



How will Quinoa, as an alternative staple be accepted as a part of UAE's Consumptions? A case study highlighting implications on the food security portfolio.

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Table of Contents

Abstract	3
Purpose:	3
Data/Methodology/Approach:	3
Findings:	3
Originality/value:	4
Introduction	4
Research question	4
Objectives	4
Literature review	5
Quinoa as potential feedstuff	5
Top grain of the 21st century	5
Solution for food security and climate change	6
Methodology	6
Area of study	6
Primary Data	7
Trends worldwide	8
Descriptive statistics:	9
Figure2.....	9
Figure3.....	10
Consumer perception and attitudes towards quinoa	11
Figure4.....	11
Figure5.....	12
Willingness	13
Regression result	14
Conclusion and recommendation	15
References	16
Appendix	17
Quinoa consumer survey:	17
Quinoa Consumer Survey	17
Knowledge	20
General percentage of respondents knowledge about quinoa	20
Respondents' opinion about quinoa comparing to other grains	21
Interest in labeling.....	23

Abstract

Purpose:

This study is aiming to show how quinoa could be an alternative choice for both food and feed through reflecting some researches. As well will study the cultural perception of demanding quinoa in United Arab Emirates through examining the acceptance, factors that affects the consumer awareness about quinoa and willingness to buy. As well will highlight how could this crop help to increase the food security in the country.

Data/Methodology/Approach:

The research been conducted through using secondary data and primary data. Secondary data to support and prove the first objective, while the primary data to provide results for the second objective. Primary data been gathered through using a questionnaires accomplished via face-to-face interviews in Abu-Dhabi and Dubai, 514 respondents completed the questionnaire. SPSS been used to analyze the data and shows factors that affecting respondents knowledge about quinoa. As the results provide that independents variable were affecting respondents' knowledge, independents variables such as age, level of education and income. Those results had been found by using "Ordered Probit regression model" as well descriptive statistics such as frequency counts and percentages.

Findings:

The regression results shows that the level of knowledge about quinoa in Abu-Dhabi and Dubai vary among individuals based on their age, level of education and monthly income. Descriptive statistics showed that the majority of the respondents are willing to replace other grains by quinoa to be a main part of their daily intakes.

Originality/value:

Researchers who are conducting research in this area, producers and policy makers will benefit the most from the results of this research.

Introduction

A solution for food security especially for areas where they have no adequate sources of protein, as well a solution to climate changes issue which affects the agricultural production. Quinoa could be counted as a miracle grain due its nutritional qualities, its diversity and its resistance to drought and cold. Quinoa plant is a grain, scientifically named *Chenopodium quinoa wild.* Years ago the plant was domesticated in the Andean countries (Peru, Chile, Ecuador and Bolivia). The last few years the plant became popular in different regions of the world such as United States, Canada, Europe, Australia, China and Japan.

Research question

- 1- Is quinoa production is increasing worldwide?
- 2- What are the factors affecting consumers' perceptions and attitude towards quinoa in Abu Dhabi and Dubai?

Objectives

First objective is to examine the trends of quinoa production worldwide in the recent years as well to indicate the biggest producer among all countries. Secondly, to study the factors that affecting consumers' perceptions and attitude towards quinoa and to understand how these factors are affecting the consumption of quinoa in Abu Dhabi and Dubai. Lastly, will highlight some suggestions and recommendations.

Literature review

Quinoa as potential feedstuff

Regarding to the study that been done in Colombia, Nariño. To the high nutritional value of quinoa and it adaptability to a different agro-climate environments, It's a good choice to use by-products or even the leaves or stems of quinoa in animal feed. Since livestock farming is the country's basic industry, so this could improve the livestock production, which will support the economic development. However, the study was to evaluate the level of quinoa consumption, use in animal feed, quinoa related to profitability and expectation with the improvement of quinoa. The findings of the study proved that there were a low proportion of farmers estimated by 20% who used quinoa in animal feed. As well the study highlighted that there's a good potential adoption of quinoa to innovate food production (ROSERO, ROSERO, & LUKESOVA, 2010)

