

Factors Associated with Anxiety Symptoms among Filipino Farmers in Central Luzon: An Analytical Cross-sectional Study

Har-li T. Young,¹ Dina Marie Yalong,¹ Vinace S. Guingguing,¹ Van Irish S. Ventilacion,¹ Merimae S. Villamayor,¹ Peter Verona G. Villangca,¹ William M. Manengyao, Jr.,¹ Ma. Beatrice M. Vega,¹ Alina Marea C. Zaño¹ and Maria Teresa Sanchez-Tolosa, MD, D Clin Epi^{2,3,4}

¹Department of Preventive and Community Medicine, St. Luke's Medical Center College of Medicine – William H. Quasha Memorial

²St. Luke's Medical Center College of Medicine – William H. Quasha Memorial

³College of Medicine, University of the East Ramon Magsaysay Memorial Medical Center, Inc.

⁴Department of Clinical Epidemiology, College of Medicine, University of the Philippines Manila

ABSTRACT

Background and Objective. Filipino farmers face unique occupational challenges that increase the risk of mental health issues, particularly anxiety. This study aims to determine the different personal, environmental, socioeconomic, occupational, and psychosocial factors associated with anxiety symptoms among Filipino farmers in Central Luzon.

Methods. Chain referral sampling method was used to recruit participants for the study, who underwent screening based on the eligibility criteria. Eligible participants were then asked about anxiety symptoms using the Generalized Anxiety Disorder-7 (GAD-7), while the validated, researcher-constructed Data Collection Tool for Factors Associated with Anxiety Symptoms (DCFAAS) was used to determine the farmers' exposure to a variety of factors. Microsoft Excel was utilized in computing for frequency and percent distribution of participants, in each factor. Binary logistic regression was used to compute crude and adjusted odds ratio of each factor thru IBM SPSS Statistics®.

Results. Among the 113 eligible farmers enrolled in the study, only 19 (16.8%) experienced anxiety symptoms, with excessive worrying, which was seen among 45 participants (39.8%). The mental health of Filipino farmers was significantly affected by the presence of physical illness (OR = 10.70 [95% CI 1.367, 83.773]) and having relatives affecting work completion (OR = 6.45 [95% CI 1.346, 30.896]).

Conclusion. Despite the low prevalence of anxiety symptoms in this study, the findings suggest government policies to improve mental health service access to farmers, to integrate psychosocial support into agricultural programs, and to address family-related work pressures. By addressing these factors, it can improve farmer productivity and promote overall well-being, putting emphasis on the mental health of the Filipino farmers.

Keywords: farmers, agriculture, Philippines, Generalized Anxiety Disorder, GAD-7



Paper presentation – 44th Philippine College of Occupational Medicine Convention, March 25, 2023, Manila Hotel.

eISSN 2094-9278 (Online)
Published: October 31, 2025
<https://doi.org/10.47895/amp.vi0.11470>
Copyright: The Author(s) 2025

Corresponding author: Har-li T. Young
Department of Preventive and Community Medicine
St. Luke's Medical Center College of Medicine -
William H. Quasha Memorial
279 E. Rodriguez Sr. Ave., Quezon City 1112, Philippines
Email: young.ht.s@slmc-cm.edu.ph
ORCID: <https://orcid.org/0000-0002-5873-4336>

INTRODUCTION

The agricultural sector is one of the most important contributors to the Philippine economy as it is a critical source of employment in the country. As of 2019, 9.72 million out of 44.69 million (21.75%) of the total labor force of the Philippines are part of the agricultural sector.¹ However, the nature of agricultural work is associated with an increased risk

of mental health problems. Common problems encountered by Filipino farmers are rotting crops, surplus of harvests that are unsold, and climate issues in the Philippines which brings destruction to the crops.²⁻⁴

The farmers, in consideration of their demographics, may experience anxiety symptoms due to the nature of their work and exposure to specific factors that serve as stressors. Married males experienced less psychosocial stress, anxiety, and depression compared to their female counterparts.⁵ This is mainly due to the difficulty experienced by the latter in balancing work and family expectations brought about by the traditional family and gender roles that exist in the Philippine culture, resulting in tension and stress.^{6,7} Educational attainment and age were also seen as factors associated with anxiety and depression, wherein those who had a lower educational attainment and those who are less experienced were more likely to experience mental health issues.^{6,8-10}

A study identified long working hours, heavy workload, extreme weather, physical health, unsafe work conditions, farm operation type, government support, and social pressure as key risk factors contributing to the increased mental health problems among farmers.¹⁰ Farmers are also exposed to long working hours, heavy workload, and unsafe work conditions, as they are found working alone or in small groups utilizing machinery that may be dangerous due to the noise level and absence of safety mechanisms.¹¹ However, despite the availability of agricultural equipment to assist the farmers, a heavy workload still exists today due to an apparent decline in the agricultural labor force.¹

Another factor causing anxiety among farmers was the exposure to pesticides.¹² One mechanism is due to the inhibition of acetylcholinesterase, an enzyme that breaks down the neurotransmitter acetylcholine into acetyl-CoA and choline in the neuromuscular junction. This causes the accumulation of acetylcholine, causing overstimulation of neurons and resulting in anxiety symptoms, such as agitation and restlessness.¹³

The Philippines, being an archipelagic nation, is susceptible to climate variability, wet seasons, and extreme weather events.¹⁴ The Central Luzon region is one of the two most disaster-prone areas in the Philippines, commonly devastated by storms and floods.¹⁵ In 2015, a total of 51,398.6 hectares of rice production area was damaged due to several typhoons hitting the area. In 2016, total recorded damage soared to 7,081.54 hectares, hitting the province of Nueva Ecija the hardest. Finally in 2018, a total of 174,468 hectares were damaged by six typhoons hitting Central Luzon.¹⁶ Wet seasons also favored the development of unsafe working conditions, such as leptospirosis, malaria, and dengue, which affect the physical health of the farmers working in their respective farming area.¹⁷

Filipino farmers were categorized based on their farm operation type. This distinction may sometimes lead to conflict in the workplace. In terms of farm ownership, most of the farmers had full ownership of the farming land, while other

farmers served as tenants, had partial ownership of the land, or owned the land through rent or lease.¹⁸ Farm operations other than full ownership and family ownership were more at risk of role conflicts due to the presence of issues about unjust wages and task distribution, which possibly resulted in psychological distress.¹⁹

Social pressure, particularly work-family conflict, is an inter-role conflict that involves the interference of work stressors, such as demanding work schedules, heavy workloads, and time pressure, into one's role as a family member, and vice versa. This causes a strain in either one area causing difficulty in tending to the other, such as when actions or behaviors required by one or both roles clash or otherwise make it a challenge to fulfill the needs of the other role.²⁰ High levels of inter-role conflict, particularly involving family relationships, have been linked to an increased incidence of depression and anxiety symptoms.²⁰⁻²² This is especially relevant for Filipino farmers, as cultural norms emphasize family involvement in farming activities which blurs the boundary between work and family life, ultimately contributing to stress and mental health challenges among Filipino farmers.

