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THE EFFECT OF DIET SUPPLEMENTATION ON

CHILDREN WITH ADHD

By

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DEDICATION PAGE

I would like to dedicate this project to my mother, sister and husband who had been a support from the beginning of my graduate years.

THE EFFECT OF DIET SUPPLEMENTATION ON CHILDREN WITH ADHD

Linda Saab

ABSTRACT

Nutritional management as related to ADHD is one aspect that has been neglected in Lebanon. This project investigates the influence of diet, without medication or behavior alteration, on children with ADHD. A case study was conducted on a 9 year old boy attending in a private school in Beirut who was diagnosed with ADHD. The participant had food additives, refined sugars, casein, gluten, and foods with salicylates removed from his diet and an increased intake of essential fatty acids (omega 3 and omega 6). The study that lasted 5 weeks aimed to observe the effects of this special diet on the boy's hyperactivity, impulsivity and inattention. The diet proved effective in that diet modification played an effective role in the management of ADHD and hence should be recommended to students with similar conditions.

Keywords: ADHD, Casein, Diet, Food Additive, Gluten, Hyperactivity, Impulsivity, Inattention, Salicylates.

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CHAPTER I

INTRODUCTION

For decades, medication has been the treatment of choice for children with ADHD. It is estimated that 96.4 % of these children are prescribed medication (National Institutes of Health, cited in Lerner & Kline, 2006). Stimulants, one commonly used type, work rapidly and 70% of children on medication have improved attention and reduced impulsivity and hyperactivity (Conners & Wagner cited in Leins, 2007). However, there are numerous concerns regarding their side effects and no consensus over its long term use has been reached (Brody, 1999). According to Schachter et al. (cited in Leins 2007), pharmacotherapy for ADHD have side effects such as insomnia or sleep disorders, loss of appetite and reduced growth. Also, most parents believe that their kids, particularly at a very young age, should not be on medication regularly (Hirayama et al, 2004). Therefore, natural treatment instead of chemical drugs and pills becomes a preferred alternative in dealing with these children.

In general, alternative treatments include behavioral techniques. For example, according to Martin and Pear (2007), modeling good behavior, rewarding or praising directly after a positive behavior occurs with token economies, frequently clarifying tasks throughout the day, and decreasing a behavior through extinction has shown to decrease the symptoms of ADHD. However, according to Dopfner & Lehmkuhl (cited in Leins, 2007), even after behavioral interventions has been used, many children continue to show ADHD symptoms. According to Doman and Delacato (cited in Guyer, 2000), patterning is another treatment that covers intensive physical motions which were not properly developed at an early stage; its focus is primarily on muscle activity. However, according to Guyer (2000), this approach will not improve

the child's ADHD symptoms. . Neurotherapy is a computer-based technique that retrains the brain to create additional regular patterns of electrical activity. Students are trained to play computerized games by means of their brainwave activity. According to Dr. Ralph Irani, a professional nutritionist, diet is a new treatment for children with ADHD in Lebanon which is highly recommended instead of psychotropic medication.

PURPOSE OF THE STUDY

This project is concerned with ADHD and the effect of diet on children with ADHD. According to Barkley, the Combined Type which is the most common form of ADHD involves "significant problems with sustained attention, persistence toward goals, resisting distractions along the way, inhibiting excessive task-irrelevant activity (hyperactivity), and inhibiting actions, words, thoughts, and emotions that are either socially inappropriate for the situation or inconsistent with one's longer term goals and general welfare"(p. 1, 2012).

The main purpose of this study is to investigate whether a relationship exists between changes in dieting and children diagnosed with ADHD. Specifically, this study purports to determine if there is a significant effect on behavior in response to types of food that students with ADHD add or remove from their diets, based on the hypothesis that such a correlation between diet and behavior exists.

RESEARCH QUESTION

Do changes in diet, without medication or behavior modification, reduce the hyperactivity, inattentiveness and impulsivity of a student in grade four attending a private school in Beirut?

RATIONALE AND SIGNIFICANCE OF THE STUDY

As we have previously seen, there are several effective alternative treatments to ADHD other than medication; however these alternative approaches have negative effects as well. While researching the subject, the investigator came across an interesting article "Attention Deficit Hyperactivity Disorder: Alternative Therapies" with regards to alternative treatments of ADHD. Unlike most treatments, this method of altering one's daily diet regime poses no threat or harm to the child diagnosed with ADHD. On the contrary, it nourishes and sustains the child's health even more. In addition to a healthy lifestyle, this approach has not been fully examined or implemented in Lebanon. Therefore, the hypothesis that a healthy diet can help reduce ADHD stands as a worthy form of treatment to be further investigated.

