The Reasons for Consuming a Vegetarian Diet in Lebanon and the Survey of its Health Impacts

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Abstract

This study addresses the reasons for adopting vegetarianism and the health impacts of a vegetarian diet on some people in Lebanon. Results of this analysis will be used to heighten the awareness of the public, health care professionals, government and health agencies on the positive attributions of a vegetarian diet. A cross-sectional study of developmental research was used for this research which consisted of a quantitative approach that used a questionnaire filled by a random sample of respondents. The people surveyed, or the respondents, were individuals exposed (for any duration of time) to any type of vegetarian diet. The hypotheses were tested using frequency analysis, chart analysis and cross-tabulation using the Statistical Package for the Social Sciences (SPSS). The researcher concluded that most of the surveyed people in Lebanon adopt vegetarianism or are interested in this diet for health and religious reasons primarily (specifically Christians during Lent), for a temporary period of time, and they believe it has a positive effect on health especially in preventing some diseases and feeling generally better.

Key words: **Vegetarian, Lebanon, Health, Statistics**

Introduction

A vegetarian diet is a meal plan made up of foods that come mostly from plants. These include vegetables, fruits, whole grains, legumes, seeds, and nuts. A vegetarian diet has little or no animal products (new Appendix I). Types of vegetarian diets include:

- **Vegan:** Diet consists of only plant-based foods.
- **Lacto-vegetarian:** Diet consists of plant foods plus some or all dairy products.
- **Lacto-ovo vegetarian:** Diet consists of plant foods, dairy products, and eggs.
- **Semi- or partial vegetarian:** Diet consists of plant foods and may include chicken or fish (pesco-vegetarian), dairy products, and eggs. It does not include red meat.
- **Macrobiotic:** Diet followed for spiritual and philosophical reasons. It aims to maintain a balance between foods seen as yin or yang, and is mainly based on plant based food.

Many researchers have reported a direct relationship between a vegetarian diet and the prevention of and curing several illnesses, such as: Hypertension, Hypercholesterolemia and Hypertriglyceremia, Obesity, Type 2 Diabetes and Heart diseases [1-8].
Compared to non-vegetarians, vegetarians usually eat:

- Fewer calories from fat (especially saturated fat)
- Fewer overall calories
- More fiber, potassium, and vitamin C

In addition to celebrating World Vegetarian Day (October 1), it seems that more products are showcasing vegetarian credentials in 2014. New research from Mintel has found that 12% of global food and drink products launched in 2013 carried a vegetarian claim, up from 6% in 2009. Also, 2% of global food and drink launches carried a vegan claim in 2013, up from 1% in 2009. Today in Britain, the vegetarian diet is firmly on the map with 12% of UK adults following a vegetarian or vegan diet, rising to 20% of 16 to 24s. This research reveals that almost half (48%) of British people see meat-free products as environmentally friendly and 52% see them as healthy [9].

In Lebanon, vegetarianism has gained some popularity over the past few years[10]. However, the exact implications of this lifestyle on people in this region are still unknown. This study addresses the main reasons for consuming any form of a vegetarian diet, and its health impacts on people in Lebanon. However, the researcher will address the social and economical impacts in future publications. .

From a medical perspective, there is minimal support from healthcare professionals encouraging patients to adopt a vegetarian diet. Many medical doctors in this region believe that diet has no significant effects on curing most modern illnesses. In spite of that belief, some do think that certain foods might be one of many factors that cause, cure or prevent certain widespread degenerative illnesses. In building awareness among doctors and health care specialists, they will be able to see the major contribution of a vegetarian diet in not only curing most of today's sicknesses, but at least in relieving symptoms and the decreased need for medication. Medical specialists would then be able to combine the best of both worlds by diagnosing, preventing and treating disorders using conventional methods (such as medication or surgery) and a balanced diet.

This study will provide various medical and health associations or government agencies in this region with data to support the encouragement of this diet, if it is followed in a balanced way. Government health agencies would encourage for instance the import and even production of meat alternatives (that is still not always accessible nor always feasible in Lebanon) by decreasing import taxes and by amending some of the import/export regulations regarding this particular food stuff. In addition, health agencies may encourage farmers to grow organic food and ingredients needed to produce meat alternatives (like soy or quinoa products) by providing them with funds and preliminary resources at low cost.

In recent decades, we have been witnessing a rapid escalation in the percentage of degenerative diseases due to several reasons, mainly adopting the Western fast food diet and modern lifestyle. With time, they have abandoned most of their healthy traditional cuisine (mainly the Mediterranean diet) and active lifestyle, heading towards a more convenient, easy going and fast paced lifestyle. This research will highlight for the public the need for a solution- one that is feasible, simple and can be applied in parallel with a modern and technological way of living. The answer is a vegetarian diet tailored for people in Lebanon, mostly based on their varied traditional vegetarian food and their seasonal produce, that would improve their health status significantly, encourage good quality social interaction, and would actually decrease their total expenses on food, medication and health services.

Materials and Methods

The research followed a quantitative approach which consisted of a questionnaire and the analysis and interpretation of the generated data with the help of Statistical Package for the Social Sciences (SPSS). The topic of interest was studied from a present point of view to yield the desired information. Therefore, a cross-sectional study of developmental research was generally used.

a. Selected variables for the study

The researcher covered all the variables needed in order to form a clear understanding about the subject and found that it is essential to ask first about personal information regarding their gender, age, occupation and so on. Then, their knowledge on any type of vegetarian diet and the health impact of vegetarianism on preventing and curing their diseases was investigated. And as clearly stated in the analysis below, two or more of these different variables together with the help SPSS were linked.