These factors, along with the existing stigma against people with mental health disorders, may contribute to the lack of access to medical care, especially for those providing mental health services due to the mismatch between farmers' needs and the provision of services available to address the farmers' needs affects mental well-being and overall productivity.²³ Therefore, by evaluating the symptoms of anxiety among farmers and determining the contributing factors, a foundation can be established upon which these needs can be addressed. Furthermore, the study findings may be used in the future as a reference in the spread of mental health awareness to the public, as a guide for public health workers to create programs, and for policymakers to facilitate the formulation of policies and allocation of resources to address the different issues affecting the mental health of Filipino farmers, which ideally can be translated into government support for either increasing farmer competitiveness or modernizing agricultural production.²⁴

Previous studies have already identified factors that are possibly associated with anxiety among farmers. Currently however, a limited number of studies focused on the proportion of farmers with anxiety symptoms, and no previous studies have established the factors associated with anxiety symptoms pertinent among Filipino farmers, specifically in Central Luzon, therefore, the general objective of this study is to lessen the knowledge gap regarding the mental health of Filipino farmers by determining the different factors associated with anxiety symptoms among Filipino farmers in Central Luzon by 1) determining the proportion of farmers with anxiety symptoms, 2) identifying the percentage distribution of the anxiety symptoms experienced by Filipino farmers in Central Luzon using the GAD-7 tool, and 3) determining the association of different factors with the presence of anxiety symptoms.

MATERIALS AND METHODS

Study Design

The study used an analytical cross-sectional design.

Study Population

The researchers chose farmers in Central Luzon (Region III) as the target population due to the region's status as a major crop producer, particularly palay or rice, and its accessibility to the researchers in terms of language.

Eligibility Criteria

Farmers who met the following inclusion criteria were eligible for participation: (1) at least 18 years of age, (2) Filipino farmers located in Central Luzon, (3) grow crops and/or raise livestock and poultry for commercial use, (4) has been working as a farmer for at least one year, (5) farming is their main source of income, and (6) can read, speak, and understand either Filipino or English language.

Meanwhile, farmers who had at least one of the following criteria were excluded from this study: (1) those who have already retired from farming and (2) those who have been previously diagnosed with depression, anxiety attacks, and panic attacks since the researchers want to prevent the possibility of triggering any emotional distress among these group of people during the data collection phase of the study.

Sampling Method

A chain referral sampling method was used to recruit participants, wherein contact was first initiated by the researchers, with point persons who are representatives of Local Government Units (LGUs), and the researcher's own social network within Central Luzon. Point persons were then contacted through emails, messaging platforms, and calls to start the chain of referrals and help recruit and coordinate with the potential participants until a total of 136 eligible participants were reached.

This sampling method was chosen since mental health issues were sensitive topics in the Philippines and may not garner many participants. As participant selection is performed through convenience rather than randomization, one potential bias for this sampling method is sampling bias. Sampling bias limits the generalizability of the study finding as it affects its external validity. To mitigate this type of bias, the researchers decided to have a separate phase dedicated to screening of each potential participants for eligibility based on the set eligibility criteria prior to proceeding to data collection. Another type of bias that may occur is self-selection bias or volunteer bias, which occurs if a participant is willing to participate in studies. This bias can lead to differences in the baseline characteristics of the participants, which may skew the study results. This type of bias was mitigated by giving a token of appreciation in the form of Gcash or mobile load, for their participation in the study.

Sample Size

The sample size was computed using a study by Serrano-Medina and colleagues by determining the percentage of population unexposed to pesticides that have generalized anxiety, resulting in 18%.¹² Using this percentage, an equation by Sanchez et al., was used to compute for sample size, where n is the sample size estimate; k is the level of confidence, set to 95%, thus $k = 1.96$; p is the estimate of the outcome in population, computed previously to be 18%; q is $1-p$; and d is the maximum amount of deviation from the frequency, set to 0.1.²⁵ With these conditions, the computed sample size is 113, and accounting for a 20% non-response rate, a total of 136 participants were needed to be recruited (Figure 1).

$$n = \frac{k^2 pq}{d^2}$$

Figure 1. Equation used to calculate sample size.

Study Variables

Table 1 shows the different variables used in this study. The operational definition defined the criteria found in each variable that will increase one's risk of having anxiety symptoms, hence equating to the exposure.

Data Collection Tools

Generalized Anxiety Disorder-7 (GAD-7)

GAD-7 is a seven-item anxiety scale developed by Spitzer and colleagues in 2006 and used by the researchers to assess the severity of anxiety symptoms for the past two weeks to prevent recall bias. The scoring used was mostly based on the instructional manual from Pfizer Inc., wherein the severity of each symptom was scored on a scale of 0–3, in which (0) was not at all, (1) was several days, (2) was more than half of the days, (3) and was nearly every day. Total scores on GAD-7 range from 0 to 21; scores of 0–4, 5–9, 10–14, and 15–21 represent points for none, mild, moderate, and severe anxiety symptoms, respectively.²⁶ For this study, participants with scores from 0 to 4 were labeled as “No anxiety symptoms,” those with scores 5 to 21 were identified as “Has anxiety symptoms.”

The official English and Filipino versions were made available by Pfizer Inc. through <https://www.phqscreeners.com> for download. No expenses were paid to acquire this tool, and permissions were not required by the company for the download and use of the assessment tool for this research.

