AN ANALYTICAL STUDY OF THE LEVEL OF KNOWLEDGE OF SECONDARY SCHOOL TEACHERS IN AJDABIYA REGARDING THE USE OF MEDICINAL PLANTS

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Abstract:
This study aims to assess the level of general knowledge among secondary-school female teachers in the city of Ajdabiya regarding medicinal plants and their uses. The study was conducted on a sample of 241 teachers who were interviewed across nine secondary schools in Ajdabiya to complete a questionnaire consisting of 20 items. The findings revealed that most teachers possessed a moderate level of knowledge about medicinal plants, and their degree of reliance on information sources and confidence in the accuracy of such information was also moderate. However, their awareness of the potential hazards associated with these plants was limited. The results further indicated that older teachers exhibited a higher level of knowledge about medicinal plants and demonstrated greater confidence in using them compared to younger teachers.
The study recommends strengthening the role of media and educational programs to improve knowledge about medicinal plants in a manner that ensures safe use.

Keywords: medicinal plants**,** Ajdabiya Region – Libya**,** Stages the Plant Undergoes from Collection to Use

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Introduction

God Almighty created plants on Earth before creating humankind, making the means of human subsistence and that of all living creatures dependent on the resources produced by these plants. From the earliest times, humans used plants as food and later began cultivating them; at other times, they relied on plants as medicine for healing Since the beginning of human existence, people have been in a continuous struggle against disease. Guided by innate instinct and the intellectual capacity with which God distinguished them from other creatures, humans turned to herbs as their primary and only available means of treatment Herbal medicine dates back approximately 6,000 years. The ancient Egyptians were among the first civilizations to show great interest in medicinal plants, while the Chinese collected and used medicinal plants as early as 4,000 to 5,000 years before Christ. After the discovery of antibiotics in the past century and their widespread use, reliance on medicinal plants declined. However, due to limitations associated with antibiotics such as side effects and the resistance developed by certain microbial strains medicinal and aromatic plants have regained their importance as one of the major sources of pharmaceuticals. They are also used as flavoring and preservative agents in several countries, owing to their natural availability, the presence of various highly active compounds, and their broad applications, in addition to the relatively limited side effects they cause (Al-Aghwani, 2024).

Medicinal plants are defined as plants that possess medicinal properties and characteristics capable of effectively treating certain human diseases through one or more of their parts. A medicinal plant contains active constituents, which may consist of one or several compounds that exert specific physiological effects in the treatment of diseases, whether in their purified form after extraction or in their natural state fresh, dried, or as an extract. Medicinal plants have occupied an important position in traditional medicine and herbal therapy across many countries worldwide. Approximately 80% of the world's population continues to rely on them due to their availability, ease of access, low cost, promising efficacy, and because they help avoid the adverse effects associated with chemical pharmaceuticals. Although most medicinal plants are non-toxic, some species can be highly poisonous to humans and animals.

Medicinal plants also referred to as herbal plants were discovered and used in traditional medical practices since prehistoric times. They served as a primary therapeutic option for a wide range of diseases across various cultures, and they are still used globally as an alternative traditional medicine for treating numerous ailments (Okoye et al., 2014).Scientists estimate that there are approximately 250,000 to 500,000 species of medicinal plants on Earth, with only a small proportion of these plants used as food for humans and animals, and an even smaller number employed for medicinal purposes (Ekwenye & Elegalam, 2005). Medicinal plants possess a variety of biological properties that must be identified, studied, and documented to ensure their safe use, while also guiding others toward proper application. Some plants may cause harmful side effects in humans and animals, and in certain cases may even be toxic enough to damage body organs. Owing to the significance of this topic, this study was undertaken. Medicinal plants differ from other plant species in that they contain certain compounds with therapeutic and pharmacological effects, which form the basis for classifying them as medicinal. When dealing with such plants, several considerations must be taken into account, the most important of which are:

- The specific part of the plant that possesses medicinal significance and should therefore be separated and preserved for use.
- Each plant has a particular part that must be utilized to achieve maximum benefit, due to the high concentration of active constituents in that part. The most commonly isolated components for therapeutic purposes include flowers, fruits, roots, leaves, buds, growing tips, bark, and the peels surrounding the fruits and vegetables.
- The active compounds present in the plant and the methods used for their extraction.
- The environment in which the plant is found, whether it grows naturally in the wild or is cultivated in agricultural fields.