SUMMARY OF LITERATURE REVIEW

Research references will be divided into three parts. In the first part, we will be referring to Dr. Russel A. Barkley, the leading scientist in the field of ADHD discussing its definition in details. The second part will be based on the alternative treatments to ADHD such as behavior modification. The third part will be a detailed proposed diet, and I will be referring to Dr. Laura J. Stevens, the leading nutritional scientist who specializes in the effects of omega 3 and fatty acids on behavior, and others such as Quinn and Richardson. Another reference will be Dr. Ben F. Feingold who specializes in the effect of food additives on behavior.

RESEARCH METHOD

SUBJECT

The case study will focus on a 9-year old male, going to 4th grade in a private school in Beirut. He was diagnosed with ADHD two years ago (2009) by Dr. Ahmad Oueini.

METHOD

This research project is a case study using a qualitative research design. A non-random sample, specifically, a convenience sample will be used in this intervention study. The convenience sample has been chosen due to my personal relationship with the guardian of the child. Also, the child will only adopt the dietary treatment which will not affect the integrity of the results.

First, naturalistic observation was used and the one-group pretest-posttest design. The child was observed at home to document his behavior and provide a baseline before initiating treatment. The next step was to monitor the child as treatment started and note all behavioral changes. This was done on a weekly basis. Furthermore, in order to objectively assess the impact of the treatment, we used anecdotal feedback from the child's mother on a weekly basis, highlighting the child's daily food intake and behavioral responses.

Also, an interview with a professional nutritionist, Dr. Ralph Irani, was conducted in order to obtain clinical guidance on how to administer and monitor the proposed treatment. Dr. Irani provided the mother with a daily food regiment which shall be strictly monitored and she would offer feedback on the child's response to the treatment.

LIMITATIONS

The results of the experiment are limited in nature as the sample population is limited to one individual. As such, we cannot generalize the results of the proposed treatment to all ADHD patients. Also, human factors must be taken into account as the child may not have religiously followed the proposed diet. This may affect the integrity and validity of the observed responses to treatment.

Due to the fact that the test subject is only 9 years old, he would not fully appreciate and understand the purpose of the treatment. Also, the change in the child's diet will not be as drastic as it would have been for an older subject as there are nutritional considerations with regards to the proper healthy growth of the child.

ETHICAL CONSIDERATIONS

In order to conduct this study, a number of ethical considerations were made with regards to confidentiality of the data collected from the parents, child with ADHD and teachers. We ensured that the information would remain confidential by withholding the name of anyone included in this project. We also made sure that the participants were protected from any potential physical or psychological harm.

CHAPTER II

This chapter includes the review of the literature and tackles the characteristics, causes, and challenges of the ADHD child, techniques to reduce disruptive behaviors such as behavior modification, types of medication and diet implementation and their effect on the child with ADHD.

ADHD AND ITS CHALLENGES

ADHD is a major problem and a growing concern that affects many children and exists in all schools. These children are in need of constant monitoring due to their high maintenance behaviors and actions. According to Barkley (1997), these children do not only suffer from behavioral and academic difficulties, but they also face emotional and social problems. When dealing with the process of learning, Barkley believes that "the problems of the ADHD child don't stem from a lack of skill but a lack of self-control and ADHD is therefore not a problem with a child's knowing what to do but a problem with doing what the child knows"(p.47, 1998). According to Gresham, Sugai, &Horner (2001), children with ADHD may lack emotional and social competence which makes it difficult for them to interact effectively with others or to get along with other peers at school. According to Barkley (2005), ADHD students may exhibit aggressive behavior that might lead the child into becoming frustrated and anti-social.

CHARACTERISTICS OF ADHD

According to the DSM-IV (diagnostic and statistical manual of mental disorders), there are three types of ADHD; each type requires that the child displays at least six of nine symptoms. In addition, these symptoms must be present for at least six months and before the age of seven.

