

Fertility Problems Associated With Pesticide Use Among Farmers in Metro Vigan

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Abstract

The study primarily aimed to determine the fertility problems associated with pesticide use among farmers in the municipalities of Metro Vigan. It also sought to determine the socio-demographic profile of the respondents like age, occupation, educational attainment, monthly income; pesticide-related factors like distance of farm from the house and the frequency of exposure to pesticides; the common pesticides used by the farmers and the level of practice of the farmers on the correct use of pesticides and the relationship between the fertility problems and the set of variables mentioned.

The study involved 133 female farmers from the different municipalities of Metro Vigan. A questionnaire checklist was the main instrument used in the gathering of data used in the study. Purposive sampling was used in selecting the samples used in the study. Frequency, percentage, mean and simple correlational analysis were the statistical tools used to treat the data.

Based from the findings, the following conclusions were drawn: the respondents are between 40-44 years old, farmers by occupation, have finished high school level and college level and have a monthly income between 15,001 – 20,000. The respondents have houses situated less than 1 km from the farm and are “Sometimes” (with 4-6 months period) exposed to pesticides.

The most common pesticides used are lanate, karate, serin, atabron pinnate, decis and biodan.

There is a “high” level of practice of farmers on the correct use of pesticides.

On fertility problems, there is a minimal level of problems since the respondents have 3-4 pregnancies, have delivered their babies in full term, have 3-4 live births, did not suffer abortion, have 1-2 years birth interval of their children and have minimal number of children with physical defects.

There is a “very low” occurrence of the common symptoms of pregnancy among mothers.

On the correlation between fertility problems and the other given set of variables, the following were found to be significantly related:

On socio-demographic variables, age is significantly related to gravidity, parity and live births. There is also a significant relationship between educational attainment and gravidity, parity, live births, and birth interval. There is a significant relationship between occupation and common symptoms during pregnancy.

On pesticide-related factors, there is a significant relationship between distance from farm and the common symptoms during pregnancy. There is also a significant relationship between frequency of exposure to pesticides and the common symptoms during pregnancy.

The level of practice is also significantly related to abortion.

Introduction

Background of the Study

The chemical agents called pesticides include herbicides (for weed control), insecticides and fungicides. More than half the pesticides used in the United States are herbicides that control weeds and only a relatively small percentages of US agricultural land areas are treated with pesticides: 24% with herbicides, 9% with insecticides and 1% with fungicide.

Most of the insecticides applied are long lasting synthetic compounds that affect the nervous system of insects on contact. Among the most effective are the chlorinated hydrocarbons, Diethyl/Diphenyl/Trichloride (DDT), chlordane and toxaphane. Others include the organophosphate insecticides which consist of malathion, parathion and dimethoate.

Pesticide use is pervasive and growing, and has serious adverse health effects on animal population; and on humans it is widespread and common. The most common adverse effects are from organochlorine and organophosphate pesticides but other types of pesticides such as pyrethins also have significant and widespread effects. The most common and widespread effects include spontaneous abortions, birth defects, neurological

effects, cognitive and behavioural effects, reproductive effects and cancer (Windham, 2002).

The human reproductive process is intricate and complex. Successful reproduction depends on two healthy sets of organs and hormone systems in the male and female and is limited by the phases of female fertility.

One of the risk factors affecting fertility in male and female is exposure to high levels of chemicals, toxic substances, high temperature, radiation or persistent stress. Of particular concern are environmental chemicals such as pesticides, aldrin, dieldrin, dioxins and furans with estrogen-like effects. Although tests of single chemicals containing estrogen have produced mixed results, a study showed that the effects of combination of these drugs can be very harmful. Studies have suggested an increased workers due to exposure to pesticides and in health care workers who handle chemotherapeutic drugs.

Objectives

The study primarily aimed to determine the fertility problems associated with pesticide use among farmers in the municipalities of Metro Vigan.

Specifically, it sought to answer the following questions:

1. What is the profile of the respondents in terms of :
 - a. Socio-demographic profile
 - a.1 age
 - a.2. occupation
 - a.3. educational attainment
 - a.4. monthly income
 - b. Pesticide-Related Factors
 - b.1. distance of farm from the house
2. What are the common pesticides used by farmers?
3. What is the level of practice of the farmers on the correct use of pesticide?
4. What are the fertility problems experienced by farmers in terms of gravidity, term, parity, live births, number of abortion, birth interval, physical defects, and common symptoms?
5. Is there a significant relationship between the fertility problems and the following set of variables: socio-demographic profile of the respondents and pesticide-related factors, common pesticides used and level of practice on pesticide use?