It is essential first to identify and classify the medicinal plant to avoid confusing it with non-medicinal species that resemble it. This includes accurately describing its morphological characteristics and structural features, such as the shape of the leaf, the form and color of the flowers, the number of petals, and, preferably, examining tissue sections under a microscope. Such procedures are typically carried out by specialists in plant taxonomy, after which the sequential stages required to process and prepare the plant for use can begin.

Stages the Plant Undergoes from Collection to Use

1. Collection Stage: The individual responsible for collecting medicinal plants must be knowledgeable about the characteristics of the plant being harvested and aware of its natural habitat or cultivated locations. The collection process should follow these principles:

- The entire plant, or its leaves and flowers, should be collected at midday, whereas roots are collected from moist soil to allow for easier extraction (Al-Shammaa, Agha, & Al-Nouri, 2012).
- The plant or its parts must be collected during the appropriate season or at the specific time when the active constituents reach their peak concentration, which is usually linked to a particular stage in the plant's life cycle. For example, if flowers are the desired part, they should be harvested during full bloom; leaves should be collected at the beginning of flowering; and bark is typically harvested in spring. Extreme care must be taken to ensure the purity of the collected plant

materials during harvesting, keeping them free from soil, dirt, weeds, insects, pesticides, and other contaminants.

2. Cleaning Stage: This stage is essential for purifying the plant and its parts from impurities, and it is preferably carried out immediately after collection. Leaves, flowers, and roots should be cleaned at room temperature using a stream of purified water, also at room temperature.

3. **Drying Stage:** Drying is a fundamental process, as it helps preserve the active properties of the plant. Its primary purpose is to remove moisture from the medicinal plant material for several reasons:
a. Water activates plant enzymes that degrade (break down) active compounds; therefore, drying helps preserve these constituents.

b. Drying plant parts facilitates their grinding in preparation for extraction with organic solvents. Additionally, proper drying protects plant material from fungal growth and decay during storage.

- Drying methods vary depending on the type of plant, its components, tissue characteristics, and its water content.
- Types of Drying Methods for Plants

1. Natural Drying: Natural drying is carried out under ambient environmental conditions. Plant parts are spread out on clean, wide surfaces in a single, non-overlapping layer and placed in dark, well-ventilated rooms for several days until they reach complete dryness (Al-Ghizzi & Eid, 2006)
2. Industrial Drying: In industrial drying, conditions such as temperature and airflow are carefully controlled, often using specialized ovens. This method is characterized by its ability to rapidly inactivate degradative enzymes and efficiently produce fully dried plant material.

Study Objectives:

1. To determine the extent of general knowledge among secondary-school female teachers regarding medicinal plants and their therapeutic uses.
2. To assess the degree to which teachers support the use of medicinal plants in treatment, their confidence in their effectiveness, their preference for using them, and their level of general awareness of the potential side effects associated with certain types of medicinal plants.

Applied Section:

This chapter presents and analyzes the questionnaire data collected from a sample of 241 participants drawn from nine secondary schools in the city of Ajdabiya. To achieve the objectives of the study, the statistical software package *IBM SPSS Statistics 25* was used as the primary tool for analyzing the study data.

Presentation of the Study Data (Analysis of the General Characteristics of the Study Sample)

1. Description of the Sample according to Age, Marital Status, and Years of Teaching Experience?

Description of the Sample According to Age		
Age Group	Number	Percentage
18–25	97	40.3%
25–30	30	12.4%
30 and above	114	47.3%
Total	241	100%