The set of independent variables investigated in the research are:

1. GENDER
2. AGE
3. OCCUPATION
4. RELIGION
5. DURATION ON A VEGETARIAN DIET
6. MAIN REASON FOR PRACTICING VEGETARIANSIM
7. SPECIFIC HEALTH PROBLEMS
8. VEGETARIANSIM HELPS GENERAL WELL-BEING
9. VEGETARIANSIM HELPS CURE CERTAIN DISEASES
10. EFFECT OF A VEGETARIAN DIET IN THE PROGRESSION OR RELIEF OF DISEASES

b. Data Collection and Analysis

The most common source of data for such research is communicating with respondents. Thus, this study used a set of questionnaires filled by a random sample of respondents. Since the percentage population who have followed a vegetarian diet or have sufficient knowledge of it is small, only individuals that have been exposed to this diet were studied. A subject data-gathering technique would provide a deeper and wider range of information. For this reason, a one-on-one survey was used. In addition, the sample size was limited to 930 individuals. The samples were collected from a few supermarkets (near the organic and produce sections), universities, schools (staff) and at gatherings (church events, friendly lunches, etc...) between Beirut, Kesserwan and Northern Lebanon. These places have residents or frequent visitors of different age groups and from the main coastal cities or surrounding suburbs/villages.

c. Research Question and Hypotheses

The main research questions in this study are:

Q1: "Why do people in Lebanon follow a vegetarian diet?"
Q2: "Do people in Lebanon who are acquainted with a vegetarian diet believe that this diet has a positive effect on their general well-being and relief of undesirable symptoms?"

Two main hypotheses, which seemed reasonable from the researcher's experience and vegetarianism, were formulated:

H1: More than 50% of the Lebanese follow a vegetarian diet for religious and health reasons.
H2: More than 70% of the Lebanese believe that a vegetarian diet has positive effects on a person's health status.

To test the hypotheses, frequency and percentage analysis were useful to diagnose the major characteristics of the selected sample. Also, cross tabulation was crucial in determining the relation and link between the variables. The use of the SPSS constituted to the basis for conducting such an analysis.

d. Scope and Limitations

There were several limitations to this study such as time and places from which samples were collected. The first major limitation of this study was the sample size. Choosing people exposed to vegetarianism from a random sample of respondents to gather data from, and then checking/organizing the gathered data, the researcher was bounded with a set of 930 questionnaires. Another limitation was the fact that the researcher had limited places from which to gather information. The researcher gathered information from a few places from the coast of Beirut to the Northern coast passing through Kesserwan ; yet trying to choose a diversified sample from most parts of Lebanon (targeting a sampled population residing, working in or visiting these districts from suburbs and surrounding villages). A third limitation was the integrity of the respondents, in answering the questionnaires, which plays a good deal of importance in the efficiency of the model.

Results and Findings

The sample is composed of 930 respondents. According to the “normal distribution theory”, the sample size lead to results that have a 2.8 % margin error and 95% confidence interval[12]. All the results are presented in charts and tables obtained from the outputs files of the SPSS software.

Table 1: Main reasons for Practicing Vegetarianism

Category label	Count	% Responses	% Cases
I have or had health problems	189	17.23	20.32
A family member/friend encouraged me	120	10.94	12.90
For general well-being or disease prevention	303	27.62	32.58
For religious or philosophical purposes	485	44.21	52.15
Total responses	1097	100.00	117.96
Total cases	930		

a. Data Analysis & Testing

Analysis of data on the personal information variables is shown in Tables 4 to 6:

• 60.36% of the sample was between the ages of 31 and 50 years old Table 4).
• 22.92% of the sample were students, while 42.37% were housewives (Table 6).
• 67.63% of the sample consumed vegetarian food either a few days a year or a few days a week (Table 5).
• Whereas Chart 1 shows that 54.3% of the sample believe or practice vegetarianism because it complies with their religious or philosophical beliefs.

In this part, the researcher focuses her analysis on the more specific variables that are related to the above two hypotheses (H1 and H2) and hence tested both research questions . There were some multiple responses to several questions targeted. Thus, some information was drawn based on those responses. Table 1 includes three category questions serving as reasons for consuming a vegetarian diet:

• 17.23% of the sample practices a form of vegetarianism because they have health problems.
• 44.21% of the surveyed sample practice vegetarianism for religious or philosophical purposes.
• 27.62% of the sample wants to prevent possible health disorders or for general well-being.

Therefore, hypothesis H1 is accepted according to the data shown in Table 1. In addition, Chart 3 clearly illustrates that 71.81% of the sample believes that a vegetarian diet can cure, gradually relieve symptoms of certain diseases and generally improve our overall health. Therefore, and according to the data shown in this chart hypothesis H2 is accepted.