Scope and Delimitation

The study aimed to determine the fertility problems associated with pesticide use among farmers in selected municipalities in Metro Vigan.

The respondents were selected female farmers in Metro Vigan. A questionnaire checklist formulated by the researchers was the main gathering tool in the study. Frequency, mean and simple correlational analysis were the statistical tools used in the study

The study was conducted from October to November 2006.

Review of Related Literature

In epidemiological studies, exposure to pesticides has been associated with menstrual cycle disturbances, reduced fertility, prolonged time to pregnancy, spontaneous abortion, stillbirths and developmental defects, which may or may not be due to disruption of the female hormonal function. Because pesticides comprise a large number of distinct substances with dissimilar structures and diverse toxicity, it is most likely that several of the above-mentioned mechanisms are involved in the pathophysiological pathways explaining the role of pesticide exposure in ovarian cycle disturbances, ultimately leading to fertility problems and other reproductive effects (Bretveld, 2006).

Although a substantial amount of research has been conducted to associate occupational exposure to pesticides with fertility problems in men, studies among women are scarce. One reason maybe that exposure to pesticides is higher among men is the fact that men usually apply pesticides whereas women get exposed through re-entry activities only. Another reason maybe is that fertility in women is more difficult to asses than fertility in men. Ovarian disorders can be caused by a large variety of factors such as high levels of physical activity, age, stress, smoking and caffeine use. In addition, exposure to chemicals such as benzene and polychlorinated biphenyls (PCBs) can affect the menstrual cycle. There are also indicators that exposure to particular pesticides may induce ovarian dysfunction (<http://www.rbej.com/content>).

In a study conducted by Bell and colleagues in 1984, they compared a group of women who were exposed to pesticides than those who were not. They found out that there was a slight increase of fetal death due to birth defects when pesticides were applied near where the pregnant women lived.

The timing of the exposure also played an important role. If the women were exposed during the third and eighth week of pregnancy – the point when the fetal organs

are forming – the fetus seemed to be the most vulnerable to the effects of pesticide exposure. (Mac Cauley, 1984)

Maternal exposure to workplace or household pesticides in early pregnancy increases the risk for stillbirths. A study of pregnant women in Iowa and Michigan found that women exposed to multiple pesticides had an increased risk of giving birth to a child with cleft palate (Engel, 2000).

Researchers found higher rates of numerous birth defects in children born to Norwegian farmers exposed to pesticides including hormone effects like hypospadias and undescended testicles (Bolognesi, 2003).

While some substances cause physical birth defects, others can cause subtle hormonal effects on the developing fetus or affect a child's functional capacities. Hormone disruptors have been linked to many health problems including reproductive cancers. Twenty four pesticides still in the market, including 2, 4- D lindane and atragene are known endocrine-disruptors. Aside from increases in reproductive cancers, increasing rates of the following are reported. Animal studies link many of these conditions with pre-natal exposure to hormone disrupting substance. Among these diseases includes endometriosis, hypospadias, undescended testicles, precocious puberty in girls, reduced sperm counts and fertility problems.

A woman's occupation can affect her fertility, particularly if it involves exposure to high levels of chemicals, toxic substances, high temperatures, radiation, or persistent stress. Of particular concern are environmental chemicals, such as certain pesticides, aldrin, dieldrin, PCPs, dioxins, and furans, with estrogen-like effects. Although tests of single chemicals containing estrogen have produced mixed results, a study showed that the effects of combinations of these drugs can be very harmful. For example, studies have suggested an increased risk for infertility in female agricultural workers (probably due to exposure to pesticides) and in health care workers who handle chemotherapeutic drugs. Studies on the effects of electromagnetic wave emissions, including those from computer displays have been inconclusive. Nearly all monitors now comply with guidelines that reduce emissions and laptop computers, which use liquid crystal display monitors, are completely safe. In any case, women should avoid the side and back of computers where wave emission is strongest and sit as far from the front of the screen as possible. ([http://www. Stopgetting sick.com/condtions_template.cfm/1389/69/1](http://www.Stopgetting sick.com/condtions_template.cfm/1389/69/1))

As more researchers investigate the effects of environmental exposure to pesticides and other toxic chemicals, evidence increasingly suggests that these chemicals contribute to infertility (Environmental Health Perspective, 2006).

Recent studies have indicated negative trends in fertility. Data from the December 2005 report of the Centers for Disease Control and Prevention's National Survey on Family Growth reveals the fastest growing segment of US women with impaired fecundity is those under 25. Based on this report, approximately 12% of American couples experienced impaired fecundity in 2002. This is a 20% increase from the 6.1 million couples that reported an inability to have children in 1995.