Data Collection Tool for Factors Associated with Anxiety Symptoms (DCFAAS)

The DCFAAS is a 23-item researcher-constructed instrument used to collect data regarding the exposure of the participants to the different factors and served as the independent variable. The questions used were close-ended and were mostly composed of multiple-choice questions and

Table 1. Operational Definition of Study Variables

Variables	Operational Definition
Dependent Variable	
Generalized Anxiety Disorder Symptoms	Participants having a score of at least 5 in the Generalized Anxiety Disorder-7 (GAD-7) screening tool
Independent Variables	
Age	Participants at least 18 years old; 18-30 years old equates to exposure
Educational attainment	Highest educational attainment of the participants; Having no formal education or having elementary level as the highest educational attainment equates to exposure
Sex	Biological sex of the participant; Being female equates to exposure
Financial status	The average monthly earnings of the participant in pesos in the past year and the sufficiency of their monthly earnings for their financial needs; Average monthly earning of PHP 6,500 or below in the past year and insufficiency of the monthly earnings for the participants' financial needs equates to exposure
Extreme weather	Negative impact of either typhoons and/or extreme heat on the participant's work in the past year equates to exposure
Working hours	Duration of work on most days of the week of the participants and their satisfaction towards their working hours; Dissatisfaction towards their working hours equates to exposure
Unsafe work conditions	Perception of danger from any one of the hazards present at work equates to exposure
Physical health	Presence or absence of any illness/disease and its impact on the participants' work; Negative impact illness/disease on work equates to exposure
Farm operation type	Current form of land ownership of the land the participants use for planting crops and/or raising livestock; Tenancy, employment, and others equate to exposure
Government support	Perception on the sufficiency of subsidies that were received from the government in the past year; Receiving insufficient government subsidies in the past year equates to exposure
Social pressure	Perception of participant that immediate family and relatives they are supporting are a responsibility, and the inability to balance work and family counts as exposure

checkbox-type questions. Questions asked in the DCFAAS were about their condition from the previous year to limit recall bias.

The DCFAAS was validated through the examination of agricultural experts and Filipino linguistic experts who assessed the content, construction, and appearance of the tool. The researchers were able to recruit a total of three validators: one BS agriculture major graduate from the University of the Philippines Los Baños, one professor from the University of Santo Tomas who teaches Filipino courses, and one BA Linguistics graduate to validate the DCFAAS. The questions of the DCFAAS were then refined according to the comments and feedback given by the validators.

Pre-testing

Prior to data collection, pre-testing of the DCFAAS was conducted by the researchers among Northern Luzon farmers. The researchers were able to recruit a total of 32 participants from Northern Luzon with 29 participants from Pangasinan, and the remaining three participants working as farmers in Isabela. Throughout the pre-testing, no feedback from the participants regarding any difficulty in answering the Google Forms questionnaire was reported.

Data Collection Procedure and Flow

Data collection period occurred from the 1st week of April 2022 until the 2nd week of May 2022. The researchers contacted people within their respective networks to aid in

looking for farmers within Central Luzon who might be eligible. Contact persons were either from the LGUs in the area, known friends or relatives based in Central Luzon, and employees working for the Department of Agrarian Reforms. They were formally invited through emails, text messages, and platforms like Messenger. After the contact person had agreed to aid the researchers, those who opted for hard copies were sent the following documents for distribution to the participants: a formal letter of invitation for the farmers, instructional materials, an Informed Consent Form (ICF), the screening tool, the GAD-7 tool, and the DCFAAS, for printing. Meanwhile, those who opted to respond online were given the following instructional materials: a formal letter of invitation for the farmers and a link to the Google Forms questionnaire, which already contained the ICF, the screening tool, the DCFAAS, and GAD-7. Each participant was given an option to answer the documents in the English language or the Filipino language. After the participants had given their consent through the ICF, they were screened for eligibility; upon satisfying the eligibility criteria, they were then given the DCFAAS and GAD-7. The contact persons assisted in the data-gathering procedure and served as witnesses for the respondents.

At the end of data gathering, the participants and the contact persons were given 50 pesos worth of either mobile load or cash sent to their GCash account, an online payment and financial platform, as a token of appreciation for their participation. Any expenses made by the contact persons,

including printing, photocopying, and the delivery of documents, were compensated accordingly by the researchers.

Since this research tackled mental health, the researchers anticipated the risk of triggering emotional discomfort among the participants while answering the questionnaire, and as a result, the participants were given an option to skip some questions in the DCFAAS or withdraw from the study altogether. To further address any emotional discomfort that the participants may have felt during data gathering, the researchers formally invited mental health facilities through a letter of intent sent via email. Two mental health facilities agreed to provide crisis hotlines that the participants may contact if they felt the need for psychological support, and these were placed in the informed consent.

Data Processing and Analysis

Since the participants were given the option to skip questions, the researchers anticipated unanswered questions and respected the decision of the respondents to not answer questions they felt uncomfortable in responding to. All data available to the researchers were reported in the frequency and percent distribution of each factor that were analyzed in the study. Missing responses from the participants which created the missing data were not filled in by the researchers, and listwise deletion was utilized for participants with missing data. Participants who answered via Google Forms were readily available for retrieval and were transferred to a spreadsheet, while responses from the hard copies were encoded in a separate Microsoft Excel worksheet. The accuracy and completeness of the data were ensured by the researchers before coding. The collected data were further converted into codes, as indicated in the coding manual.

Frequencies and the percentage distribution were computed using Microsoft Excel[®]. Analysis of the odds ratio and binary logistic regression were conducted in IBM SPSS Statistics[®]. The crude odds ratio was computed for each factor, and the adjusted odds ratio accounted for confounders such as age, sex, finance, type of farmer, and education.

Table 2. Distribution of Filipino Farmers from Central Luzon by Demographics

Demographics	n (%)	Total (N)
Sex		
Male	102 (75.0)	136
Female	34 (25.0)	
Age		
30 years old and below	18 (13.4)	134
More than 30 years old	116 (86.6)	
Educational Attainment		
No formal education	1 (0.76)	132
Elementary	33 (25.0)	
High school	57 (43.2)	
College	39 (29.5)	
Post-graduate/ Vocational	2 (1.5)	

A confidence interval of 95% was consistently used for the crude and adjusted odds ratio. Binary logistic regression was used to determine the crude and adjusted odds ratio, reported with their corresponding confidence interval and p-value. Computed p-values of less than 0.05 were determined to be statistically significant.

Ethics Approval

The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Ethics Review Committee (IERC) of St. Luke's Medical Center with reference number of SL-21237, approved last October 30, 2021.

RESULTS

The researchers were able to recruit a total of 175 respondents, 136 (77.7%) of which satisfied the inclusion criteria and were considered eligible to participate in this research study. The valid responses from the eligible farmers were tabulated despite incomplete answers in the DCFAAS questionnaire. All valid responses were summarized in Table 2 according to demographics.

Among the eligible farmers, 86.6% were aged more than 30 years old with a mean age of 47.6 ± 14.4 , clustering between ages 48 and 58 years old. They were mostly male (75.0%). The highest educational attainment of the farmers consisted mostly of high school (43.2%), followed by college (29.5%), and elementary (25.0%).

