higher frequencies under the *"Maybe"* options, which means they have a collective neutral attitude in terms of the interaction of Paracetamol and food. Furthermore, despite having poor knowledge and a neutral attitude, assessing the practices of the respondents obtained an overall mean score of 3.50 which is considered to have moderate practice. Paracetamol being one of the most accessible over-the-counter drugs causes its food interactions to be frequently overlooked. Most pharmacists rarely provide counseling on how to use Paracetamol properly leading people to have a tendency to self-medicate without considering its possible effects [9].

There was a significant association in terms of the respondents' socio-demographic variables, particularly those who are female (*Sex*) and unemployed (*Employment Status*) with regards to their knowledge on Paracetamol - food interaction. Furthermore, no significant association was found between the socio-demographic variables and the respondents' attitudes and practices on Paracetamol - food interaction. This implies that those with neutral attitude and moderate practices are similar to those who had positive and negative attitudes as well as to those with poor and good practices.

5. Conclusion

The results obtained substantiated that *Sex* and *Employment Status* have significant association with the respondents' knowledge on Paracetamol - food interactions having p-values of 0.027 and 0.006 respectively, which is less than the desired significant threshold of 0.05. On the other hand, attitude and practices have no significant association with the social demographic variables.

The extent of knowledge, attitude, and practices of the respondents are "*Poor*", "*Neutral*", and "*Moderate*" respectively.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declared no conflict of interest.

Statement of ethical approval

The authors hereby confirmed that the study protocol and informed consent underwent and was approved by the Institutional Ethics Review Boards (IERB).

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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