Chart 1: Main Reasons for Practicing Vegetarianism

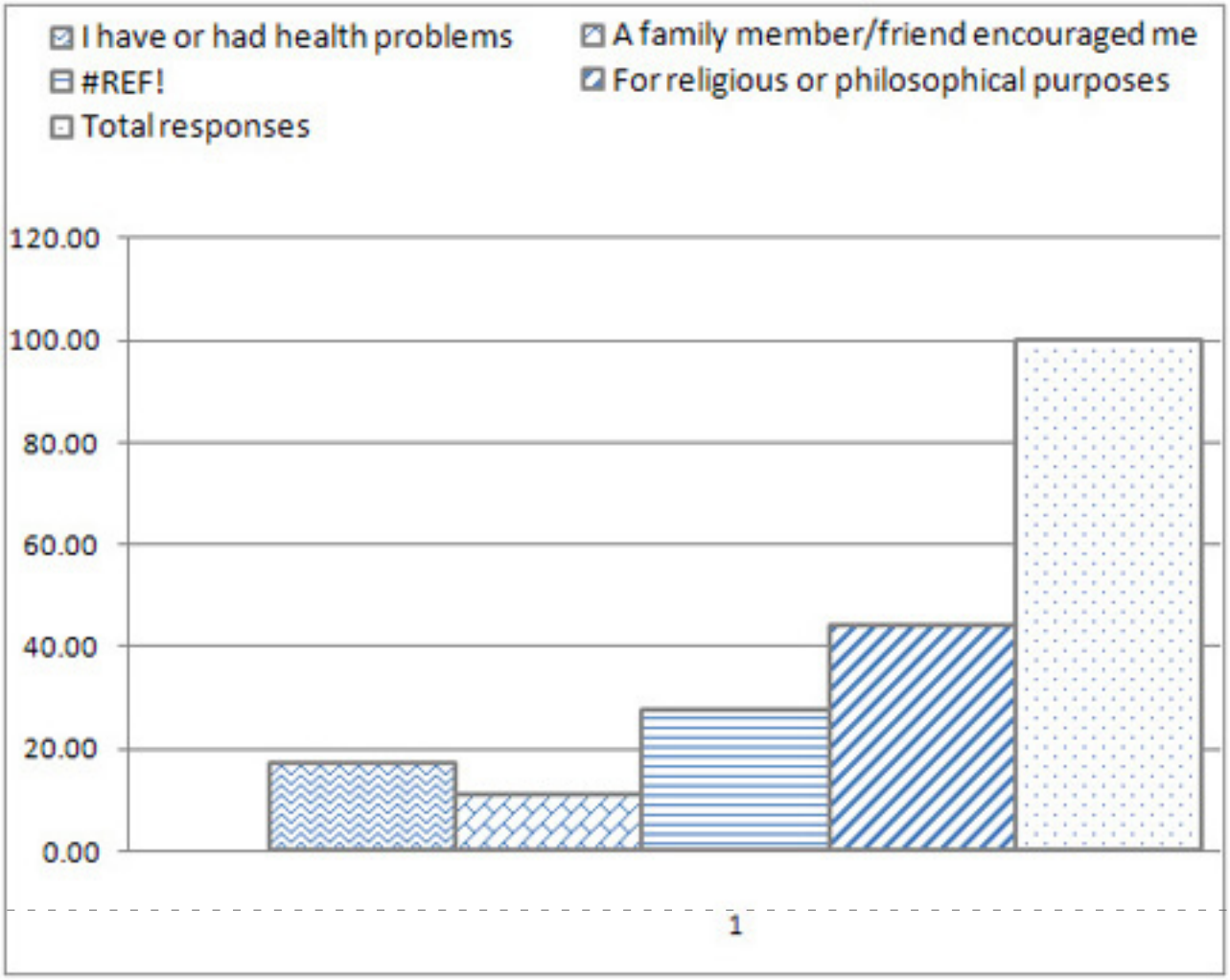

Table 2: Main Health Problems Indicated by the Sample Surveyed

Category label	Count	% Responses	% Cases
General fatigue	90	8.82	9.67742
General health problems	172	16.86	18.4946
Diabetic	54	5.29	5.80645
Weight issues	154	15.10	16.5591
Blood pressure	82	8.04	8.8172
Respiratory system problems	24	2.35	2.58065
High blood lipids	248	24.31	26.6667
Allergies	42	4.12	4.51613
Hormone/Endocrine problems	24	2.35	2.58065
Digestive problems	130	12.75	13.9785
Total responses	1020	100.00	109.677
Total Cases	930		