Meanwhile, Table 3 enumerates the occupational factors that are associated with exposure to anxiety, and it determines that the amount of earnings consists mostly of farmers with less than the average monthly earnings (61.2%), and the majority (67.4%) perceived that their monthly earnings are insufficient to meet their needs. The farmers compensate for this by having other forms of income, which include, but are not limited to, tricycle driving, charcoal selling, and trading other goods. More than half of the farmers (57.4%) admitted to having jobs other than farming, namely, carpentry and construction; selling fruits, vegetables, and prepared food; charcoal making; tricycle and truck drivers; having job order positions in the government office; having a small business, such as sari-sari stores; occupying political positions at the barangay level; house helpers; and participation in the business process outsourcing (BPO) industry.

Majority of the farming land worked on by the participants was either solely owned (30.8%) or owned by a landlord (39.1%). Other forms of ownership that were stated by the respondents were farmlands being lent to the respondent from family members with an income percentage arrangement and farmlands being lent to the respondent from family members without lease payment. About 87% of the farmers deny receiving government support.

Both the occurrence of strong typhoons and extreme heat conditions had negative effects on the farmers, with

values of 72.2% and 70.7%, respectively. Remarkably, 81.1% of farmers were satisfied with their working hours despite the perceived danger, which 65.4% of the farmers recognized. The researchers were able to provide at least five common hazards in which the majority of the farmers ticked more than five of the mentioned hazards.

The presence of illness seemed to have no effect on their work as well, as 83.3% of the farmers indicated. The common illnesses stated were the following: hypertension, asthma, allergies, epilepsy, diabetes, and cardiovascular diseases. Lastly, social pressure was represented by the influence of relatives on time and energy consumption, and work completion of the farmer, with 67.9% admitting to spending more time and energy to sustain their family. More than a third of the farmers (36.5%) had their work completion affected by their respective relatives.

In assessing the prevalence of anxiety symptoms, the researchers accounted for the number of eligible respondents who completed the GAD-7 tool, where out of 136 valid responses, there were 113 respondents who answered GAD-7 in its entirety, while the remaining 23 respondents had missing data or skipped some of the questions in the GAD-7. About 17% experienced anxiety symptoms. This means that most of the farmers (83.2%) denied experiencing anxiety symptoms based on the operational definition of Generalized Anxiety Symptoms (Table 4). It was also determined that the most prevalent symptom among farmers was “worrying too much about different things”, wherein 39.8% of respondents experienced this symptom, accounting for the symptom which was ticked the most. The least prevalent symptom was “being so restless that it is hard to sit still”, wherein 12.4% of the farmers experienced this symptom. Figure 2 summarizes other anxiety symptoms included in the GAD-7 tool.

Analysis based on binary logistic regression had the following findings, as summarized in Table 5. A total of 104 valid responses were analyzed, as 32 of 136 valid responses failed to accomplish either/both the DCFAAS and GAD-7 questionnaires, thereby excluding their responses from the analysis. Table 5 summarizes the results, wherein the factors that are significantly associated with anxiety symptoms are physical health and social pressure affecting work completion. Analysis shows that poor physical health or the presence of illness can affect work and increase the risk of anxiety symptoms by 10 times (OR = 10.700, 95% CI [1.367, 83.773]). There is also an increase in the probability that farmers experiencing a burden from relatives affecting primarily their work will have six times (OR = 6.449, 95% CI [1.346, 30.896]) more likelihood of anxiety symptoms. Notably, those who did not receive government support had no incidence of anxiety symptoms, resulting in an undefined OR.

Table 3. Distribution of Filipino Farmers from Central Luzon by Demographics and Work Factors

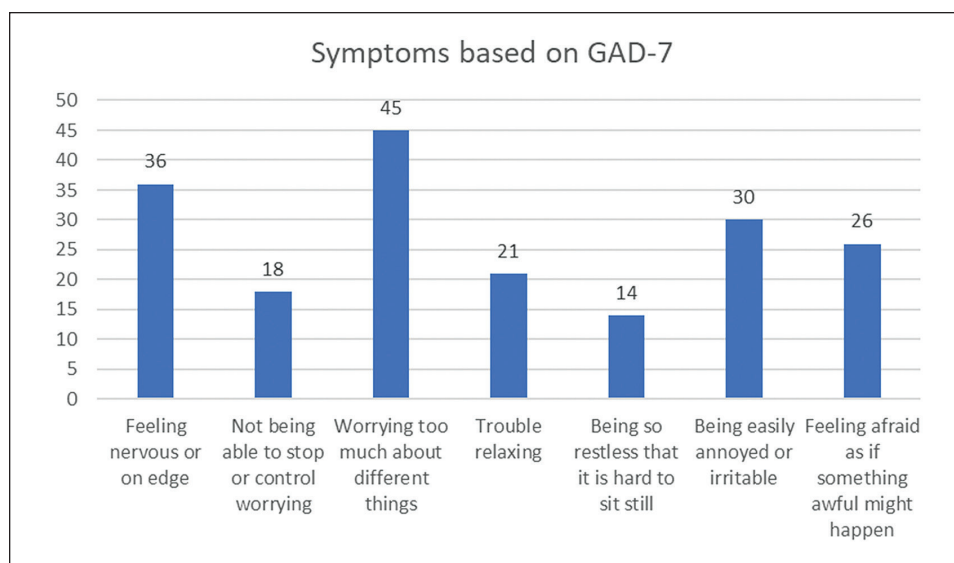
Occupational Factors	n (%)	Total (N)
Average amount of earnings in farming per month		
Less than average	82 (61.2)	134
More than average	52 (38.8)	
Sufficiency of monthly earning in farming		
Enough	43 (32.6)	132
Not enough	89 (67.4)	
Other forms of income		
No	58 (42.6)	136
Yes	78 (57.4)	
Land ownership		
Solely owned	41 (30.8)	133
Owned with family	16 (12.0)	
Employee	12 (9.0)	
Tenant	52 (39.1)	
Others	12 (9.0)	
Receives government support		
No	109 (87.2)	125
Yes	16 (12.8)	
Affected by typhoons		
No	37 (27.8)	133
Yes	96 (72.2)	
Affected by extreme heat		
No	39 (29.3)	133
Yes	94 (70.7)	
Satisfied with the working hours		
No	25 (18.9)	132
Yes	107 (81.1)	
Illness affects work		
No	105 (83.3)	126
Yes	21 (16.7)	
Perceives to be in danger from Occupational Hazards		
No	44 (34.6)	127
Yes	83 (65.4)	
Relatives consume time and energy		
No	43 (32.1)	134
Yes	91 (67.9)	
Relatives affect work completion		
Never	30 (28.9)	104
Rarely	38 (36.5)	
Sometimes	31 (29.8)	
Always	5 (4.8)	