Top grain of the 21st century

Regarding to many researches quinoa nutritional properties and it stress-tolerant characteristics been proved and described. This review study recall quinoa nutritional properties and shows it's functional potential for human health. Explaining the nutritional values of quinoa by comparing it with the most crucial food worldwide in both human and animal diets. As the results of the study show that the content of protein for each 100g of quinoa is between 13.1% and 16.7% while in rice its 6.8% and in wheat its 11.3%. However, quinoa is highly contents of minerals and vitamins as well. High levels of vitamin C, riboflavin (B2), pyridoxine (B6) and folic acid, than those of most other grains such as wheat, rice, barely and corn. Moreover, to the nutritional values of quinoa and gluten-free attribute, quinoa grain has been proved it's exert beneficial effects on high-risk group consumers, such as children, the elderly, lactose intolerant

and people with anemia, diabetes, obesity, dyslipidemia and celiac disease. Studies result proves that the main activities of quinoa seeds are the antioxidant activity that has been associated with their high content of phenolic compounds. Quinoa is a perfect replacement to all grains due to its high nutritional value and it's positive affection on health. (Volcancundo & Ledesma, 2016)

Solution for food security and climate change

The study discusses how global climate change is affecting the production; as well it's negative impact on food security. However, climate change concerns being a nowadays big talk since the scientists shows the rapid increase in salinization and aridity, as been proved salinity is increasing by at a rate of about 10% annually. The changes of climate affect negatively in world agriculture productions, which lead to reduce food security levels. Due to examination and experiments quinoa can handle the harsh climate conditions, all quinoa genotypes are salt tolerant. Regarding to its capacity to tolerate adverse environmental factors and exceptional nutritional qualities, quinoa can generate profits from the exclusive use of its varieties. The main benefit of this miracle crop is that it can help in increasing food security levels, biodiversity conservation and cultural identity. (Ruiz, et al., 2014)

Methodology

Area of study

This study was conducted in UAE, the focus of this study was mostly in the capital Abu Dhabi and Dubai. UAE have a large density of population with variety of nationalities. Since the educational levels and the quality of educating is improving in the country so people starts to have more knowledge about how life choices could affect health. From

this perspective the study wills to prove their knowledge about quinoa, the availability of it in the market as well the average of their acceptance of it.

Primary Data

Questionnaires were used to collect data mostly from the capital of United Arab Emirates Abu-Dhabi and the most economically active and attractive emirate, which is it Dubai. The survey sample reached up to 514 randomly selected respondents. The survey addressed questions regarding the availability of quinoa in UAE market, the consumption of it and consumer acceptance of it.

Secondary Data

As well gathered data from secondary resources such as (Report On Quinoa Around the World), from Food and Agriculture Organization of the United Nation. The data were used to support the objective of Quinoa production worldwide.

Data Analysis

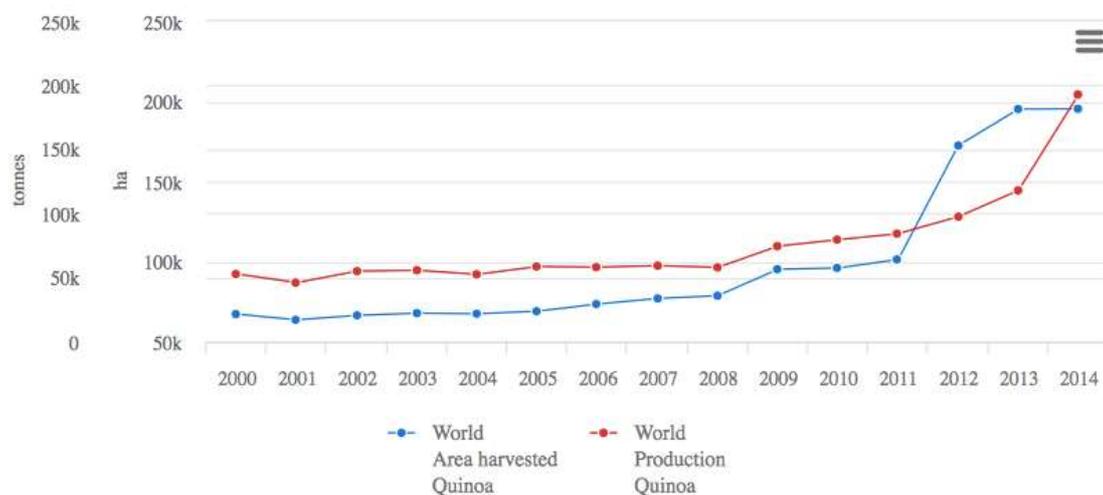
Data been analyzed through SPSS statistics version 24, to come up with results that prove and insure the objectives of this study. Dependent variable is knowledge level of quinoa in Abu-Dhabi and Dubai while the independent variables are the socio-demographics characteristics of the respondents: age, level of education and income.

Results and discussions

The results of this report will focus on highlighting the worldwide trends in quinoa production as well to discuss the outcomes of the face to face interview that been done in Abu-Dhabi and Dubai to find out the factors affecting consumers attitude and perceptions towards quinoa.