Table (1): Description Sample According to Age

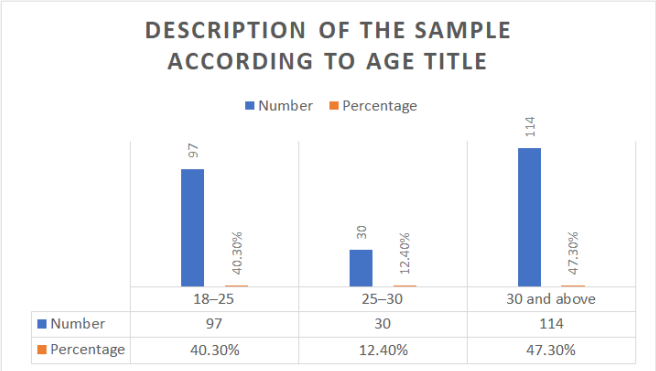

Figure (1) Age Distribution

2. Sample Description Based on the Question: Description of the Sample According to Marital Status?

Description of the Sample According to Marital Status		
Marital Status	Number	Percentage
Single	122	50.7%
Married	103	42.7%
Divorced	8	3.3%
Widowed	8	3.3%
Total	241	100%

Table (2): Description of the Sample According to Marital Status

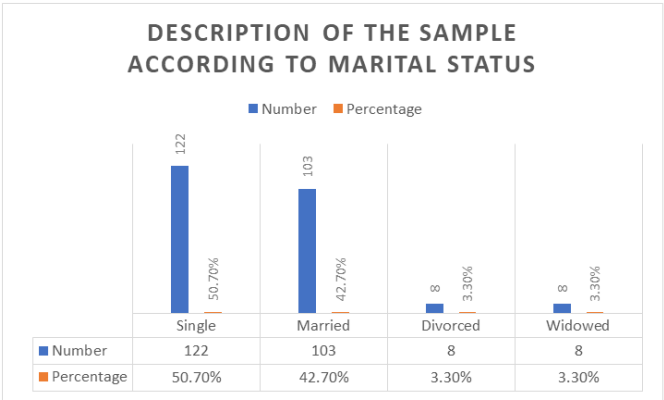

Figure (2): Marital Status Distribution

3. Sample Description Based on the Question: Description of the Sample According to Years of Experience**?**

Description of the Sample According to Years of Experience		
Years of Experience	Number	Percentage
5–15 years	154	63.9%
15–25 years	49	20.8%
25 years and above	38	15.8%
Total	241	100%

Table (3): Description of the Sample According to Years of Experience

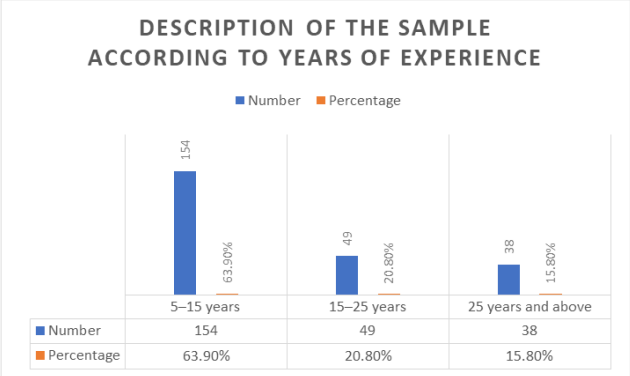

Figure (3): Description of the Sample According to Years of Experience

The results of the previous tables indicate that the ages of the respondents in the study sample mostly fall within the category of 30 years and above, with a total of approximately 114 respondents. The findings also revealed that the majority of the respondents were single, totaling around 122 individuals, representing approximately 50.7%. Additionally, the results showed that the years of experience for most respondents ranged between 5 and 15 years, with 154 respondents in this category, accounting for 63.9%.

4. Sample Description Based on the Question: "What are the reasons behind your attempt to obtain medicinal plants?

The reasons behind your attempt to obtain medicinal plants		
Reason	Number	Percentage
Health-related	162	67.2%
Cosmetic purposes	34	14.1%
Academic/study purposes	7	2.9%
Curiosity	22	9.1%
Influence of others' experiences	16	6.6%
Total	241	100%

Table (4): The reasons behind your attempt to obtain medicinal plants

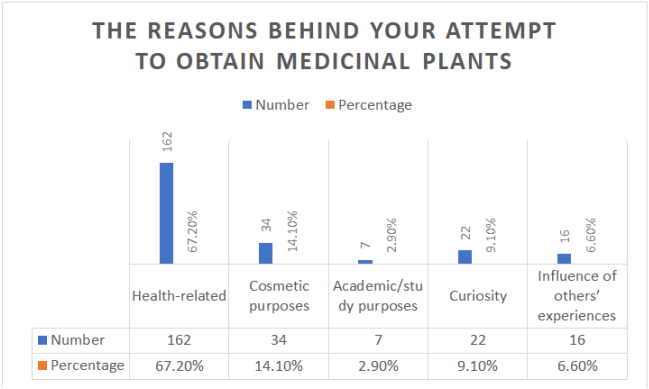

Figure (4) illustrates the reasons behind your attempt to obtain medicinal plants.