Chart 2: Main Health Problems Indicated by the Sample Surveyed

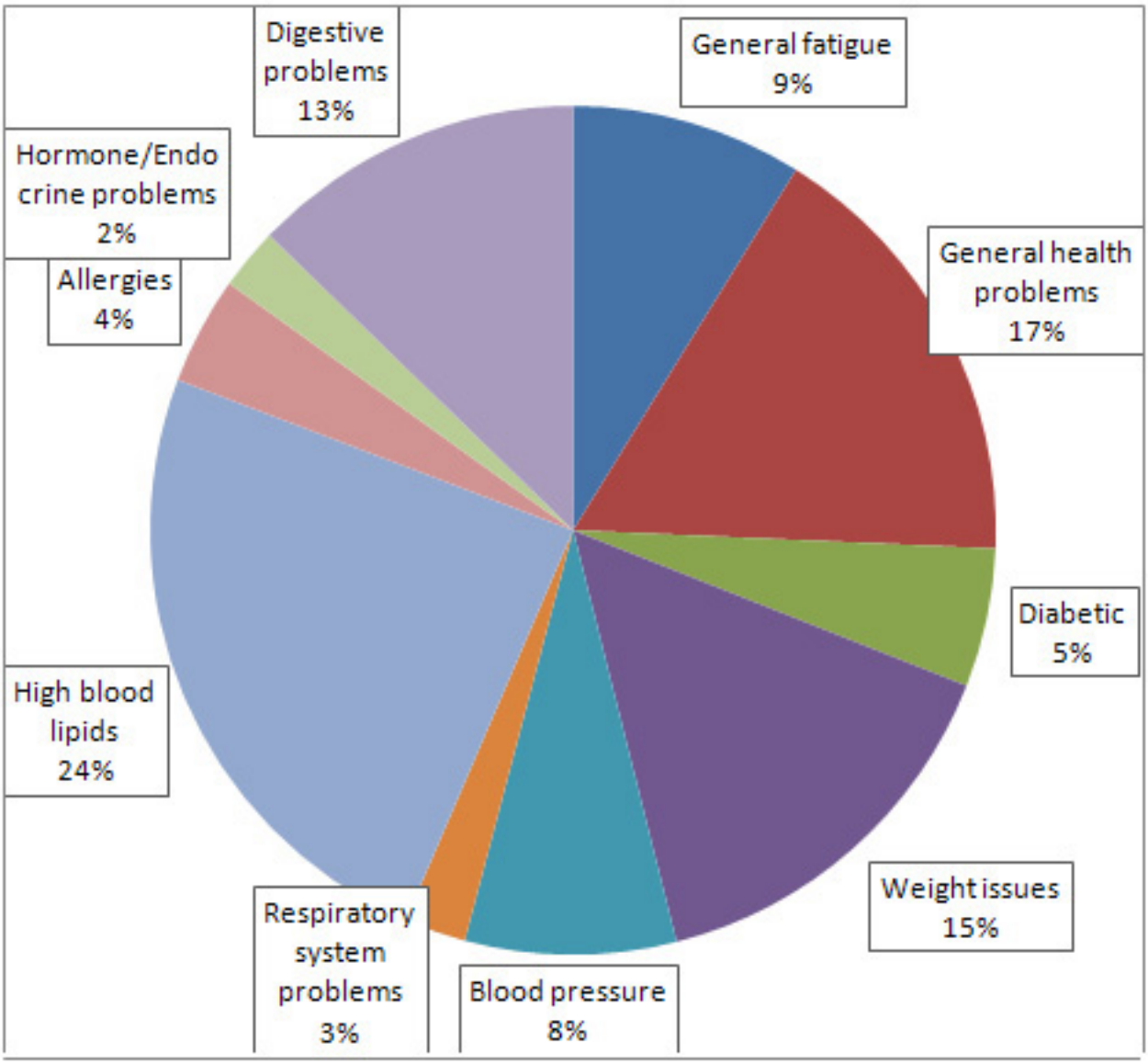

Table 3: How Vegetarianism Affected Sample's Healing Process

Category label	Count	% Responses	% Cases
Bad/no effect	39	4.18	4.19
Gradually relieved pain or other symptoms	157	16.83	16.88
Cured the disorder	67	7.18	7.20
Felt better generally	446	47.80	47.96
Reduced medication	98	10.50	10.54
Lost unwanted weight	126	13.50	13.55
Total response	933	100.00	100.32
Total Cases	930		