Trends worldwide

As the secondary data provided the results that the production of quinoa been increasing globally, but lately from 2011 up to 2014 the production has increased rapidly. The production increased from 84,087 tons a year up to 192,818 tons. The growth of quinoa production shows that there's a demand for it globally as well this growth means that the competition between the producers are strong and regarding the consumers who creates the demand, this reflect that most of them starts to have more knowledge about quinoa.



(2014, FAO Stat.)

Regarding to the results of Food and Agriculture Organization in the United States, the greatest and biggest producer worldwide is Peru. Peru is a country in South America and it's one of the quinoa origins.

Descriptive statistics:

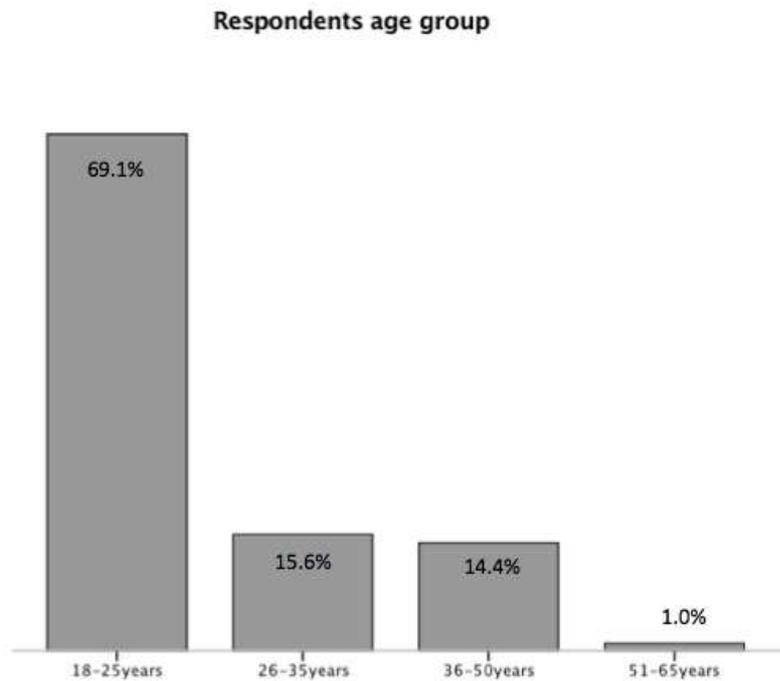


Figure2

This figure provides the respondents age group, the majority was the younger group age of 18-25years they created the biggest group of the respondents 69.1% followed up by group of age 26-35years.

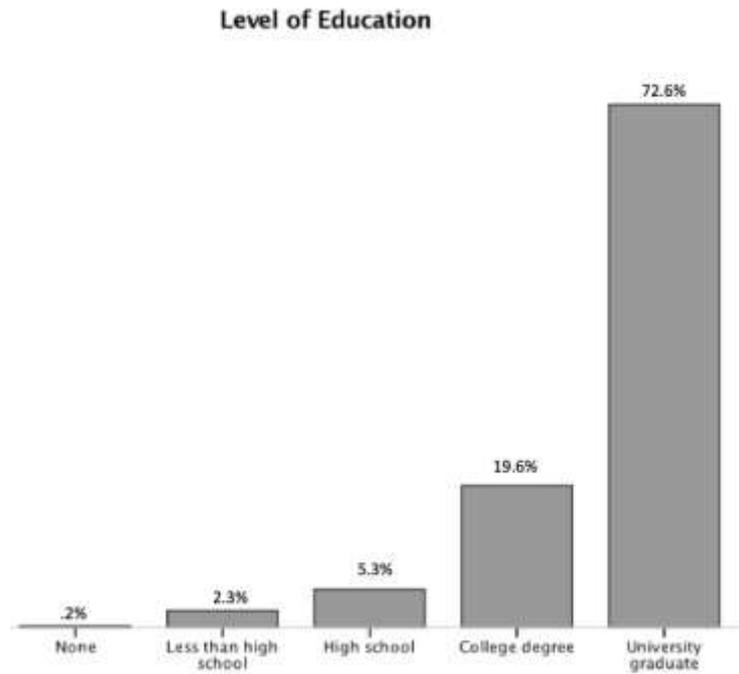


Figure3

The level of the education of the majority of the sample was University graduate while the respondents of the survey with a less than high school level of education were very low percentage 2.3% of the whole sample.