Table 4. Frequency and percentage of Filipino farmers by prevalence of anxiety symptoms (N=113)

	n (%)
Farmers who experienced anxiety symptoms (scores ≥ 5)	19 (16.8%)
Farmers who did not experience anxiety symptoms (scores < 5)	85 (83.2%)

Table 5. Association between Demographics and Work Factors Exposure with the Presence of Anxiety Symptoms among Filipino Farmers (N=104)

Factors		Crude OR	Adjusted OR		p-value
			OR	95% CI	
Female		0.907	0.517	0.097, 2.756	0.439
Age <30 years old		0.791	1.706	0.193, 15.079	0.631
No formal education to elementary		0.337	0.405	0.029, 5.622	0.501
Financial Status	Lower than average	0.942	0.400	0.086, 1.868	0.244
	Insufficient earnings	3.385	5.374	0.812, 35.548	0.081
	At least one other income source	1.088	0.927	0.189, 4.552	0.925
Tenant, employee, others		2.117	3.696	0.552, 24.727	0.178
Unsatisfactory government support		undefined	undefined	undefined	0.998
Extreme weather	Affected by typhoons	5.906	9.533	0.477, 190.578	0.140
	Affected by extreme heat	1.750	0.496	0.067, 3.682	0.493
Unsatisfactory working hours		0.716	0.214	0.027, 1.678	0.142
Illness affecting work		1.978	10.700	1.367, 83.773	0.024*
Unsafe work conditions		2.218	1.061	0.226, 4.978	0.940
Social pressure	Relatives consume time and energy	5.635	4.226	0.960, 18.615	0.057
	Relatives affect work completion	5.841	6.449	1.346, 30.896	0.020*

*Significant ($p < 0.05$)**Figure 2.** Frequency of Filipino farmers with scores ≥ 1 in each anxiety symptom (N=113).

DISCUSSION

This paper has recognized the various factors that Filipino farmers encounter in their line of work that may put them at risk of anxiety disorders. Factors such as long working hours, heavy workload, the presence of unsafe working conditions, the presence of physical illness, and low income were commonly known factors that increase farmers' vulnerability to mental health problems.¹¹ Despite that, the results showed that only 16.8% of the eligible participants experienced anxiety symptoms for the last two weeks. This

may be influenced by the bias of the sampling method, which was through chain referral and the small sample size. Moreover, there was a particularly small proportion of female and younger participants, with both factors being associated with anxiety.²⁷

A study by Cevher and colleagues done in 2021, assessed the presence of anxiety disorders among male Turkish farmers during the COVID-19 pandemic, found that all farmers experienced anxiety symptoms at varying levels of severity based on their GAD-7 scores.²⁸ However, such findings were not observed in this study, which has a low

prevalence of anxiety symptoms, despite being similarly set during the COVID-19 pandemic. This may be explained by the presence of barriers in confiding psychological issues, namely, (1) the high cost of medical services, (2) a lack of health insurance, (3) self-stigmatization with fear of negative judgment, embarrassment, and shame, and (4) the presence of social stigma affecting family or group reputation, which are prevalent among Filipinos. Moreover, Filipinos prefer confiding to religious clergies, friends, and family members over mental health professionals. These professionals are sought either as a last resort or in severe cases.²⁹ Religion also plays a vital role in Filipino resilience, as a local study showed that religious participants had higher resilience.³⁰ The Filipinos' Christian culture, alongside the cultural values of "bayanihan" (communal unity), "malasakit" (compassion), and "volunteerism", may have helped the farmers overcome their anxiety symptoms by enhancing available resources.³¹ In addition, there has been a development of climate-resilient or climate-smart agriculture options, which not only improved the farmer's productivity but also their adaptivity.³²

Worrying too much about different things was the most prevalent symptom. About 40% of the farmers experienced excessive worrying, which was attributed to farming season, weather, physical environment, and farm economy. Moreover, there is the risk of poverty, malnutrition, and climate change, among others, which farmers worry about.^{33,34} Farming itself is also not financially rewarding, as farming demands are high but income remains uncertain.³⁵ Related to excessive worrying is nervousness (31.9%), followed by irritability (26.5%), which are common responses to stress. These anxiety symptoms were significantly associated with physical health, having the highest odds ratio (OR) of 10.700 [95% CI 1.367, 83.773]. Similar findings were observed in other studies wherein physical health was related to vulnerability to mental illness and symptoms thereof.^{10,36,37} Agricultural workers in Korea were reported to be prone to stressful factors related to their occupation, which include pesticide exposure, zoonotic diseases, extremes of weather, and exposure to tobacco, increasing their susceptibility to both physical and mental health problems.³⁸ Moreover, other factors were linked to the increased risk, such as lower levels of education, older age, more than three children, and social isolation.³⁶ Health problems are multifaceted, and a cascade of factors will influence time-bound work.³⁷ This article, however, found no significant association between insufficient earnings and anxiety symptoms despite an OR of 5.374 [95% CI 0.812, 35.548]. This may be due to the limited access to medical facilities in the rural areas where farmers have poor health-seeking behaviors, prompting their earnings to be solely used for everyday needs instead of seeking medical treatment. Some of the rural farmers even prefer "manghihilot" (folk masseurs) and "albularyo" (folk healers) to tend to their health needs.