Environmental exposure assessments, wildlife studies and animal and human studies hint at multiple factors including exposure to low level environmental contaminants such as phthalates, polychlorinated biphenyls, dioxins, pesticides and other chemicals may be undermining our ability to reproduce. Unfortunately, there is lack of definitive information available for couples experiencing fertility problems due to difficulties in declining measures of fecundity and research challenges involved when studying environmental contaminants.

On exposure and menstrual cycles, it has been observed that women who worked with pesticides suspected of being hormonally active has a 60-100% increased odds of experiencing long cycles, missed periods and inter-menstrual bleeding compared with women who had never worked with pesticides.

One key report was a review in the British Medical Journal indicating significant declines in sperm counts in many countries between 1938 and 1990. The findings were controversial because the reviewed studies used inconsistent designs and methods. In November 1997, however, a review confirmed the findings for males in the United States and indicated an even sharper decline among European men.

Researchers saw significant reductions in sperm concentration, motility and total motile sperm ion men from Columbia, Missouri compared with men in New York City, Minneapolis and Los Angeles. In an in-depth follow up study comparing variables between the Columbia and Minneapolis men, the researcher discovered that the Missouri group had higher exposure to agricultural pesticides. Further, men with low sperm counts were more likely to have higher urine metabolite levels of the pesticide alachlor, atrazine, metolachlor and diazinon.

Research Methodology

Research Design. The study made use of the descriptive correlational type of research.

Data Gathering Instrument. The study made use of a questionnaire checklist coupled with interview.

Population and Sample. The population of the study was female farmers in Metro Vigan. Purposive sampling was use in selecting the respondents for the study.

Statistical Treatment of Data

Frequency and percentage were used to describe the profile of the respondents in terms of socio-demographic, pesticide and fertility-related factors.

Mean was used to interpret the level of practice on pesticide use and common symptoms experienced during pregnancy.

Simple correlational analysis was used to determine the relationship between the severity of pesticide use and the other set of variables.

Results and Discussion

This chapter presents, interprets, and analyzes the data gathered in the study.

Profile of the Respondents

Table 1. Distribution of Respondents in Terms of Age.

Age	Caoayan		Bantay		San Vicente		Sta. Catalina		Vigan		Total	
	n	%	n	%	N	%	n	%	n	%	n	%
Above 70							1	2.78	1	4.55	2	1.50
65-69					1	4.55	2	5.56			3	2.26
60-64					6	27.27	2	5.56			8	6.02
55-59					2	9.09	6	16.67	4	18.18	12	9.02
50-54	1	6.67	1	2.63	2	9.09	7	19.44	1	4.55	12	9.02
45-49	1	6.67	4	10.53	1	4.55	5	13.89	2	9.09	13	9.77
40-44	6	40.0	10	26.32	3	13.64	4	11.11	6	27.37	29	21.80
35-39	5	33.33	10	26.32	4	18.18	2	5.56	3	13.64	24	18.05
30-34	2	13.33	9	23.68	1	4.55	4	11.11	3	13.64	19	14.29
25-29			3	7.89	2	9.09	2	5.56	2	9.09	9	6.77
20-24			1	2.63			1	2.78			2	1.50
Total	15	100.0	38	100.0	22	100	36	100.0	22	100.0	133	100.0

It can be seen from Table 1, that most of the respondents (29 or 21.80%) belong to the age bracket 40-44 years old and the least respondents (2 or 1.50%) belong to the ages 20 -24 years old and above 70 years old.

Table 2. Distribution of the Respondents in Terms of Occupation.

Occupation	Caoayan		Bantay		San Vicente		Sta. Catalina		Vigan		Total	
	N	%	n	%	N	%	n	%	n	%	n	%
Housekeeper	3	20.0	5	13.16	9	40.91	4	11.11	4	18.18	25	18.80
Farmer	8	53.33	33	86.84	3	13.64	32	88.99	14	63.64	90	67.67
Vendor	4	26.67			5	22.73			3	13.64	12	9.02
Teacher									1	4.55	1	0.75
Office worker					5	22.73					5	3.76
Total	15	100.0	38	100.0	22	100.0	36	100.0	22	100.0	133	100.0

Table 2 reveals that majority (90 or 67.67%) of the respondents are farmers and only one respondent (1 or 0.75%) is a teacher.

Table 3. Distribution of the Respondents in Terms of Educational Attainment.