Consumer perception and attitudes towards quinoa

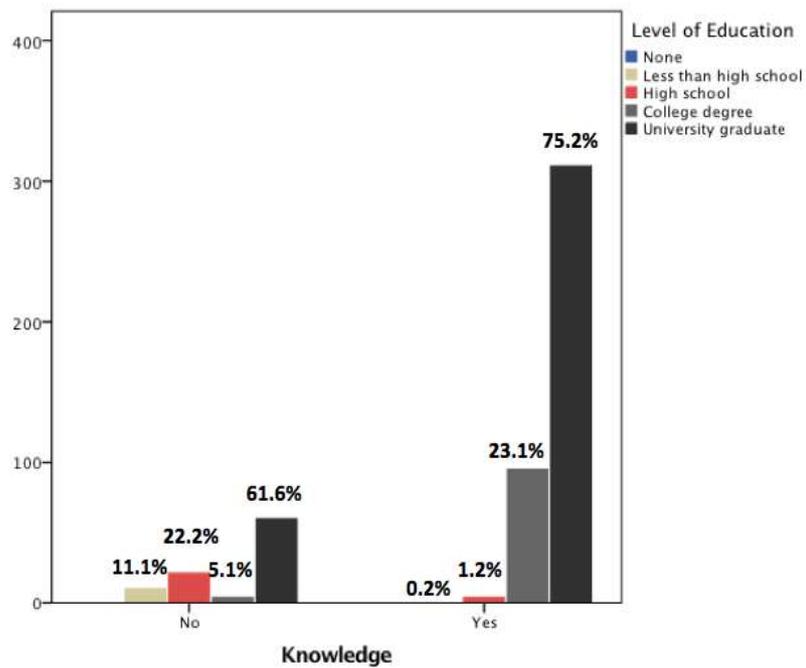


Figure4

This graph is an output of question one; Have you ever heard about Quinoa?, and question thirteen; Education level. The graph shows if there's a relationship between the level of education and respondents knowledge about quinoa. The averages shows that people with higher level of education have more knowledge about quinoa while people with low level of education tends to don't have knowledge. 75.2% of the whole sample are university graduates who have higher level over all and have knowledge about quinoa.

Respondents opinion about quinoa compares by other grains.the below figure shows what respondents think about quinoa comparing to rice since it's the most favorable grain in Abu-Dhabi and Dubai. However, most of the respondents thinks that quinoa is healthier than rice, 48.5% of all of the sample rate quinoa as healthier while the second highest rate goes to expensive, 26.1% of the respondednts thinks that it's expensive comparing to rice.

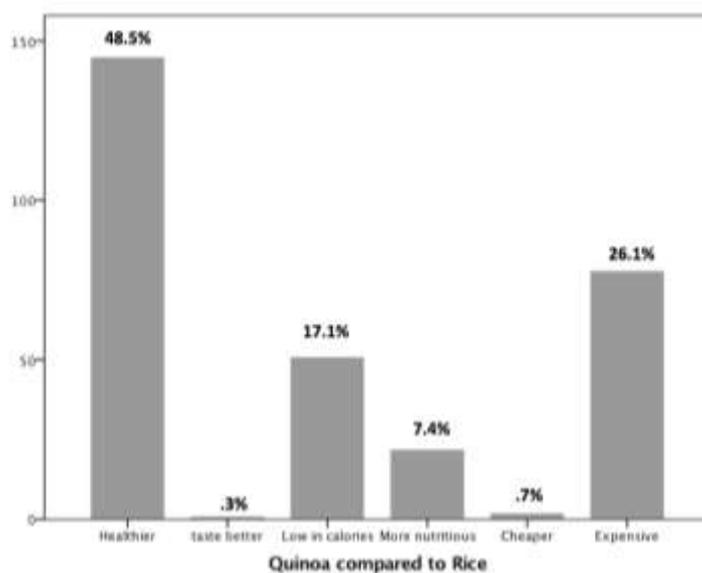


Figure5

Willingness

Regarding the willingness of the consumer to replace carbs and other grains by quinoa to be a main part of your everyday die.