It is clear from Table (4) and Figure (4) that the reasons behind the sample's attempt to obtain medicinal plants were predominantly health-related, accounting for 67.2%. This was followed by cosmetic purposes at 14.1%, while the least common reason was academic purposes.

5. What are the sources you relied on to obtain information about the use of medicinal plants?

Sources relied upon to obtain information about the use of medicinal plants		
Source	Number	Percentage
Media	32	13.3%
Others' experiences	111	46%
Books and references	20	8.3%
Social media platforms	78	32.4%
Total	241	100%

Table (5): Sources relied upon to obtain information about the use of medicinal plants

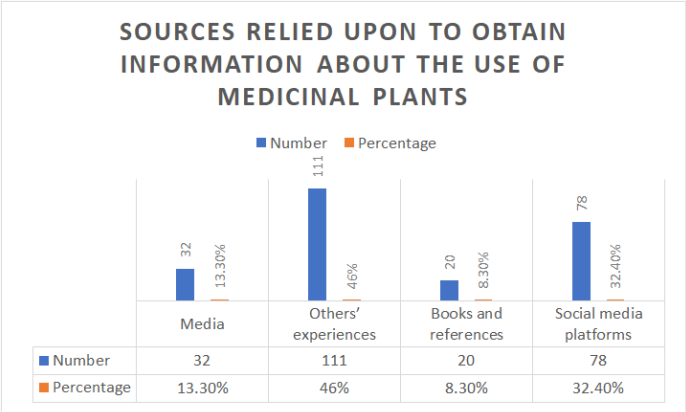

Figure (5) the sources relied upon to obtain information about the use of medicinal plants.

It is evident from Table (5) and Figure (5) that 46.06% of the respondents relied on others' experiences as their primary source of information on the use of medicinal plants. This was followed by social media, which ranked as the second most common source, accounting for 32.7% of the information obtained about the use of medicinal plants.

6. what extent did you benefit from the sources mentioned above in obtaining your information?

The extent to which you benefited from the sources mentioned above in obtaining your information		
Level of Benefit	Number	Percentage
None	12	5%
Moderate	173	71.8%
High	56	23.2%
Total	241	100%

Table (6): the extent to which the mentioned sources are used to obtain information

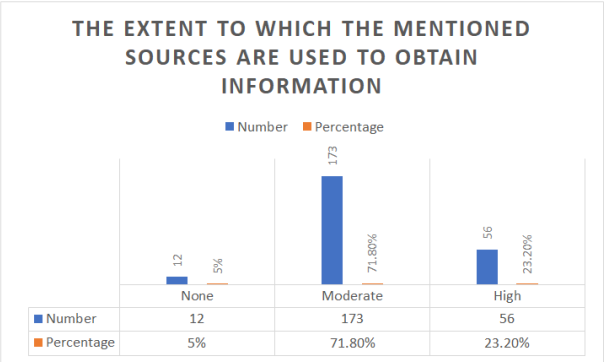

Figure (6) shows the extent to which the mentioned sources are used to obtain information.

From Table and Figure (6) above, it is evident that the level of benefit gained from the sources mentioned was moderate, accounting for 71.78%.