Chart 3: How Vegetarianism Affected Sample's Healing Process

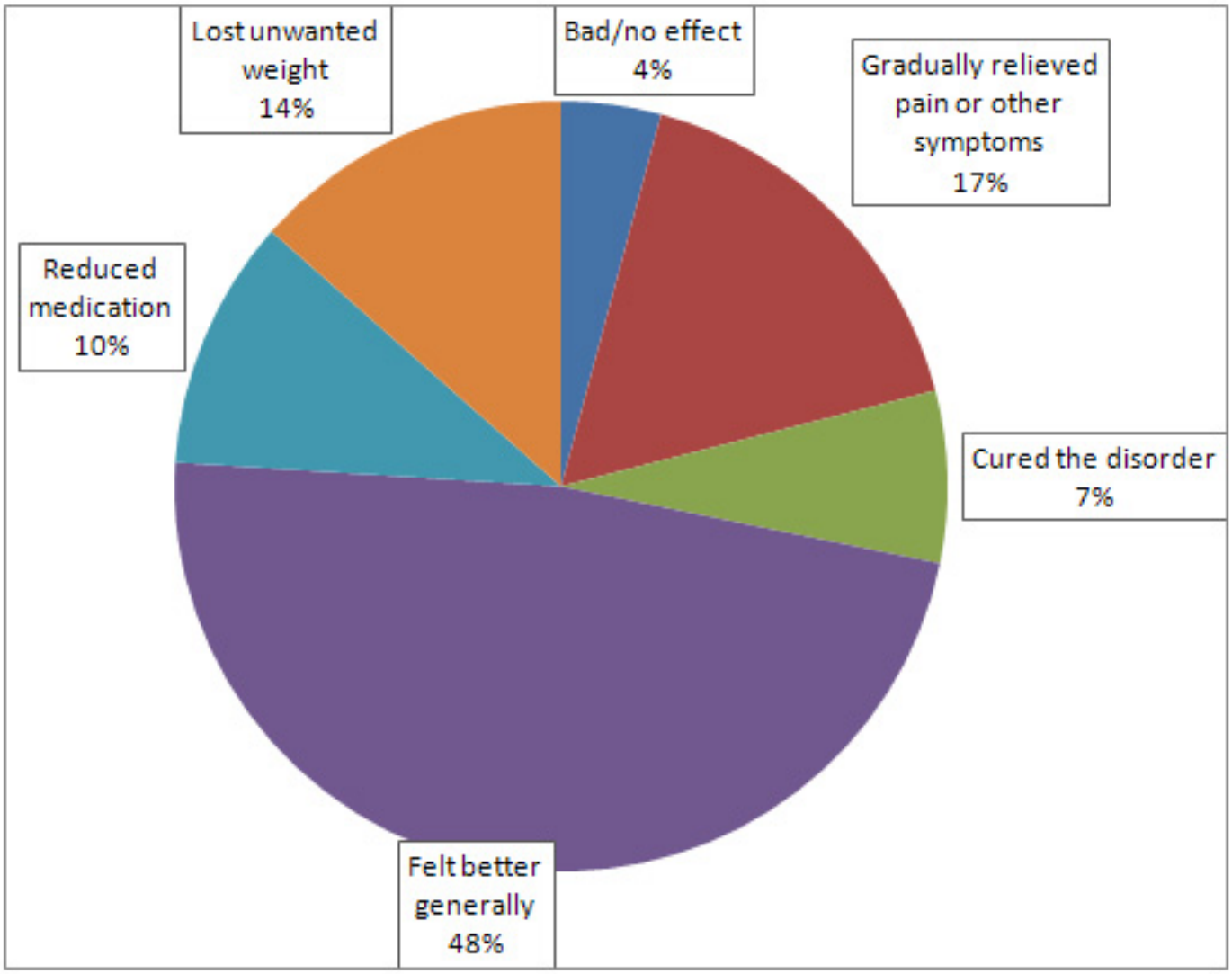

Table 4: Frequency analysis of the "Age" variable

Age	Frequency	Percent	Valid Percent	Cumulative Percent
20 Years or less	42	4.52	4.73	4.73
Between 21-30 years old	154	16.56	17.34	22.07
Between 31-40 years old	232	24.95	26.13	48.20
Between 41-50 years old	304	32.69	34.23	82.43
Between 51-60 years old	108	11.61	12.16	94.59
More than 61 years old	48	5.16	5.41	100.00
Total Valid	888	95.48	100.00	
Total Missing	42	4.52		
Total	930	100.00		

Table 5: Frequency analysis of the "Duration on Vegetarianism" variable

Duration on Vegetarianism	Frequency	Percent	Valid Percent	Cumulative Percent
a few days a year	366	39.35	41.21621622	41.22
1-2 days/week	263	28.28	29.61711712	70.83
1-2 months	169	18.17	19.03153153	89.86
3-6 months	40	4.30	4.504504505	94.37
more than 6 months	26	2.80	2.927927928	97.30
permanently	24	2.58	2.702702703	100.00
Total Valid	888	95.48	100	
Total Missing	42	4.52		
Total	930	100.00		

Table 6: Frequency analysis of the "Occupation" variable

Occupation	Frequency	Percent	Valid Percent	Cumulative Percent
Student	204	21.94	22.92	22.9
Self employed	62	6.67	6.97	29.9
Employed	178	19.14	20.00	49.9
Housewife	394	42.37	44.27	94.2
Retired	24	2.58	2.70	96.9
Unemployed	28	3.01	3.15	100.0
Total Valid	890	95.70	100.00	
Total Missing	40	4.30		
Total	930	100.00		

According to this study and based on the above results, the answers to the research questions are: Most Lebanese consume a vegetarian diet temporarily for health and religious reasons mainly. And yes, people who consume a vegetarian diet in Lebanon believe that this diet can cure, prevent and relieve symptoms of disorders.

The researcher looked further into the type of health problems that the population is concerned with and how a vegetarian diet affects certain ailments and health concerns. By examining the data in table 2, 25.68% of the sample was concerned about general health problems and fatigue, while 15.10%, 24.31% and 12.75% were concerned with weight loss, high blood lipids and digestive problems respectively.

Table 3 shows the response to the question: How did a vegetarian diet affect the healing process? The majority felt better generally(47.80%) and had gradual relief of their symptoms (16.83%). In addition, only 4.18% felt that this diet had no or bad effect on them. (As a side note, most of the 'bad' effects were not grave: hunger, dizziness or uneasiness with cutting out meat). An encouraging 13.50% indicated that this diet helped them lose a lot of unwanted weight, while 10.50% reduced their medication intake.

Discussion and Conclusions

According to this study where both hypotheses H1 and H2 were accepted, the researcher concluded that most Lebanese adopt a type of vegetarian diet or are interested in this lifestyle for a temporary period and mainly for religious and health reasons. They also feel it has a positive effect on their health. This conclusion is based on the following reasons:

• Some people in Lebanon have resorted to vegetarian food for religious reasons, mainly Christians (during Lent period and Wednesdays &/or Fridays throughout the year).

• Fewer Lebanese have adopted vegetarianism based on certain principles and a belief system like animal rights activists or simply losing confidence in the sources of their meat or dairy products and correspondingly their safety to be consumed [10]. This has been happening in the recent years after exposing suppliers' and distributors' unethical and unhygienic practices on national TV news.

• In Lebanon, a fair percentage of the sample surveyed have adopted this diet since they themselves or their relatives suffer from ailments and found this diet to have a positive effect in relieving some symptoms, generally feeling better and reducing the intake of certain medications. Many others found a vegetarian diet (if not permanently, at least at certain periods) to be a good complementary lifestyle to their conventional therapies.