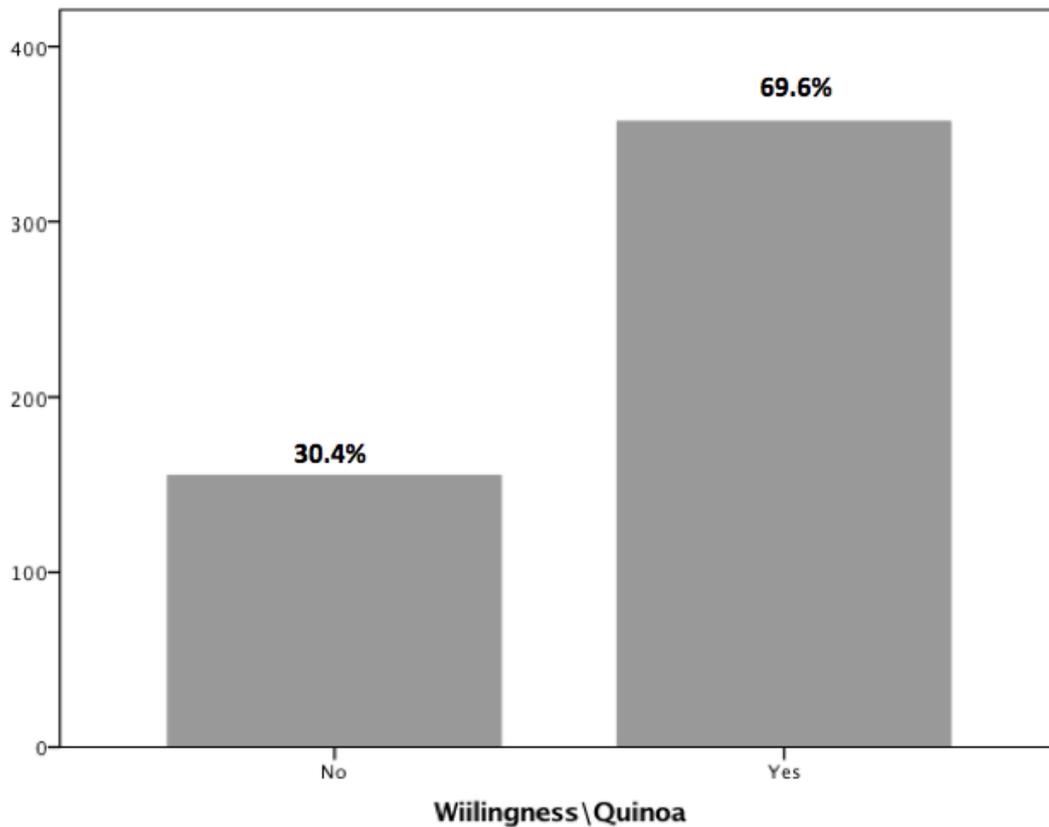


Figure6

As the above figure shows the willingness of the respondents to have quinoa as an everyday main part of their meals. The majority shows a higher acceptance by answering yes the average was 69.6% of the whole sample. The results shows us that more people are willing to have a better life style by having healthier food choices and since there're high averagers of the society suffering from obesity and diabetese this will be perfect choice for them so by letting the majority knows about quinoa benefits for health will push them somehow to consume it and demand it more.

Regression result

Parameter	Estimate	Std. Error	Z	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
PROBIT ^a Gender	-.460	.162	-2.837	.005	-.777	-.142
Age	-.815	.294	-2.774	.006	-1.390	-.239
Education level	.977	.225	4.353	.000	.537	1.417
Nationality	1.597	.290	5.507	.000	1.029	2.166
Income	.777	.132	5.888	.000	.519	1.036
Household size	.034	.040	.853	.394	-.044	.112
Intercept	-5.408	1.343	-4.028	.000	-6.751	-4.065

a. PROBIT model: PROBIT(p) = Intercept + BX

Table1

As the regression results shows there're a significant relationships between gender, age, educational level, income and respondents knowledge about quinoa.

Moreover, as shown there's a negative significant relationship between gender and knowledge, age and knowledge. Which means with the increase of respondents age the probability to know about quinoa decrease. The postive significant relationship represents the educational level and income with the respondents knoweledge about quinoa. Values of the positive relationship insure that with the increase of the educational level and respondents income the probability of respondents knowledge about quinoa increases as well.

Conclusion and recommendation

In conclusion, as been found production of quinoa increased worldwide and the major producers are Peru, Bolivia and Ecuador. Regrading to the survey findings the majority of the consumers in Abu-Dhabi and Dubai were willing to pay and substitute quinoa over other grains (rice, wheat, couscous, barely and lintels). Moreover, regression analysis were used to show that the knowledge of quinoa in Abu-Dhabi and Dubai vary among individuals based on their age, education level and their income. The main highlighted outcome of this study is that people with higher level of education has knowledge about quinoa. The results of the study could be very helpful for quinoa market in United Arab Emirates especially in Abu-Dhabi and Dubai as well for policy makers and producers. There's a need for programs to disseminate information about quinoa to local producers and consumers. The project will also contribute significantly in the country's food security efforts.

References

ROSERO, O., ROSERO, D., & LUKESOVA, D. (2010). Determination of the Capacities of the Farmers to Adopt Quinoa Grain(*Chenopodium quinoa* Wild) as Potential Feedstuff. *Agriculture Tropica et Subtropica* , 43(4).