Educational Attainment	Caoayan		Bantay		San Vicente		Sta. Catalina		Vigan		Total	
	N	%	N	%	N	%	n	%	n	%	n	%
Elementary Level			2	5.26			2	5.56	5	22.73	9	6.77
Elementary Graduate			7	18.42			2	5.56	4	18.18	13	9.77
High School Level	2	13.33	8	21.05	3	13.64	3	8.33	5	22.73	21	15.79
High School Graduate	6	40.0	11	28.95	3	13.64	10	27.78	3	13.64	33	24.81
College Level	7	46.67	8	21.05	8	36.36	8	22.22	2	9.09	33	24.81
College Graduate			2	5.26	8	36.36	11	30.56	3	13.64	24	18.05
Total	15	100	38	100	22	100	36	100	22	100	133	100

As shown on Table 3, there are equal number of respondents (33 or 24.81%) each who has finished high school level and college level. There are only nine (9 or 6.77%) respondents who reached elementary level.

Table 4. Distribution of the Respondents in Terms of Monthly Income.

Educational Attainment	Caoayan		Bantay		San Vicente		Sta. Catalina		Vigan		Total	
	N	%	n	%	N	%	n	%	n	%	n	%
Below 1000	1	6.67	14	36.84	3	13.64	1	2.78	1	4.55	20	15.04
1001-5000	8	53.33	19	50.0	10	45.45	14	38.89	18	81.82	69	51.88
5001-10,000	6	40.0	5	13.16	9	40.91	7	19.44	3	13.64	30	22.56
10001 – 15,000							4	11.11			4	3.01
15,001-20,000							3	8.33			3	2.25
Above 20,000							7	19.44			7	5.26
Total	15	100.0	38	100.0	22	100.0	26	100.0	22	100.0	133	100.0

It can be gleaned from Table 4 that most of the respondents (69 or 51.88%) have a monthly income between 1001 – 5000. The least of the respondents (3 or 2.25%) have a monthly income between 15,001-20,000.

Table 5. Distribution of Respondents in Terms of Pesticide-Related Factors.

Pesticide-Related Factors	Caoayan		Bantay		San Vicente		Sta. Catalina		Vigan		Total	
	N	%	n	%	N	%	n	%	n	%	n	%
Distance of House from Farm												
Less than 1 km	13	86.67	31	81.58	1	4.55	28	77.78	22		95	71.43
1 km	2	13.33	3	7.89	19	86.36	5	13.89			29	21.80
2 km			4	10.53	1	4.55	3	8.33			8	6.02
3 km and above					1	4.55					1	0.75
Total	15	100	38	100	22	100	36	100	22	100	133	100
Frequency of Exposure to Pesticide												
Always (whole year round)							20	55.56	1	4.55	21	15.79
Often (7-9 mos)			4	10.53	1	4.55	5	13.89			10	7.52
Sometimes (4-6 mos)	13	86.67	18	47.37	8	36.36	7	19.44	5	22.73	51	38.35
Seldom (1-3 mos)	2	13.33	14	36.84	12	54.55	4	11.11	15	68.18	47	35.34
Never			2	5.26	1	4.55			1	4.55	4	3.00
Total	15	100	38	100	22	100	36	100	22	100	133	100

Table 5 shows that majority of the respondents (95 or 71.43%) have their houses situated less than 1 km from the farm and only one respondent (1 or 0.75%) live more than 3 km away from the farm.

As to the frequency of exposure, Table 5 further shows that most of the respondents (51 or 38.35%) are exposed to pesticides “sometimes” or within 4-6 months periods. Only four respondents (4 or 3.00%) are “never” exposed to pesticides within the whole year.

Common Pesticides Used by Farmers

As shown in Table 6, the top 5 pesticides commonly used in the municipalities of Metro Vigan are lanate, karate, serin and atabron, pinnate, and decis and biodan, respectively.

Table 6. Common Pesticides Used by Farmers.

Pesticides	Caoayan		Bantay		San Vicente		Sta. Catalina		Vigan		Total	
	n	%	n	%	N	%	n	%	n	%	n	%
Tamaron	7	28.0	2	2.44	11	50.0					20	7.04
Herbicide									1	1.72	1	0.35
Urea	7	28.0	12	14.63							19	6.69
Ammonia	4	16.0	6	7.32							10	3.52
Karate	7	28.0	10	12.20					10	17.24	27	9.51
Oneside					4	18.18	3	3.09	3	5.17	10	3.52
Thiodan			16	19.51			2	2.06			18	6.34
Biodan			1	1.22			19	19.59	1	1.72	21	7.39
Lanate			14	17.07			10	10.31	8	13.79	32	11.27
Steward							2	2.06			2	0.70
Pennate							21	21.65	1	1.72	22	7.75
Decis							5	5.15	17	29.31	22	7.75
Serin			17	20.73	6	27.27					23	8.10
Selecion							12	12.37			12	4.23
Atabron							23	23.71			23	8.10
Complete			2	2.44							2	0.70
Phyador					1	4.55					1	0.35
Magnesia			2	2.44							2	0.70
Ronstar									17	29.31	17	5.99
Total	25	100	82	100	22	100	97	100	58	100	284	100

Level of Practice of the Farmers on the Correct Use of Pesticide

Table 7 reveals that as a whole, there is a “high” level of practice of farmers on the use of pesticide.