7. What is your opinion on the quality of locally available medicinal plants?

Your opinion on the quality of locally available medicinal plants		
Quality Rating	Number	Percentage
Excellent	69	28.7%
Acceptable	156	64.7%
Poor	16	6.6%
Total	241	100%

Table (7): Your opinion on the quality of locally available medicinal plants

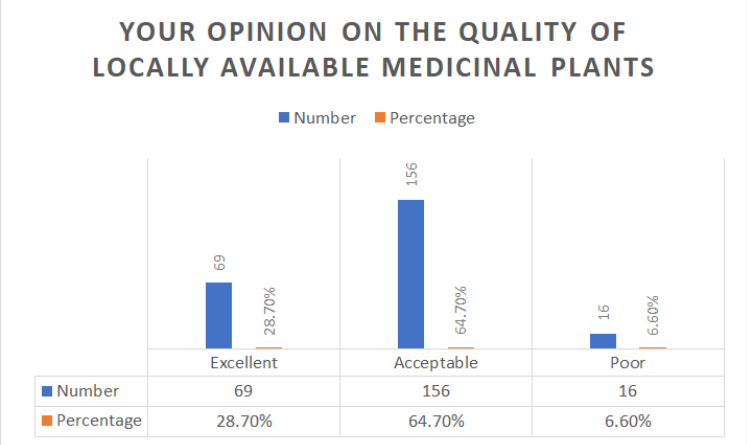

Figure (7) illustrates your opinion on the quality of locally available medicinal plants.

8. How many medicinal plants are you able to identify by name?

Number of Medicinal Plants Known by Name		
Category (Number of plants known)	Count	Percentage
5–10	148	61.5%
11–20	70	29%
20 and above	23	9.5%
Total	241	100%

Table (8): Number of Medicinal Plants Known by Name

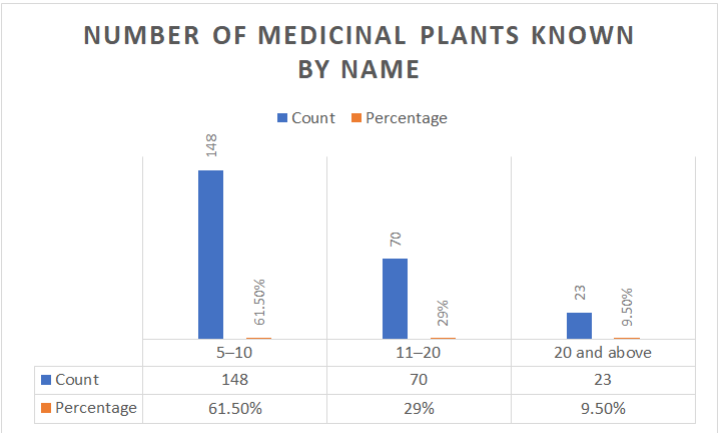

Figure (8): Number of Medicinal Plants Known by Name

From Table (8) and Figure (8), it is evident that the opinions of the sample members indicate a generally low level of knowledge regarding the names of medicinal plants. Approximately 148 individuals reported knowing between 5 and 10 plants, representing the largest group among the categories. This limited knowledge may be attributed to a lack of awareness of the broad field of medicinal botany and its numerous benefits and applications.

9. How confident are you in the accuracy of information about medicinal plants?

Level of Confidence in the Accuracy of Information About Medicinal Plants		
Confidence	Count	Percentage
Not confident	9	3.7%
Slightly	143	59.4%
Very confident	89	36.9%
Total	241	100%

Table (9): Level of Confidence in the Accuracy of Information About Medicinal Plants