The paper also determined the effects of social pressure on work completion, wherein farmers living with relatives that affect their productivity to complete their farm work

were six times more likely to experience anxiety symptoms (OR = 6.449 [95% CI 1.346, 30.896]). It is not surprising that Filipinos are affected by family members, considering Filipinos have a family-oriented culture. In the Philippines, it is often that family members establish family businesses; therefore, when problems arise, family and work get intertwined.³⁹ In the Bicol region of the Philippines, the pandemic prompted the families of the abaca farmers to work in farm fields and production, leading to an increased yield of abaca.⁴⁰ It can be deduced that working with the family will cause little to no association with respect to anxiety symptoms, as family members hold stronger perceived personal social support.⁴¹ However, this was not observed in this research, which may be explained by the easing transition to pre-pandemic, opting some members to return to their previous jobs or find work that they like. Other studies also show that the decision-making involvement of other family members causes stress and leads to more serious consequences, especially for those who are living in more than one-generation families. This is aggravated by financial issues, which often result in familial conflict.^{41,42} The spillover effect of both family and work stressors will affect farming productivity. This shifts the attitudes and stresses within the family, which may negatively impact the person's well-being and inevitably their work as well.⁴³

Other factors that several studies determined to influence anxiety symptoms were shown to be not as significant among Filipino farmers. One article stated that low levels of household income were more associated with mental disorders, with a decrease in income indicating a higher risk of anxiety.⁴⁴ However, this was not observed in this article, where lower-than-average income had no substantial association with anxiety symptoms. Another noteworthy factor was extreme weather conditions, specifically typhoons, which the Philippines frequently experiences. However, despite a significant adjusted OR of 9.533 [95% CI 0.477, 190.578], it was determined to be not statistically significant to cause anxiety symptoms. A greater sampling size would elucidate the reliability of the results.

Limitations and Future Directions

With regard to the study design, the researchers acknowledge that a longitudinal design may be better in testing and establishing the association of the different factors being proposed in this manuscript compared to a cross-sectional design because of its longer timeframe and multiple assessment points over time. However, due to the limited timeframe given for this research study, the limited resources available to the researchers, and the imposed travel restrictions brought about by the COVID-19 pandemic, the researchers perceived a cross-sectional study design as the more fitting study design.

The research is limited only to Central Luzon farmers; therefore, further studies may widen the geographical scope and include other farmers across the country. There are factors involved that are unique to an area such as culture, situations such as armed conflict, and others. Furthermore,

the COVID-19 pandemic restricted onsite data collection; hence, the researchers relied on point persons, specifically Agricultural Officers, to aid in data collection. Travel restrictions limited the interaction of the researchers with the farmers; nevertheless, it is recommended that real-time interviews be conducted onsite or over the phone.

Limitations on the sampling size and the sampling method resulted in a wide range of confidence intervals that decreased the precision of the results. The chain referral sampling method and the addition of the small sample size in this study have introduced biases such as sampling bias which limited the generalizability of our study. Therefore a randomized sampling strategy may be employed such as stratified random sampling or systematic sampling which can better ensure representation of diverse groups especially in terms of age, gender, and farming types.

Future researches studying the association of anxiety symptoms and Filipino farmers, may look into other factors such as existent spiritual beliefs due to its influence in the perception and stress management, and its cultural relevance among the Filipinos which in theory can affect prevalence of anxiety symptoms. In addition, future researches can also look at the degree of agricultural training among the farmers since these can affect their competency and confidence in handling agricultural problems which in turn can affect prevalence of anxiety.

The DCFAAS questionnaire was constructed by the researchers, and the indicated exposure factors were based on the limited literature on Filipino farmers and their mental health. Further studies and validation must be performed to properly assess the reliability of the DCFAAS questionnaire. On the other hand, the GAD-7 questionnaire only accounted for anxiety symptoms that were experienced for the past two weeks. This can be improved by adding more questions per factor or using a stress scale and other forms of established assessment tools that can assess anxiety along with the use of the DCFAAS questionnaire to better measure the association of each factor. The inclusion of a psychiatrist or psychologist as an expert will also help in assessing the farmers, validating the results, and providing technical expertise in dealing with farmers with mental health problems.

The researchers acknowledge that more extensive analytical methods such as sensitivity analysis and subgroup analysis may have been done in this study, however, the objectives of this study was only to determine the proportion of farmers with anxiety symptoms, identify the percentage distribution of the anxiety symptoms experienced by Filipino farmers, and determine whether there is association of the different chosen factors with the presence of anxiety symptoms. Future studies may opt to conduct these tests to assess the consistency of the study results when parameters are modified, and to better understand variations in effects across predefined groups, extensively in order to strengthen the validity and depth of the study.

CONCLUSIONS

This study emphasizes the urgency to address the mental health and well-being of Filipino farmers, who face unique challenges including illness, social pressures, and the tedious demands of agricultural work. There was a low prevalence of anxiety among the farmer-participants of this study. The most prevalent symptom reported was “worrying too much about different things.” Two factors were found to be significantly associated with the presence of anxiety symptoms: illness affecting work, and relatives affecting task completion. The findings of this study highlight the urgent role of local government units in mitigating these risks by implementing financial assistance and support programs targeted to farmers.

Therefore, local government units and policymakers should focus on creating policies with the coordination of the Department of Health (DOH), addressing problems related to the farmer's physical and mental well-being as well as providing support and additional health and financial benefits for the farmers and their family members. These benefits can be in the forms of providing subsidies for healthcare, financial relief during low-yield seasons, and improved access to health services for them and their family members to significantly reduce the health burdens on farmers.

Acknowledgments

The completion of this research would not be possible without the participation and guidance of the people who assisted the authors. They would like to express their deepest gratitude and appreciation to the following:

To the Preventive and Community Medicine Department, especially to Dr. Edmyr M. Macabulos for helping in the gathering of potential contact people, and Dr. Ma. Lucila M. Perez for signing their required documents.

To Assistant Professor Ma. Lanie Vergara, MAT, Aljohn Garcia, and Kriziel Dela Rosa, for validating the DCFAAS questionnaires.

To their partner mental health institutions, In Touch Community Services Inc., and Mariveles Mental Wellness and General Hospital, who supported them by providing a free avenue for the farmers to contact.

To their contact people, namely: Marilyn Yalong, Dennis Felipe, Dennis Tagupa, Aljohn Garcia, Marielle Tagupa, Engr. Nenita Palomo, and Arlene Infante who assisted in gathering the participants.

To their statistician, Rossjyn Fallorina and Gerard Ompad, who helped them with the interpretation of results.

To St. St. Luke's Medical Center College of Medicine - William H. Quasha Memorial, for their considerate endorsement of their research.

To their relatives and friends, who helped them in their own way, the authors thank and appreciate them.

Informed Consent

Each participant has read, signed, and possessed a copy of their own Informed Consent form, prior to the start of the data collection.

Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

All authors declared no conflicts of interest.

Funding Source

The research was funded solely by the St. Luke's Medical Center College of Medicine - William H. Quasha Memorial.