• Historically speaking, Arabic medicine roots from this region and is based on herbal and other ancient home remedies encouraging the consumption of more vegetarian food in combination with herbal medicine in several treatment aspects. Most people in Lebanon find it easier to surrender to the westernized lifestyle , modern medicine and taking little part in the treatment process. Relieving symptoms as quick as possible by taking medication seems to be a habit. Changing your diet and removing meat products seems very challenging and limiting to most of them since it entails taking one's health into one's own hands, making major diet and lifestyle changes, not to mention amending the menu for weekend family barbeques (which seems to be a hobby for many) and changing habits while tolerating some withdrawal symptoms like hunger and cravings. Therefore, from the health point of view, a vegetarian diet (specially the semi-vegetarian or lacto-vegetarian) will most likely be adopted by Lebanese during certain periods and not permanently, usually in cases of religious purposes (Christian Lent) and major illnesses that mandate the abstinence of meat and high fat dairy product for a certain period of time. Rarely will few Lebanese adopt being strict vegans on a more permanent basis. Thus, the researcher concluded that many people in Lebanon look upon vegetarianism as a temporary diet rather than a permanent one or to be applied a few times a week/month.

This research implies that most people in Lebanon are more interested in its health, religious and diet facets. This can be emphasized since a vegetarian diet in general has several positive effects on a person's health status even when a disorder is involved. Contrary to modern belief, a vegetarian diet (rich in whole grains and beans) provides more strength and endurance than a modern meat and sugar diet. In many cases, it reduces the need for medication, slowly relieves some undesirable symptoms, improves general well-being and decreases the need for conventional medical therapies. Several medical doctors praise the vegetarian diet for its low fat, sugar and caloric properties. In addition, a vegetarian diet is high in fiber and complex carbohydrates. When you omit processed foods, you begin to strengthen your immune system. Vegetarian diets offer a number of advantages, including lower levels of saturated fat, cholesterol, and animal protein with higher levels of carbohydrates, fiber, magnesium, boron, folate, antioxidants such as vitamins C and E, carotenoids, and phytochemicals [9]. These diets also provide health benefits in the prevention and treatment of certain ailments (specifically hypertension, hypercholesterolemia, diabetes, etc) . The key to reaping the benefits of a vegetarian diet is in the understanding of the phrase "appropriately planned," meaning, identifying the key nutrients deficient and finding ways to supplement them.

On the other hand, the major concerns are that strict vegetarian diets (like vegans) may be low or lacking in protein, Vitamin B12, calcium, omega 3, iron, and Vitamin D. So there are certain key points to consider for avoiding the drawbacks of a vegan diet. Lacto -ovo and semi-vegetarian diets are at a very low risk of developing these nutrient deficiencies.

Vegetarians could easily meet their protein needs by eating a varied diet, as long as they consume enough calories to maintain their weight. It is not necessary to plan combinations of foods. A mixture of proteins throughout the day will provide enough essential amino acids [11]. Thus complementary proteins (i.e. rice and beans) do not need to be consumed at the same meal [14]. Most importantly, the quality of plant protein varies: whereas soy protein can meet protein needs as effectively as animal protein, wheat protein eaten alone may be 50% less usable than animal protein [15]. So for semi-vegetarians, seafood, especially white fish and sometimes salmon or tuna, if consumed 1-3 times per week, will benefit the diet with a good source of protein and omega 3 fatty acids. In general, sources of protein for all vegetarians should include beans, lentils, tofu, nuts, seeds, tempeh, chickpeas and peas. In addition, whole grain bread, cereals, low fat dairy and other common foods may also add to protein intake.

Iron needs will vary most likely from individual to individual based on the makeup of their overall vegetarian diet. Recommended iron intakes for vegetarians are 1.8 times those of non-vegetarians because of lower bioavailability of iron from a vegetarian diet [11]. Iron sources for vegetarians include dried beans, tofu, lentils, tempeh, spinach, chard, baked potatoes, cashews, dried fruits, bulgur, and iron-fortified foods (such as cereals,

instant oatmeal, and veggie “meats”). Plant foods contain only non-heme iron, which is more sensitive than heme iron to both inhibitors and enhancers of iron absorption. Inhibitors include phytate, calcium, teas, coffee, cocoa, and fiber, while enhancers include vitamin c and other organic acids. To increase the amount of iron absorbed at a meal, eat a food containing vitamin C, such as citrus fruit or juices, tomatoes, or broccoli. Using iron cookware also adds to iron intake [16].

Calcium, the main mineral in bones, plays an important role in bone health. Children whose diets are low in calcium may develop osteoporosis as adults and have a greater risk of breaking bones. Some studies, although not all, have shown that older adults with a high calcium intake have stronger bones and a lower fracture risk. There is a limited number of studies on vegans, most of which find low bone density as well as low calcium intakes[19-20]. One study, where vegans had calcium intakes close to recommended levels, found that calcium was well-absorbed from a vegan diet[21]. Calcium is present in many plant foods and fortified foods. Low oxalate greens (bokchoy, broccoli, Chinese/Napa cabbage, collards, kale, okra, turnips greens) provide calcium with high bioavailability (49-61%) in comparison with calcium fortified juices, tofu, and cow’s milk (31-32%), and with fortified soymilk, sesame seeds, almonds, and red and white beans (21-24%) [17]. However, oxalates present in some foods can greatly reduce calcium absorption, so vegetables that are high in oxalates, such as spinach and beets are not good sources of usable calcium despite their high calcium content [11]. The ADA recommends that vegetarians meet the recommended intakes for calcium by consuming at least eight servings per day of foods that provide 10-15% of the adequate intake for calcium as indicated in the Vegetarian Food Guide Pyramid (see Appendix I). For vegetarians who do not want to include dairy products in their diet, they are advised to consume calcium-enriched products (like orange juice and rice milk), leafy green vegetables, grains, nuts, tofu, pumpkin seeds, and soy drinks.