Specifically, it is from the municipality of Vigan in which farmers have the highest practice ($x=4.11$), followed by Caoayan ($x=3.98$), Sta. Catalina ($x=3.58$), Bantay ($x = 3.28$) and San Vicente ($x = 3.12$).

Table 7. Level of Practice of Farmers on the Use of Pesticide

Items	Caoayan		Bantay		San Vicente		Sta. Catalina		Vigan		Total	
	X	DR	x	DR	X	DR	x	DR	X	DR	x	DR
1. Uses gloves when spraying.	4.64	VH	2.10	L	2.86	A	3.36	H	4.04	H	3.40	A
2. Uses face mask while spraying.	4.80	VH	2.05	L	3.14	A	3.42	H	4.23	VH	3.52	H
3. Washes hands after spraying.	3.60	H	4.74	VH	4.63	VH	4.61	VH	5.00	VH	4.52	VH
4. Takes a bath after spraying.	3.87	H	3.26	A	4.00	H	3.92	H	4.95	VH	4.00	H
5. Changes clothes after spraying.	3.87	H	3.21	A	4.55	VH	4.08	H	4.95	VH	4.13	H
6. Discards containers of spray properly.	4.47	VH	4.50	VH	3.82	H	3.97	H	4.86	VH	4.32	VH
7. Dilutes spray with water.	4.73	VH	4.42	VH	3.45	H	4.75	VH	4.77	VH	4.42	VH
8. Does the spraying herself.	3.73	H	1.92	L	1.45	VL	3.64	H	3.91	H	2.93	L
9. Stays in the farm for 24 hours.	3.27	A	2.47	L	1.27	VL	2.14	L	2.04	L	2.24	L
10. Sprays 4x a year.	3.60	H	2.76	A	2.36	L	4.22	VH	2.23	L	3.03	A
11. Have someone do the spraying.	3.53	H	3.74	H	2.86	A	2.19	L	4.5	VH	3.36	A
12. Washes the container of the spray after using.	3.73	H	4.16	H	3.04	A	2.67	A	3.86	H	3.49	H
	3.98	H	3.28	A	3.12	A	3.58	H	4.11	H	3.61	H
Legend:	Item	Overall										
4.21-5.00	Always	Very High										
3.41 – 4.20	Very Often	High										
2.61 – 3.40	Often	Fair										
1.81 – 2.60	Seldom	Low										
1.00 – 1.80	Never	Very Low										

Fertility Problems Experienced by Farmers

As shown on Table 8, most of the respondents (61 or 45.86%) were pregnant for 3-4 times. Only three respondents (3 or 2.26%) have no pregnancy at all.

Table 8. Distribution of Respondents in Terms of Gravidity.

Gravidity	Caoayan		Bantay		San Vicente		Sta. Catalina		Vigan		Total	
	n	%	n	%	N	%	n	%	n	%	n	%
0							3	8.23			3	2.26
1-2	3	20.0	11	28.95	8	36.36	14	38.89	8	36.36	44	33.08
3-4	12	80.0	21	55.26	10	45.45	11	30.56	7	31.82	61	45.86
5-6			5	13.16	3	13.64	6	16.67	4	18.18	18	13.53
7 and above			1	2.63	1	4.55	2	5.56	3	13.64	7	5.26
TOTAL	15	100	38	100.0	22	100	36	100	22	100	133	100.

Table 9. Distribution of Respondents in Terms of Term.

Term	Caoayan		Bantay		San Vicente		Sta. Catalina		Vigan		Total	
	n	%	N	%	N	%	n	%	n	%	n	%
Full-term (37-42 weeks)	15	100	38	100	22	100	31	79.49	22	100	128	96.24
Pre-term (less than 37 weeks)							4	11.11			4	3.00
Post Term (more than 42 weeks)							1	2.56			1	0.76
TOTAL	15	100	38	100	22	100	36	100.0	22	100	133	100

As shown in Table 9, almost all (128 or 96.24%) of the respondents delivered their babies in full term (within 37-42 weeks). There were four (4 or 3.00%) respondents who had delivered a pre-term baby and only one (1 or 0.76%) respondent has delivered a post term baby.