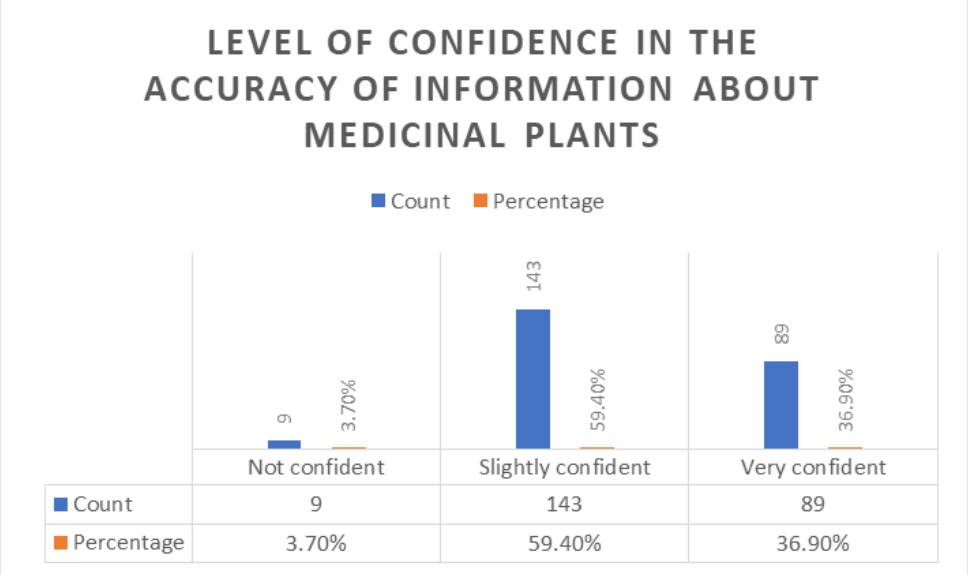

Figure (9): Illustration of the Level of Confidence in the Accuracy of Information About Medicinal Plants

From Table (9) and Figure (9), it is evident that the level of confidence in the accuracy of information related to medicinal plants is generally low. Approximately 59.34% of respondents reported having low confidence, whereas 3.73% indicated that they are not confident at all.

10. Do you prefer to purchase medicinal plants from the local market or grow them yourself?

Preference for Obtaining Medicinal Plants: Buying from the Local Market or Growing Them Personally		
Preference	Count	Percentage
Local market (purchase)	164	68%
Growing them personally	77	32%
Total	241	100%

Table (10): Purchasing Medicinal Plants from the Local Market or Growing Them Personally

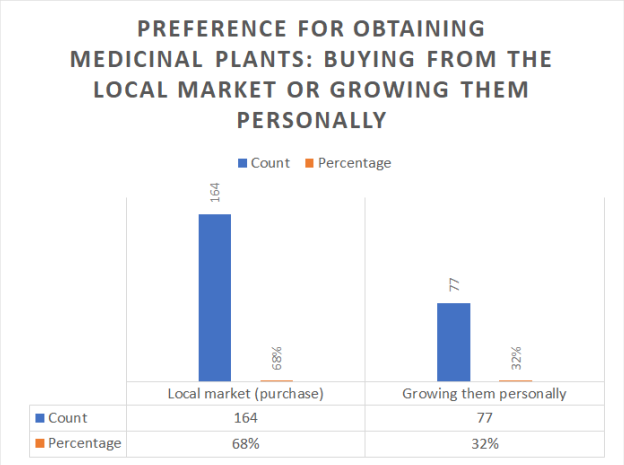

Figure (10): Illustration of Purchasing Medicinal Plants from the Local Market or Growing Them Personally

From Table (10) and Figure (10), it is evident that respondents tend to prefer purchasing medicinal plants from the local market rather than growing them themselves, with 68.33% indicating a preference for market purchase.

Study Hypotheses

First Hypothesis: The relationship between the available information on medicinal plants in Ajdabiya and the sources relied upon to obtain information on their medicinal uses.

1. Null Hypothesis (H0): There is no statistically significant relationship between the respondents' knowledge of medicinal plants found in the city of Ajdabiya and the sources they relied on to obtain information about the medicinal uses of these plants.
2. Alternative Hypothesis (H1): There is a statistically significant relationship between the respondents' knowledge of medicinal plants found in the city of Ajdabiya and the sources they relied on to obtain information about the medicinal uses of these plants.

Knowledge about Medicinal Plants	Media	Others' Experiences	Books & References	Social media	Total
Yes	15	33	12	27	87
No	17	78	8	51	154
Total	32	111	20	78	241

Table (11): The Relationship Between the Information Available to You About the Medicinal Plants Found in the City of Ajdabiya