REFERENCES

- Philippine Statistics Authority. Selected statistics on agriculture 2020. Selected Statistics on Agriculture and Fisheries (SSAF) [Internet]. August 2020 [cited Apr 19]. Available from: https://library.psa.gov.ph/kohaimages/PSA/ebookreader/viewebook.html?out=1&d=pdf/326ec066e9f356267c6f41f96d376d96_2_SSA2020_final_signed.pdf&speech=1&ref=https://library.psa.gov.ph/cgi-bin/koha/opac-detail.pl?biblionumber=15963&biblionumber=15963#book/7
- Rivas R. Farmers trash spoiled vegetables while poor go hungry [Internet]. 2020 [cited 2024 Dec 6]. Available from: <https://www.rappler.com/newsbreak/in-depth/256982-farmers-trash-spoiled-vegetables-urban-poor-hungry-coronavirus-lockdown/>
- Madarang CR. Local farmers struggle with unsold excess crops amid pandemic. Here's how to help [Internet]. 2021 [cited 2024 Dec 6]. Available from: <https://interaksyon.philstar.com/trends-spotlights/2021/03/26/188569/local-farmers-struggle-with-unsold-excess-crops-amid-pandemic-heres-how-to-help/>
- Del Rosario D. Mahirap mawalan ngayon': Cagayan farmers cry for help after Maring destroys crops [Internet]. 2021 [cited 2024 Dec 6]. Available from: <https://newsinfo.inquirer.net/1501026/mahirap-mawalan-ngayon-cagayan-farmers-cry-for-help-after-maring-destroys-crops>
- Ambong RM, Gonzales AM. Influencing Factors and Stress Coping Mechanisms in Agricultural Communities of Occidental Mindoro, Philippines. [Internet]. 2019 [cited 2021 Apr 19]. Available from: https://www.researchgate.net/publication/334162164_Influencing_Factors_and_Stress_Coping_Mechanisms_in_Agricultural_Communities_of_Occidental_Mindoro_Philippines
- McGregor MJ, Willock J, Deary I. Farmer stress. *Farm Management* 1995;9:57-65.
- Marks J, Bun LC, McHale SM. Family patterns of gender role attitudes. *Sex Roles*. 2009;61(3-4):221-34. doi:10.1007/s11199-009-9619-3. PMID: 22308059; PMCID: PMC3270818.
- Bjelland I, Krokstad S, Mykletun A, Dahl AA, Tell GS, Tambs K. Does a higher educational level protect against anxiety and depression? The HUNT study. *Soc Sci Med*. 2008 Mar;66(6):1334-45. doi: 10.1016/j.socscimed.2007.12.019. PMID: 18234406.
- Briones RM. Characterization of Agricultural Workers in the Philippines. Philippines Institute of Developmental Studies Discussion Paper Series No. 2017-31 [Internet]. 2017. [cited 2021 Apr 19]. Available from: <https://pidswebs.pids.gov.ph/CDN/PUBLICATIONS/pidsdps1731.pdf>
- Rudolphi JM, Berg RL, Parsaik A. Depression, anxiety and stress among young farmers and ranchers: a pilot study. *Community Ment Health J*. 2020 Jan;56(1):126-34. doi: 10.1007/s10597-019-00480-y. PMID: 31583619.
- Agricultural Machinery Testing and Evaluation Center. Hazards of agricultural machinery used in the Philippines. College of Engineering and Agro-industrial Technology, UPLB [Internet]. 2012 [cited 2021 Apr19]. Available from: http://www.unapcaem.org/Activities%20Files/A1205_AS/PPT/ph01.pdf
- Serrano-Medina A, Ugalde-Lizárraga A, Bojorquez-Cuevas MS, Garnica-Ruiz J, González-Corral MA, García-Ledezma A, et al. Neuropsychiatric disorders in farmers associated with organophosphorus pesticide exposure in a rural village of Northwest México. *Int J Environ Res Public Health*. 2019 Feb 26;16(5):689. doi: 10.3390/ijerph16050689. PMID: 30813607; PMCID: PMC6427808.
- Mwabulambo SG, Mrema EJ, Ngowi AV, Mamuya S. Health symptoms associated with pesticide exposure among flower and onion pesticide applicators in the Arusha region. *Ann Glob Health*. 2018 Aug 31;84(3):369-79. doi: 10.29024/aogh.2303. PMID: 30835378; PMCID: PMC6748213.
- Yumul GPJ, Cruz NA, Servando NT, Dimalanta CB. Extreme weather events and related disasters in the Philippines, 2004-08: a sign of what climate change will mean? *Disasters*. 2011 Apr;35(2):362-82. doi: 10.1111/j.1467-7717.2010.01216.x. PMID: 21073508.
- Mines and Geosciences Bureau. Top 10 provinces highly susceptible to flooding [Internet]. 2015 [cited 2024 Dec 6]. Available from: <https://www.denr.gov.ph/priority-programs/geo-hazard-mapping-and-assessment-program.html>
- Suarez K. Typhoon Labuyo: 4 dead; P69-M Houses, P438-M crops damaged. [Internet]. 2013 [cited 2024 Dec 6]. Available from: <http://www.rappler.com/nation/36288-20130813-labuyo-casualties-damage>
- Department of Health. Prepare for the Rainy Season - DOH [Internet]. 2019 [cited 2021 Apr 19]. Available from: <https://doh.gov.ph/node/17435#:~:text=The%20common%20diseases%20during%20the,such%20as%20malaria%20and%20dengue.>
- Philippine Statistics Authority. Special Report - Highlights of the 2012 Census of Agriculture (2012 CA) [Internet]. 2015 Dec 21 [cited 2021 May 8]. Available from: <https://psa.gov.ph/content/special-report-highlights-2012-census-agriculture-2012-ca#>
- Yazd SD, Wheeler SA, Zuo A. Key risk factors affecting farmers' mental health: a systematic review. *Int J Environ Res Public Health*. 2019 Dec 2;16(23):4849. doi: 10.3390/ijerph16234849. PMID: 31810320; PMCID: PMC6926562.
- Zhang Y, Duffy J, De Castillero E. Do sleep disturbances mediate the association between work-family conflict and depressive symptoms among nurses? A cross-sectional study. *J Psychiatr Ment Health Nurs*. 2017 Oct;24(8):620-8. doi: 10.1111/jpm.12409. PMID: 28635074; PMCID: PMC5585039.
- Moreira H, Fonseca A, Caiado B, Canavarro MC. Work-family conflict and mindful parenting: the mediating role of parental psychopathology symptoms and parenting stress in a sample of Portuguese employed parents. *Front Psychol*. 2019 Mar 22;10:635. doi: 10.3389/fpsyg.2019.00635. PMID: 30967822; PMCID: PMC6438855.
- LaRocca E. The correlation between personal stressors, anxiety and caffeine consumption among JMU faculty. James Madison University [Internet]. 2020 May 8 [cited 2021 May 8]. Available from: <https://commons.lib.jmu.edu/cgi/viewcontent.cgi?article=1009&context=honors202029>
- Nuvey FS, Kreppel K, Nortey PA, Addo-Lartey A, Sarfo B, Fokou G, et al. Poor mental health of livestock farmers in Africa: a mixed methods case study from Ghana. *BMC Public Health*. 2020 Jun 1; 20(1):825. doi: 10.1186/s12889-020-08949-2. PMID: 32487132; PMCID: PMC7268426.
- Balié J, Valera H. Domestic and international impacts of the rice trade policy reform in the Philippines. *Food Policy*. 2020 April;92: 101876. doi: 10.1016/j.foodpol.2020.101876.
- Sanchez FS, Morelos SI, Baltazar JC. Research Methods in Health and Medicine, Volume 1: Planning Research. Taguig, Metro Manila: Philippine Council for Health Research and Development, Department of Science and Technology; 1989.