Table 10. Distribution of Respondents in Terms of Parity.

Parity	Caoayan		Bantay		San Vicente		Sta. Catalina		Vigan		Total	
	n	%	N	%	N	%	n	%	n	%	n	%
0							7	19.44			7	5.26
1-2	4	26.67	11	28.95	8	36.36	17	47.22	11	50.0	51	38.35
3-4	11	73.33	21	55.26	10	45.45	7	19.44	7	31.82	56	42.11
5-6			6	15.79	3	13.64	3	8.33	2	9.09	14	10.53
7 and above					1	4.55	2	5.56	2	9.09	5	3.76
TOTAL	15	100.0	38	100.0	22	100.0	36	100.0	22	100.0	133	100.0

As gleaned from the table, fifty six (56 or 42.11%) respondents have 3-4 live births and only five respondents (5 or 3.76%) have more than 7 live births.

Table 11. Distribution of Respondents in Terms of Live Births.

No. of Live Births	Caoayan		Bantay		San Vicente		Sta. Catalina		Vigan		Total	
	n	%	N	%	N	%	N	%	N	%	N	%
0							3	8.33			3	2.26
1-2	4	26.67	12	31.58	11	5.00	19	52.78	11	50.0	57	42.86
3-4	11	73.33	21	55.26	8	36.36	11	30.56	7	31.82	58	43.61
5-6			5	13.16	3	13.64	2	5.56	2	9.09	12	9.02
7 and above							1	2.78	2	9.09	3	2.26
TOTAL	15	100.0	38	100.0	22	100.0	36	100.0	22	100.0	133	100.0
No. of Stillbirths												
1-2	1		1		1		9				12	

Most of the respondents (58 or 43.61%) have 3-4 live births while only three (3 or 2.26%) have 7 and above live births.

It can also be shown on the table that there are 12 respondents who gave birth to still birth babies.

Table 12. Distribution of Respondents in Terms of the Number of Abortion.

Number of Abortion	Caoayan		Bantay		San Vicente		Sta. Catalina		Vigan		Total	
	n	%	N	%	N	%	N	%	n	%	n	%
With abortion	1	6.67	7	18.42	5	22.73	7	19.44	6	27.27	26	19.55
Without abortion	14	93.33	31	81.58	17	77.27	29	80.56	16	72.73	107	80.45
Total	15	100.0	38	100	22	100	36	100.0	22	100	133	100.0
No. of Abortion												
1	1		6		3		6		6		22	
2			1		1		1				3	
3					1						1	

Majority of the respondents (107 or 80.45%) did not suffer from abortion. There were twenty six (26 or 19.55%) respondents who had abortion.

Of those who had abortion, most of them had experienced abortion only once.

Table 13. Distribution of Respondents in Terms of the Birth Interval of Children

Birth Interval of Children (in Years)	Caoayan		Bantay		San Vicente		Sta. Catalina		Vigan		Total	
	N	%	N	%	N	%	n	%	n	%	n	%
0							3	8.33	2	9.09	5	3.76
1-2	11	73.33	24	63.16	9	40.91	7	19.4	10	45.45	61	45.86
3-4	4	26.67	12	31.58	10	45.45	24	66.6	7	31.82	57	42.86
5-6			2	5.26	2	9.09	2	5.56	3	13.64	9	6.77
Above 6					1	4.55					1	0.75
TOTAL	15	100	38	100	22	100	36	100	22	100	133	100

Most of the respondents (61 or 45.86%) have 1-2 years interval of their children and only one (1 or 0.75%) respondent has more than 6 years interval of childbearing.

Table 14. Distribution of Respondents in Terms of the Presence of Physical Defects in Children

Physical Defects	Caoayan		Bantay		San Vicente		Sta. Catalina		Vigan		Total	
	n	%	N	%	n	%	N	%	n	%	n	%
Yes					1	4.55	2	5.56			3	2.26
No	15	100.0	38	100.0	21	95.45	34	94.4	22	100.0	130	97.74
Total	15	100.0	38	100.0	22	100.0	36	100	22	100.0	133	100.0
Types of Physical defects												
Psychotic					1							
Cleft Palate							1					
Epilepsy							1					

Table 14 shows that one hundred thirty (130 or 97.74%) respondents do not have any children with physical defects but three respondents (3 or 2.26%) have children with physical defects. The physical defects suffered by these children are psychosis, cleft palate and epilepsy.