It’s not enough to have a high-calcium diet; adequate vitamin D is needed for calcium to be absorbed. Vitamin D is necessary throughout life to help build strong bones in childhood and adolescence and to maintain bones throughout adulthood[19]. Vitamin D status depends on sunlight exposure and intake of vitamin D fortified foods or supplements. Sun exposure to the face, hands, forearms and legs for 5-15 minutes per day during the summer is believed to provide sufficient amounts of vitamin D for light skinned people, while darker skinned people require longer exposure [18]. Nevertheless, many factors, including season, time of day, age, sunscreen use, and pollution, can interfere with this production. Some vegetarian food that is fortified with vitamin D includes soymilk, rice milk, and some breakfast cereals. Therefore, if sun exposure and intake of fortified foods are insufficient, then vitamin D supplements are recommended [13].

Despite the fact that vitamin B12 has a low recommended daily intake, it is still an essential nutrient (with undesirable deficiency symptoms) encouraging vegetarians to familiarize themselves and consume a variety of good sources. Fortified foods, such as some brands of cereal, nutritional yeast, soymilk, or veggie “meats,” are good non-animal sources [11]. A balanced vegetarian diet may also contain tempeh and natto (forms of fermented soybeans) that are rich in Vitamin B12. To be on the safe side, vegetarians should consume a supplement, fortified food, dairy product, or eggs to meet recommended intakes of vitamin B12 especially pregnant, lactating women and for breastfed infants if the mother’s diet is not supplemented. Tempeh, miso, sea vegetables, and other plant foods are sometimes reported to contain vitamin B12. These products, however, are not reliable sources of the vitamin. The standard method for measuring vitamin B12 in foods measures both active and inactive forms of vitamin B12. The inactive form (also called analogues) actually interferes with normal vitamin B12 absorption and metabolism [22]. When only active vitamin B12 is measured, plant foods including fermented soyfoods and sea vegetables do not contain significant amounts of active vitamin B12 [23].

The researcher truly believes that a well-balanced vegetarian or at least a semi-vegetarian diet will be successful in Lebanon and the market for its organic and meat-alternative products will grow noticeably in the near future. If not abiding 100% with a vegetarian diet, a well-balanced diet based mostly on plant-based food, could simply be applied, most essentially: eating organic seasonal food, mostly vegetarian food (whole grains, beans, legumes, seaweeds, vegetables), eating according to our seasonal needs, exercising, avoiding fast food and processed food, etc.

Therefore, the Lebanese government and health agencies should:

- Support organized import and export regulations regarding organic foods, meat-alternatives and dairy-substitutes.
- Encourage farmers to grow organic food and to produce meat and dairy alternatives.
- Cooperate with local and international vegetarian associations or experts to organize workshops, conferences and research programs.

Summary and Overall Recommendations

People who are interested in a vegetarian diet or are knowledgeable about it believe that this diet can improve their general well-being, yet find it difficult to find healthy meat/dairy alternatives and to follow a balanced nutrient-rich diet. Therefore, providing them with healthy substitutes and simple tips would be very beneficial. The following are some substitutes for animal products available in natural foods stores, Asian food stores or specified aisles in big supermarkets :

****Meat substitutes in soups or stews :**
- Tempeh (cultured soybeans with a chewy texture)
- Tofu (a bean curd; freezing and then thawing gives tofu a meaty texture; tofu will turn slightly off-white in color)
- Wheat gluten or seitan (made from wheat and has the texture of meat; great for vegan 'shawarma')

****Egg replacers (binders)**
- Ener-G Egg Replacer (or similar products)
- 1 small banana for 1 egg (great for cakes & pancakes)
- 2 Tablespoons cornstarch or arrowroot starch for 1 egg
- ¼ cup tofu for 1 egg (Blend tofu smooth with the liquid ingredients before they are added to the dry ingredients)

****Dairy substitutes in cooking**
- Soymilk
- Rice, coconut, almond, and other nut milks
- Rice cheese, almond cheese or soy based cheese
- Soy margarine
- Soy or almond yogurt
- Soy sour cream
- Spreadable tofu (mashed and flavored with thyme, olive oil or other flavors; great in sandwiches)

To maximize production of DHA and EPA (omega-3 fatty acids found in fish and made by our bodies), include good sources of alpha-linolenic acid in your diet. Alpha-linolenic acid is found in flaxseed, flaxseed oil, canola oil, tofu, soybeans, and walnuts. You can also obtain DHA directly from foods fortified with DHA from microalgae (in some brands of soymilk) and supplements containing microalgae-derived DHA.

In conclusion, it is imperative that practitioners educate patients on the importance of maintaining proper nutrition, keeping continuous surveillance for signs of nutritional deficiencies and to never avoid necessary medical consultation. If you choose a vegetarian lifestyle, consuming yeast extracts, soy products, spreads without animal fats and enriched whole grains is helpful. In that case, you could also add high quality supplements depending on your need like a multivitamin, B Complex vitamins, vitamin B12, vitamin D, calcium, magnesium, iron or omega 3 fatty acids.