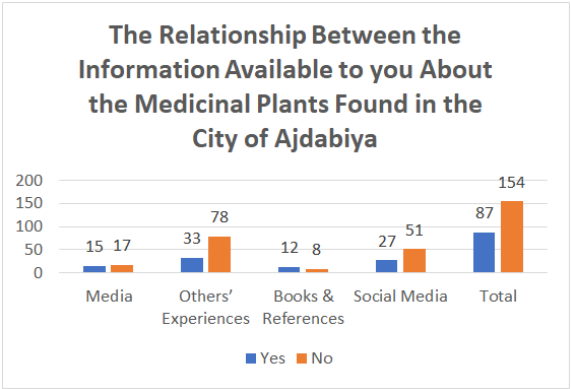

Figure (11): The Relationship Between the Information Available to You About the Medicinal Plants Found in the City of Ajdabiya

Based on the significance value of the Chi-square test, which is (0.003) and lower than the 0.05 significance level, it is evident that there is a statistically significant relationship between the respondents' knowledge of medicinal plants in the city of Ajdabiya and the sources they relied upon to obtain information about the medicinal uses of these plants.

Second Hypothesis: Between the adequate awareness of the benefits of plants in the city of Ajdabiya and their opinion on the quality of locally available medicinal plants.

1. **Null Hypothesis (H0):** There is no relationship between adequate awareness of the benefits of plants in the city of Ajdabiya and their opinion on the quality of locally available medicinal plants.
1. **Alternative Hypothesis (H1):** There is a relationship between adequate awareness of the benefits of plants in the city of Ajdabiya and their opinion on the quality of locally available medicinal plants.

	Excellent	Acceptable	Weak	Total
Yes	52	76	6	134
No	17	80	10	107
Total	69	156	16	241

Table (12): Adequate Awareness of the Benefits of Plants in the City of Ajdabiya

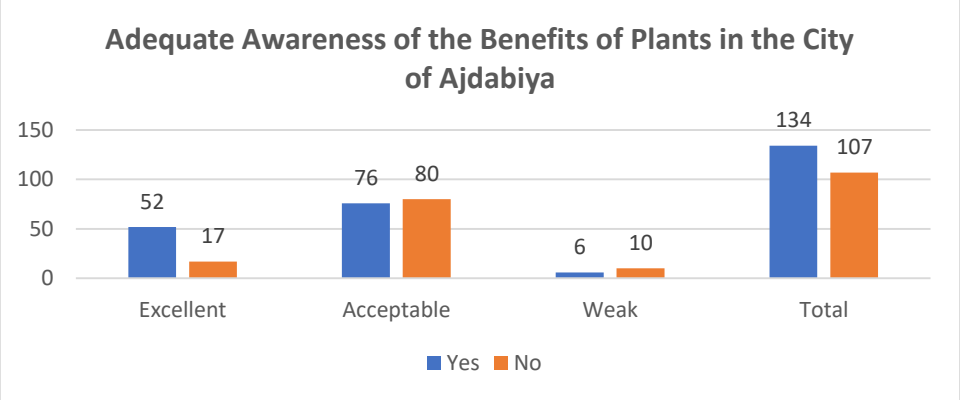

Figure (12): Adequate Awareness of the Benefits of Plants in the City of Ajdabiya

By examining the significance value of the Chi-square test, we find that it equals (0.001), which is less than 0.05. Therefore, there is a relationship between the adequate awareness of the benefits of plants in the city of Ajdabiya and their opinion on the quality of locally available medicinal plants.

Third Hypothesis:
Between the information about medicinal plants that grow in Ajdabiya and the number of medicinal plants known by name.

1. **Null Hypothesis (H0):**
2. There is no relationship between the information about medicinal plants that grow in Ajdabiya, and the number of medicinal plants known by name.

3. **Alternative Hypothesis (H1):**

There is a relationship between the information about medicinal plants that grow in Ajdabiya, and the number of medicinal plants known by name.

	5–10	11–20	20 and above	Total
Yes	35	36	16	87
No	143	34	7	154
Total	148	70	23	241

Table (13): Information About the Medicinal Plants That Grow in Ajdabiya

By examining the significance value of the Chi-square test, we find that it equals (0.000), which is less than 0.05. Therefore, there is a relationship between the information about the medicinal plants that grow in Ajdabiya, and the number of medicinal plants known by name among the sample individuals.