Table 15. Common Symptoms Experienced by Farmers During Pregnancy

Common Symptoms	Caoayan		Bantay		San Vicente		Sta. Catalina		Vigan		Total	
	\bar{x}	DR	\bar{x}	DR	\bar{x}	DR	\bar{x}	DR	\bar{x}	DR	\bar{x}	DR
1.dizziness	2.60	L	2.34	L	2.09	L	3.03	Mo	3.32	Mo	2.67	Mo
2.vomitting	1.60	VL	2.13	L	1.50	VL	2.91	Mo	2.82	Mo	2.19	L
3.difficulty in breathing	1.33	VL	1.71	VL	1.23	VL	1.89	L	1.23	VL	1.47	VL
4.colds	2.80	Mo	1.97	L	1.82	L	1.97	L	1.50	VL	2.01	L
5.fever	1.20	VL	1.89	L	1.59	VL	1.11	VL	1.00	VL	1.35	VL
6.skin allergies	1.46	VL	1.39	VL	1.27	VL	1.25	VL	1.18	VL	1.31	VL
7.hypertension	1.60	VL	1.60	VL	1.27	VL	2.19	L	1.36	VL	1.60	VL
8.headache	2.20	L	1.47	VL	1.63	VL	2.25	L	1.95	L	1.90	L
9.blurred vision	1.06	VL	1.76	VL	1.82	L	1.08	VL	1.23	VL	1.39	VL
10.fainting	1.13	VL	1.61	VL	1.14	VL	1.05	VL	1.36	VL	1.25	VL
11.loss of appetite	1.2	VL	1.76	VL	1.27	VL	2.03	L	1.18	VL	1.48	VL
12.weakness	1.33	VL	2.02	L	2.27	L	2.33	L	2.04	L	1.99	L
13.depression	1.06	VL	1.63	VL	1.09	VL	1.33	VL	1.09	VL	1.24	VL
OVERALL	1.58	VL	1.79	VL	1.57	VL	1.87	L	1.64	VL	1.68	VL

As gleaned from Table 15, overall, there is a “very low” (\bar{x} =1.68) occurrence of the common symptoms of pregnancy among the respondents in all the municipalities.

Significant Relationship Between the Fertility Problems

Age significantly influences some of the fertility problems as gravidity ($r=0.38$), parity ($r=0.35$) and live birth ($r=0.35$). It means that the elder the woman, the higher are the fertility problems. This is backed up by Decheaney and Pernott which states that chromosomal disorders and other fetal abnormalities appear to increase with advancing maternal age. Other complications that appear to be related to advanced maternal age include hypertension, intrauterine growth retardation, gestational diabetes mellitus and preterm delivery. Maternal ages of 20-29 years have the lowest rates of maternal perinatal ad infant morbidity and mortality; younger and older women have higher rates.

As shown on the table, many of the fertility problems are associated with many socio- demographic characteristics of the pregnant mothers along the following:

On parity, many clinicians believe that women who have had 6 or more previous deliveries are at risk of uterine inertia during labor and of post partum hemorrhage due to uterine atony.

Table 16. Correlation Coefficient Showing the Relationship Between the Fertility Problems, Socio-Demographic Factors, Pesticide Related Factors, Common Pesticide Used and Level of Practice

Socio-demographic Factors	Fertility Problems						Presence of Defects	Common Symptoms
	Gravidity	Parity	Term	Abortion	Live Births	Interval		
Age	0.38*	0.35*	-0.13	-0.11	0.35*	0.04	-0.07	0.03
Educational Attainment	0.21*	0.25*	-0.06	0.04	0.22*	0.24*	0.07	0.02
Occupation	-0.03	-0.10	0.05	0.11	-0.08	0.00	-0.16	-0.39*
Monthly Income	-0.08	-0.14	-0.11	-0.21*	-0.18*	-0.13	0.10	0.27*
B. Pesticide-related								
Distance from Farm	0.07	0.07	-0.04	-0.08	-0.07	0.16	0.00	0.18*
Frequency of Exposure	0.02	0.05	0.18*	0.10	0.05	0.08	0.15	-0.31*
C. Common Pesticides Used	-							
D. Level of Practice	0.05	-0.02	-0.02	-0.18*	-0.08	0.01	0.02	0.04

* Correlation significant at 0.05 level

Still on the table, educational attainment significantly influences the following fertility problems such as gravidity ($r=0.21$), parity ($r=0.25$), live births ($r=0.22$) and birth interval ($r=0.24$). This means that the higher the educational attainment of the pregnant mother, the better are the prenatal practices that would prevent the risks brought about by pregnancy and delivery, and vice versa. Likewise, with higher educational attainment, the higher the chances for a healthier live birth because of the knowledge of the mother. The desired pregnancy interval will also be attained if the mother has higher educational attainment. This again may be attributed to the knowledge or the knowledge and benefits to be derived from proper birth intervals.