26. Spitzer RL, Kroenke K, Williams JWB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med*. 2006 May 22;166(10):1092-7. doi: 10.1001/archinte.166.10.1092. PMID: 16717171.
27. Flores JL, Hernandez MA, Leyva EW, Cacciata M, Tuazon J, Evangelista L. Prevalence and correlates of depression, anxiety, and distress among Filipinos from low-income communities in the Philippines. *Philipp J Nurs*. 2018 Jul-Dec;88(2):8-13. PMID: 33935304; PMCID: PMC8088195.
28. Cevher C, Altunkaynak B, Gürü M. Impacts of COVID-19 on agricultural production branches: an investigation of anxiety disorders among farmers. *Sustainability*. 2021;13(9):5186. doi: 10.3390/su13095186.
29. Martinez AB, Co M, Lau J, Brown JS. Filipino help-seeking for mental health problems and associated barriers and facilitators: a systematic review. *Soc Psychiatry Psychiatr Epidemiol*. 2020 Nov;55(11):1397-413. doi: 10.1007/s00127-020-01937-2. PMID: 32816062; PMCID: PMC7578164.
30. Callueng C, Aruta JR, Antazo BG, Briones-Diato A. Measurement and antecedents of national resilience in Filipino adults during coronavirus crisis. *J Community Psychol*. 2020 Nov;48(8):2608-24. doi: 10.1002/jcop.22438. PMID: 32845013; PMCID: PMC7461071.
31. Isidro MQY, Calleja MT. How do national values contribute to perceived organizational resilience and employee resilience in times of disaster? An example from the Philippines. *Asian Journal of Social Psychology*. 2021 Dec;24(4):511-23. doi:10.1111/ajsp.12439.
32. Chandra A, Dargusch P, McNamara KE, Caspe AM, Dalabajan D. A study of climate-smart farming practices and climate-resiliency field schools in Mindanao, the Philippines. *World Development*. 2017; 98:214-30. doi:10.1016/j.worlddev.2017.04.028.
33. Torske M, Hilt B, Glasscock D, Lundqvist P, Krokstad S. Anxiety and depression symptoms among farmers: The HUNT Study, Norway. *J Agromedicine*. 2016;21(1):24-33. doi:10.1080/1059924X.2015.1106375. PMID: 26488439; PMCID: PMC4720047.
34. Lubang SA-FA [Internet]. FFTC Agricultural Policy Platform (FFTC-AP); 2020 [cited 2025 Jan 30]. Available from: <https://ap.fttc.org.tw/article/643>
35. Palis F. Aging Filipino Rice Farmers and Their Aspirations for Their Children [Internet]. *Philippine Journal of Science*. 2020 [cited 2022 May 28]. Available from: https://philjournalsci.dost.gov.ph/images/pdf/pjs_pdf/vol149no2/aging_Filipino_rice_farmers_.pdf
36. Çakmur H. Health risks faced by Turkish agricultural workers. *The Scientific World Journal*. 2014. doi: 10.1155/2014/185342. PMID: 25054165; PMCID: PMC4099035.
37. Kallioniemi MK, Simola AJK, Kymäläinen H-R, Vesala HT, Louhelainen JK. Mental symptoms among Finnish farm entrepreneurs. *Ann Agric Environ Med*. 2009;16(1):159-68. PMID: 19572488.
38. Lee WJ, Cha ES, Moon EK. Disease prevalence and mortality among agricultural workers in Korea. *Journal of Korean Medical Science*. *J Korean Med Sci*. 2010 Dec;25(Suppl):S112-S118. doi: 10.3346/jkms.2010.25.S.S112.
39. Braun B. Farm Family Stressors: Private Problems, Public Issue [Internet]. National Council on Family Relations. 2019 [cited 2022 May 28]. Available from: <https://www.ncfr.org/sites/default/files/2019-09/Fall2019ExecSum.pdf>
40. Conde M. For Philippine farmers reeling from disasters, lockdown is another pain point [Internet]. *Mongabay Environmental News*. 2020 [cited 2022 May 28]. Available from: <https://news.mongabay.com/2020/05/for-philippine-farmers-reeling-from-disasterslockdown-is-another-pain-point/>
41. Ortega RL, Hechanova MRM. Work-Family Conflict, Stress, and Satisfaction among Dual-Earning Couples [Internet]. Philippine Social Science Council. 2010 [cited 2022 May 27]. Available from: https://www.pssc.org.ph/wp-content/pssc-archives/Philippine%20Journal%20of%20Psychology/2010/Num%201/04_WorkFamily%20Conflicts_Stress%20and%20Satisfaction%20among%20Dual-Earning%20Couples.pdf
42. Weigel DJ, Weigel RR. Family satisfaction in two-generation farm families: the role of stress and resources. *Family Relations*. 1990 Oct; 39(4):449-55. doi: 10.2307/585227.
43. Bialowolski P, McNeely E, VanderWeele TJ, Weziak-Bialowolska D. Ill health and distraction at work: Costs and drivers for productivity loss. *PLoS One*. 2020 Mar 31;15(3):e0230562. doi: 10.1371/journal.pone.0230562. PMID: 32231382; PMCID: PMC7108714.
44. Sareen J, Affi T, McMillan K, Asmundson G. Relationship between household income and mental disorders: Findings from a population-based longitudinal study [Internet]. *Archives of General Psychiatry*. *Arch Gen Psychiatry*. 2011 Apr;68(4):419-27. doi: 10.1001/archgenpsychiatry.2011.15. PMID: 21464366.