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Appendix

Quinoa consumer survey:

Quinoa Consumer Survey

Quinoa is the common name for *Chenopodium quinoa* of the flowering plant family Amaranthaceae. It is grown as a grain crop primarily for its edible seeds. It is a pseudocereal rather than a true cereal, due to it not being a grass.

1. Have you ever heard about Quinoa?

Yes No

2. Do you buy Quinoa?

Always Sometime Rarely Never

If you Don't buy Quinoa go to question number 10

3. What do you think about Quinoa when compared to rice?

Healthier Taste better Low in calories More nutritious Cheaper Expensive

• **wheat :**

Healthier Taste better Low in calories More nutritious Cheaper Expensive

• **Couscous:**

Healthier Taste better Low in calories More nutritious Cheaper Expensive

• **Barley:**

Healthier Taste better Low in calories More nutritious Cheaper Expensive

• **Lentils:**

Healthier Taste better Low in calories More nutritious Cheaper Expensive

4. Where can you buy Quinoa?

Carrefour Lulu Mega Mart Spinneys Coop Abela Safeer Al-Falah

- **Note: The following table to share information about availability of quinoa and quinoa products in UAE markets.**

Quinoa products in the UAE markets	Price per unit	Country of Origin
Quinoa Milk (1L)	21 DH	Italia
Quinoa Chips (99g)	13.5 DH	USA
Quinoa Flakes (283g)	30.5 DH	Bolivia
Quinoa Premium red (340g)	24.75 DH	Bolivia
Biona Organic Rice Cake with Quinoa 100g	7.95 DH	UK
Powerful coconut and Quinoa nonfat yogurt	14.5 DH	USA
Mixed Grains Quinoa lentil and whear berries	15.95 DH	Britain

- Are you satisfied with the availability of quinoa products in the UAE markets?
 - Very satisfied
 - Some satisfied
 - Not satisfied

- What's the most important thing to you when it comes to quinoa product?
 - Price
 - Nutritional value
 - Availability
 - More information about the products

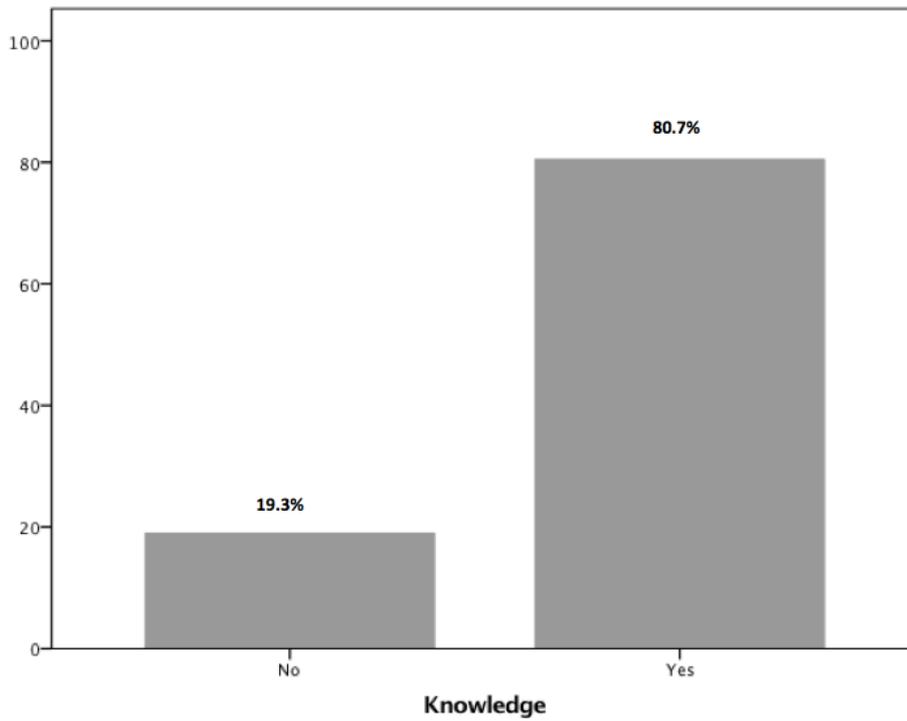
- Do you ever look at labels to see where a product is made or grown?
 - Always
 - Frequently/regularly
 - Sometimes
 - Never

- Are you willing to buy quinoa if it was produced in UAE?
 - Yes
 - No

- I don't want to buy quinoa because ?
 - I am Satisfied with alternative products currently available
 - Its too expensive
 - I Don't have much knowledge about quinoa
 - Its Not available in UAE market
 - I Tried it before but I didn't like it