References

1. American Dietetic Association. Position of the American Dietetic Association: Vegetarian diets. J Am Diet Assoc. 2009;109:1266-1282.
2. Craig WJ. Nutrition concerns and health effects of vegetarian diets. Nutr Clin Pract. 2010;25:613-620.
3. Thedford K, Raj S. A vegetarian diet for weight management. J Am Diet Assoc. 2011;111:816-818.
4. United States Department of Agriculture. Center for Nutrition Policy and Promotion. Dietary Guidelines for Americans. 2010. National Academy Press, Washington, D.C. 2010.
5. Smith SC, Jr. Current and future directions of cardiovascular risk prediction. Am J Cardiol. Jan 16 2006;97(2A):28A-32A.
6. Buckley DI, Fu R, Freeman M, Rogers K, Helfand M. C-reactive protein as a risk factor for coronary heart disease: a systematic review and meta-analyses for the U.S. Preventive Services Task Force. Ann Intern Med. Oct 6 2009;151(7):483-495.
7. Food Labeling: Health Claims; Soy Protein and Coronary Heart Disease. Federal Register: (Volume 64, Number 206)]; 1999. p. 57699-733.
8. Mitchell DC, Lawrence FR, Hartman TJ, Curran JM. Consumption of dry beans, peas, and lentils could improve diet quality in the US population. J Am Diet Assoc. 2009 May;109:909-13.
9. "Mintel: vegetarian launches have doubled in five years". Ingredients Network. 10/2/2014 <http://ingredientsnetwork.com/News/Show/865/Mintel_3a_vegetarian_launches_have_doubled_in_five_years?cid=iN_ema_nws_vis_8oct2014_informer41>.
10. " Vegetarian diet gains popularity in Lebanon". The Daily star. Oct. 16, 2004. <http://www.dailystar.com.lb/News/Lebanon-News/2004/Oct-16/2912-vegetarian-diet-gains-popularity-in-lebanon.ashx#ixzz3Fq8jlbpc> .
11. "Position of the American Dietetic Association: Vegetarian Diets," JADA, July 2009.
12. Churchill A, Iacobucci D. Marketing research: Methodological foundations (8th ed.). South Western College Pub.; 2001.
13. American Dietetic Association; Dietitians of Canada. Position of the American Dietetic Association and Dietitians of Canada: Vegetarian diets; Journal of the American Dietetic Association: 2003 June; 103(6): pp.748-765 .
14. VR Young and PL Pellett. Plant proteins in relation to human protein and amino acid nutrition. Am J Clin Nutr 59 (1994), pp. 1203S-1212S.
15. VR Young, L Fajardo, E Murray, WM Rand and NS Scrimshaw. Protein requirements of man: Comparative nitrogen balance response within the submaintenance-to-maintenance range of intakes of wheat and beef proteins, J Nutr 105 (1975), pp. 534-542.
16. RF Hurrell, M Reddy and JD Cook. Inhibition of non-haem iron absorption in man by polyphenolic- containing beverages, Br J Nutr 81 (1999), pp. 289-295.
17. C Weaver, W Proulx and R Heaney. Choices for achieving adequate dietary calcium with a vegetarian diet. Am J Clin Nutr 70 (1999), pp. 543S-548S.
18. Feskanich D, Willett WC, Colditz GA. 2003. Calcium, vitamin D, milk consumption, and hip fractures: a prospective study among postmenopausal women. Am J Clin Nutr 77:504-11.
19. Marsh AG, Sanchez TV, Michelsen O. 1988. Vegetarian lifestyle and bone mineral density. Am J Clin Nutr 48 (suppl):837-41.
20. Chiu JF, Lan SJ, Yang CY, et al. 1997. Long-term vegetarian diet and bone mineral density in post-menopausal Taiwanese women. Calcif Tissue Int 60:245-49.
21. Kohlenberg-Mueller K, Raschka L. 2003. Calcium balance in young adults on a vegan and lactovegetarian diet. J Bone Miner Metab 21:28-33.
22. Herbert V. Vitamin B12: Plant sources, requirements, and assay. Am J Clin Nutr 1988;48:852-858.

Appendix 1

The Vegetarian Food Pyramid

Guidelines for Healthful Vegetarian Diets

- Variety of plant foods in abundance
- Emphasis on unrefined foods
- Healthy range of fat intake
- Adequate water and other fluids
- Regular physical activity
- Moderate sunlight exposure

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* A reliable source of vitamin B12 should be included if no dairy or eggs are consumed.

Other Lifestyle Recommendations

Daily Exercise

Water—eight, 8 oz. glasses per day

Sunlight—10 minutes a day to activate vitamin D

Calories/day ▶	1600kcal/day	2000kcal/day	2500kcal/day	1600kcal/day	2000kcal/day	2500kcal/day
Food Groups	vegan servings/day			lacto-ovo servings/day		
Whole Grains	5	7	12	5	6	9
Legumes and Soy	3	3	3	3	3	3
Vegetables	6	8	9	6	8	9
Fruits	3	4	4	3	4	4
Nuts and Seeds	2	2	2	1	1	2
Vegetable Oils	1	2	2	1	2	2
Dairy Products	0	0	0	2	2	2
Eggs	0	0	0	1/2 egg	1/2 egg	1/2 egg
Sweets	Optional					

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