On the table, occupation also yielded a significant relationship with the experience of common symptoms during pregnancy ($r=-0.39$). The negative correlation reveals that the better the occupation of the pregnant woman, the lesser the discomforts of pregnancy experienced by the mother. It further means that the mother will not be exerting so much physically that will aggravate the discomforts of pregnancy and vice versa.

Abortion, live births and common symptoms during pregnancy are significantly influenced by the income of the pregnant mothers and her family. It means that the lower

the incomes of the family, the higher are the risks for abortion and occurrence of common discomforts. It further denotes that the lower the income, the poorer the health practices of the pregnant woman that this may increase the risks for abortion and discomforts during pregnancy.

Live birth is also influenced by the income of the family ($r=-0.18$) which means that the higher the income, the higher are the chances of having healthier fetus and more live births, the lower are the risks for abnormal births or stillbirths.

Among the problems of infertility, only common symptoms was found to have significant relationship with the distance from the house to the farm ($r=0.18$) where pesticides are being used. This is so because the closer the distance between the farm and the location of the house, the higher must be the symptoms or discomfort felt by the pregnant woman. The discomforts or symptoms may be aggravated by the effects of the pesticide used where the mother is being exposed.

The frequency of the use of pesticide may also influence the term of the delivery ($r=0.18$) of the baby. It means that with the known effects of pesticides, it is a factor in having a delivery which may not reach full term. As a hazard, it has adverse effects on the fetus inside the womb of the mother.

Lastly, there is a significant influence on the level of practice on the use of pesticide and abortion ($r=-0.18$). This means that if the practice on the use of pesticide is not healthy or when safety measures are not being applied properly, then the risks of abortion is very high. If the practice is good or healthy, the risk of abortion is low because the pregnant mother is not highly exposed to the hazards of the harmful chemicals. It confirms with Decheaney and Pernott that “a teratogen is any substance , agent or environmental factor that can adversely affect the development of the fetus as evidenced by the presence of malformation or maldevelopment of some of the fetus.”

Conclusions

1. Majority of the respondents are middle-aged adults, farmers, with low educational attainment and low monthly income.
2. Most of the respondents live near the farm where the pesticides are sprayed and are “sometimes” exposed to pesticides within a year.
3. The respondents have a “high” level of practice on the correct use of pesticides.

4. Majority of the respondents have been pregnant 3-4 times, have 3-4 living children, delivered full term babies, did not experienced abortion and have children with no physical defects. The respondents also experienced “very low” symptoms or discomforts during pregnancy.

5. The following variables were found to be significantly related:
 - a. Gravity and parity are significantly related to age and educational attainment.
 - b. Live births is significantly related to age, educational attainment and monthly income.
 - c. Income is significantly related to abortion and level of practice on the correct use of pesticides.
 - d. Birth interval is significantly related to educational attainment.
 - e. Common symptoms during pregnancy is significantly related to occupation, monthly income, distance of exposure to pesticide and frequency of exposure to pesticide.

Recommendations

Based from the conclusions, the researchers forward the following recommendations:

1. The Department of Agriculture should conduct dissemination programs on the hazards of pesticides as well as to brief the farmers on the proper techniques of pesticide use.
2. Pregnant farmers should take necessary precautions not to expose themselves to pesticides to minimize the risk and abnormalities that pesticides can cause.
3. A similar study should be conducted to include more respondents and to include other variables relevant to the study.

References

- Mc Cauley, Linda A, et.al. 1984. Studying Health Outcomes in Farmworker Populations Exposed to Pesticides: Environmental Health Perspectives.
- Bolognesi, C. 2003. Genotoxicity of Pesticides: A Review of Human Biomonitoring Studies. *Mutat Res* 543: 251-272.
- Engel, L.S. et. al. 2000. Maternal Occupation in Agriculture and Risk of Limb Defects in Washington State. *Scandinavian Journal of Work, Environment and Health* 26 (3): 193-198. [S.L.: s.n.]
- Strong, LL, et.al. 2003. Health Symptoms and Exposure to Organophosphate pesticides in Farmworkers. *American Journal Ind Med* 46:599-606. [S.L.: s.n.]
- Windahm, Frank. 2002. *Pesticides: Problems, Improvements, Alternatives*. USA: University Science Books.
- [.http://flcv.com/pesticid.html](http://flcv.com/pesticid.html)
- [http://www. Stopgetting sick.com/condtions_template.cfm/1389/69/1](http://www.Stopgetting sick.com/condtions_template.cfm/1389/69/1)
- <http://www.rbej.com/content>