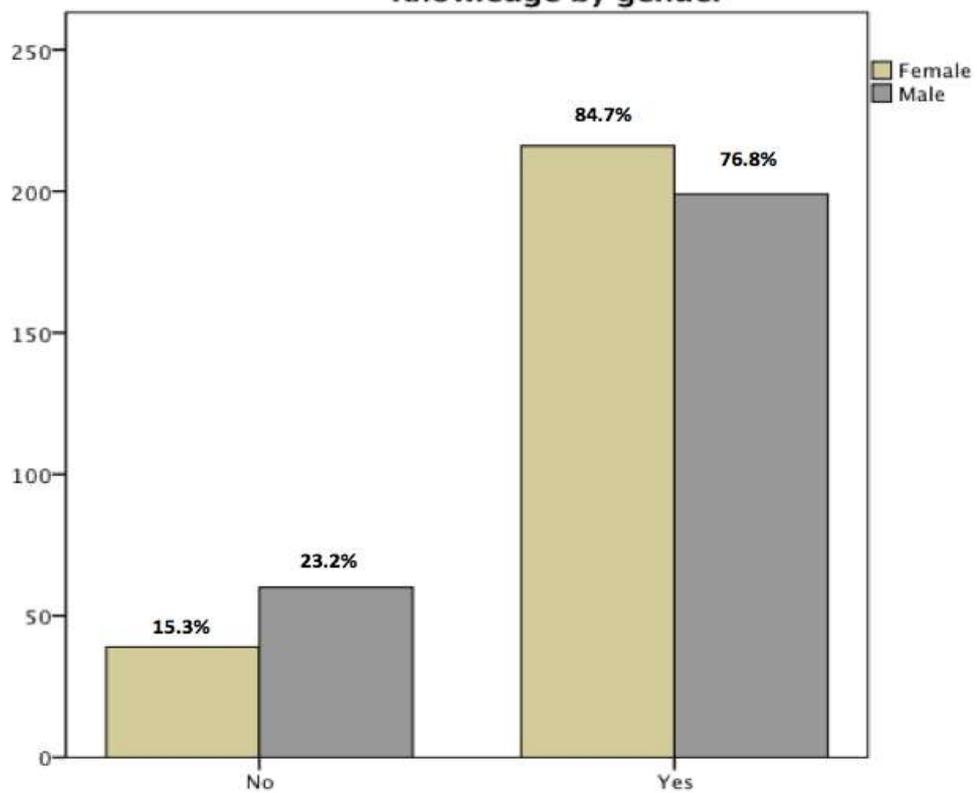
Knowledge

General percentage of respondents knowledge about quinoa

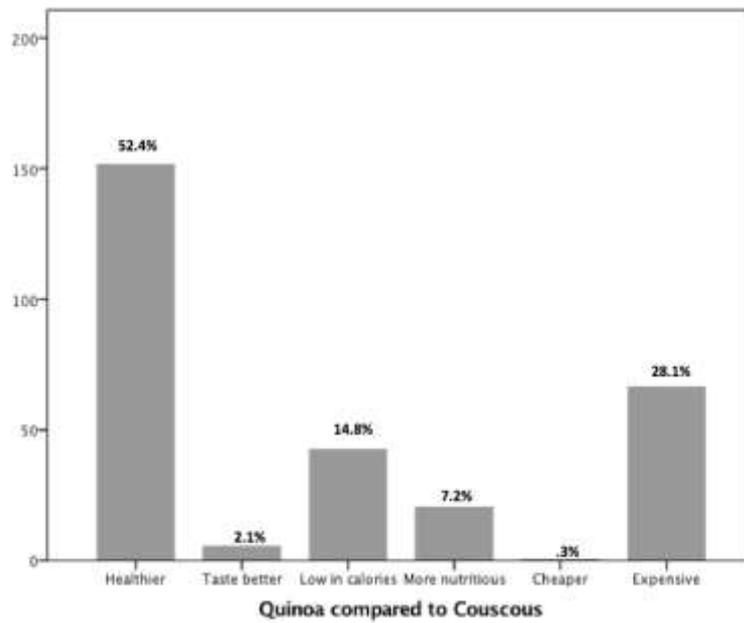
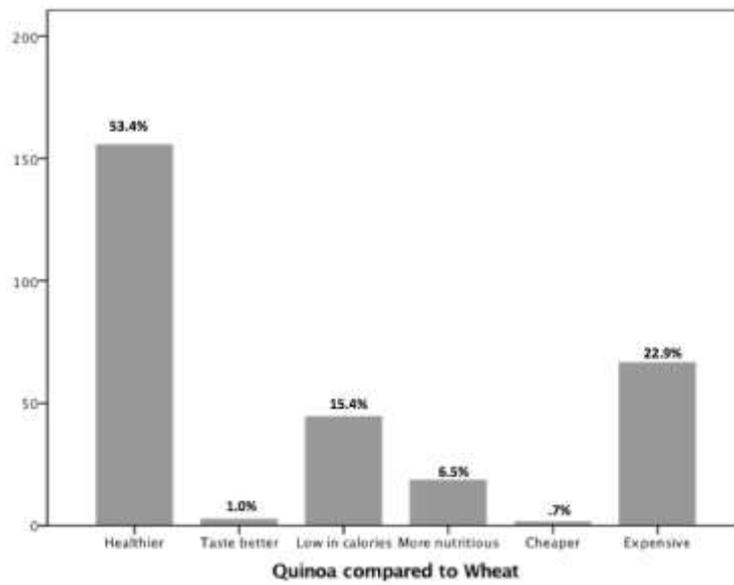