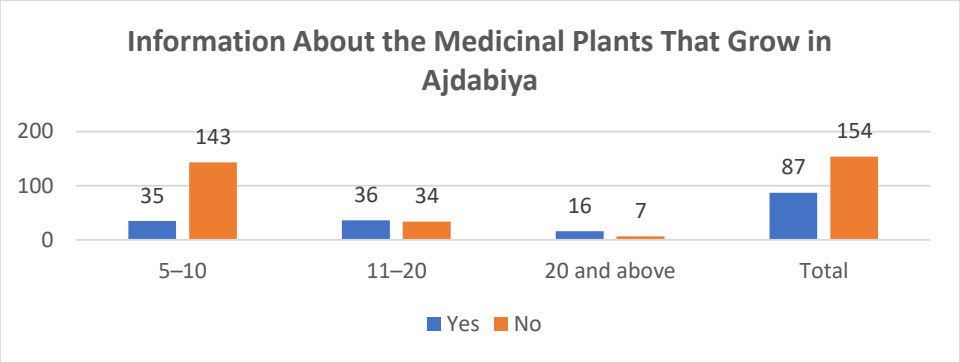

Figure (13): Information About the Medicinal Plants That Grow in Ajdabiya

Fourth Hypothesis:
The relationship between information about the medicinal plants that grow in Ajdabiya and the level of confidence among the sample individuals in the accuracy of information about medicinal plants.

1. **Null Hypothesis (H0):** There is no relationship between the information about the medicinal plants that grow in Ajdabiya and the level of confidence among the sample individuals in the accuracy of information about medicinal plants.
2. **Alternative Hypothesis (H1):** There is a relationship between the information about the medicinal plants that grow in Ajdabiya and the level of confidence among the sample individuals in the accuracy of information about medicinal plants.

	Not Confident	Slightly Confident	Very Confident	Total
Yes	2	38	47	87
No	7	105	42	154
Total	9	143	89	241

Table (14): The Relationship Between Information About Medicinal Plants That Grow in Ajdabiya and the Level of Confidence of the Sample Individuals

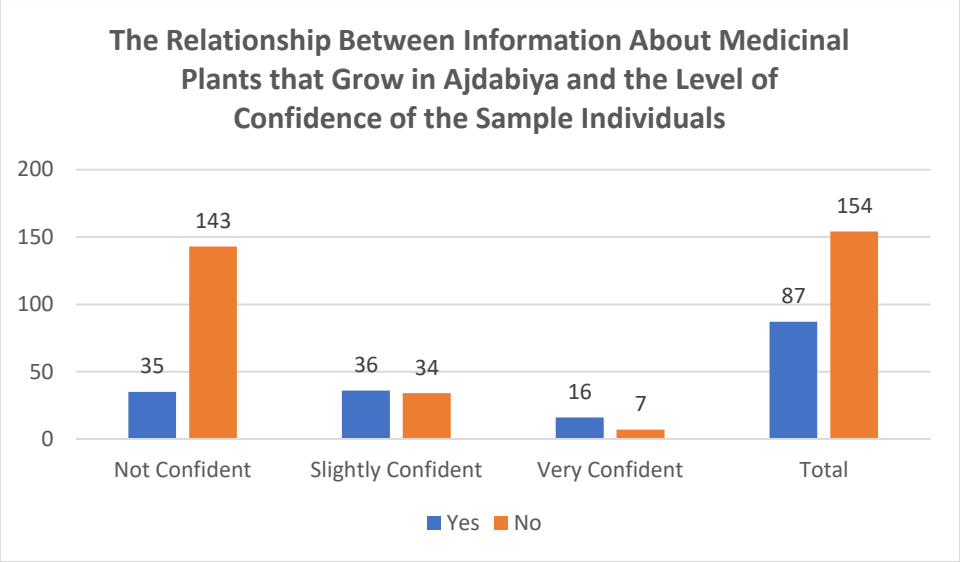

Figure (14): The Relationship Between Information About Medicinal Plants that Grow in Ajdabiya and the Level of Confidence of the Sample Individuals

By examining the significance value of the Chi-square test, we find that it equals (0.000), which is less than 0.05. Therefore, there is a relationship between the information possessed by the sample individuals about the plants in the city of Ajdabiya and their level of confidence in the accuracy of information regarding medicinal plants.

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