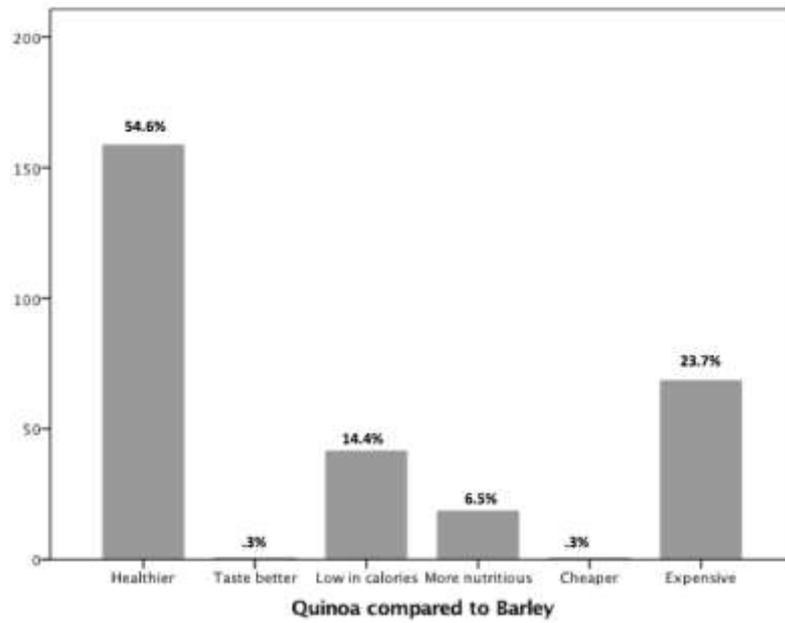
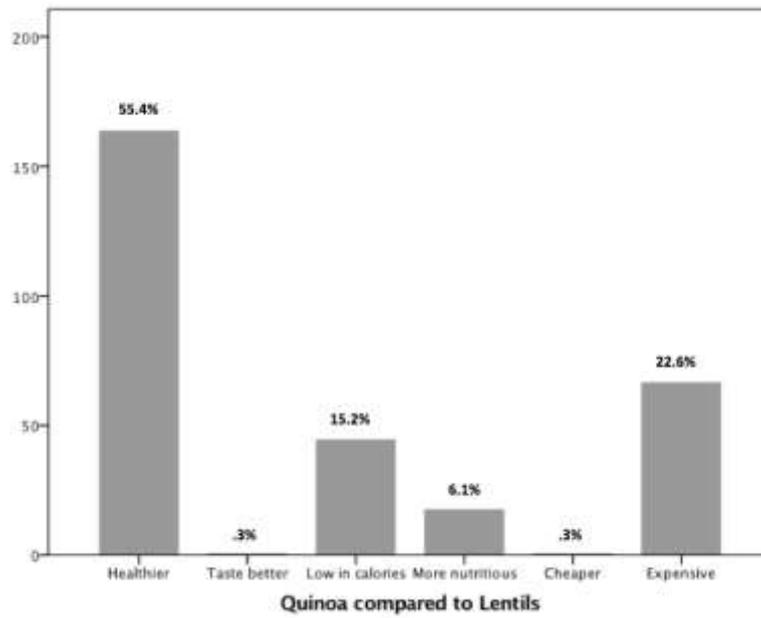
Respondents' knowledge about quinoa regarding to gender

Knowledge by gender



Respondents' opinion about quinoa comparing to other grains





Interest in labeling

Reading labels question 7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Always	189	45.7	45.7	45.7
	Frequently/regularly	63	15.2	15.2	60.9
	Sometimes	37	8.9	8.9	69.8
	Never	125	30.2	30.2	100.0
	Total	414	100.0	100.0	