The three types of ADHD are:

According to the American Psychiatry Association, "ADHD-IA refers to the children that are primarily inattentive, who have problems primarily with attention. The symptoms of inattention:

- Often fails to give close attention to details, makes careless mistakes
- Often has difficulty sustaining attention
- Often does not seem to listen
- Often does not follow through or finish tasks
- Often has difficulty organizing tasks and activities
- Often avoids or dislikes tasks that require sustained effort
- Often loses things needed for tasks
- Often is easily distracted by extraneous stimuli
- Often is forgetful in daily activities

ADHD-HI refers to the children that are primarily hyperactive and impulsive, but do not show problems with attention. The symptoms of hyperactivity and impulsivity:

- Often fidgets with hands or feet or squirms in seat
- Often leaves seat in classroom or in other situations
- Often runs about or climbs excessively in situation in which it is inappropriate
- Often has difficulty playing or engaging in leisure activities quietly
- Often talks excessively
- Often is 'on the go' or acts as if 'driven by a motor'
- Often blurts out answers before questions have been completed
- Often has difficulty waiting in turn

- Often interrupts or intrudes on others

ADHD-C refers to children who have a combination of attention problems and also display symptoms of impulsivity and hyperactivity. The symptoms of the combined subtype are both ADHD-IA and ADHD-HI." (p.83-84, 2000)

According to Rappley (cited in Lerner & Kline, 2006), 5% of children with ADHD are primarily inattentive, 15% are primarily hyperactive and impulsive and 80% are of the combined.

CAUSES OF ADHD

According to Hallahan, Kauffman, & Pullen (2009), there are four different theories related to the causes of ADHD which are neurological dysfunction, neurotransmitters, hereditary factors and toxins and medical factors.

Neurological dysfunction has been identified as one of the causes of ADHD. The prefrontal and frontal lobe (responsible for regulating one's behavior), the basal ganglia and cerebellum (responsible for coordination and control of motor behavior), and the corpus callosum (responsible for connecting the right and left sides of the brain) are five areas of the brain that have been found to be smaller in children and adult with ADHD than in nondisabled individuals.

Another cause of ADHD has been the abnormal level and imbalance of two neurotransmitters (chemicals in the brain that aid in the sending of messages between neurons) that are the dopamine and norepinephrine.

A significant and very strong cause of ADHD is heredity. A child may have ADHD if anyone else in the family does too, such as a parent or sibling.

Finally, toxins and medical factors have been shown to be related to ADHD. Fetal exposure to toxic substances, such as lead, alcohol and tobacco puts the unborn

child at risk of developing ADHD. Also, medical conditions such as low birth weight and complications at delivery may be the cause of ADHD.

INTERVENTIONS FOR CHILDREN WITH ADHD

Many different types of treatment are recommended for children with ADHD. The kinds of approaches for treating these children include play therapy, coaching, music therapy, EEG Neurofeedback, family and child counseling, home management etc. However, the most common and widely used treatments are medication, behavior therapy and the combination of both.

One study (Wolraich et al. 2001) explains that pharmacological intervention is the treatment of choice for children with ADHD because it increases the arousal or alertness of the central nervous system, lengthens the child's attention span, controls impulsivity, and decreases distractibility. According to Lerner and Kline (2006), there are three different types of medication for children with ADHD.

The first type is the psychostimulant medications (affects the dopamine levels that control behavior) that are the most widely used and effective for the majority of children, they include Ritalin, Dexedrine, Adderall, Concerta, and Cylert. Although the psychostimulant medications have many advantages such as improving attention and scholastic performance, they also have side effects such as insomnia, dizziness, loss of appetite, headaches and moodiness, and in some cases Ritalin may trigger tics (Barkley, cited in Lerner & Kline 2006).

The second type is the nonstimulant medication (affects the neurotransmitter norepinephrine) that has been recently approved by the Food and Drug Administration and the brand name is called Strattera.

Finally, there are also antidepressant medications, including Prozac, Norpramin, Tofranil, Elavil, wellbutin, and Pamolar, that are given to children with ADHD that have not shown any improvement with psychostimulant medications.

Another type of treatment is behavioral management which has been shown to improve the symptoms of ADHD. According to Hallahan et al. (2009), behavioral

Another type of treatment is behavioral management which has been shown to improve the symptoms of ADHD. According to Hallahan et al. (2009), behavioral procedures that is, rewarding desirable behavior with positive reinforcement such as social praise, prizes, and token economies and punishment when undesirable behavior occurs, plays a very crucial role in helping children with ADHD reach positive behavioral changes. According to Martin and Pear (2007), those who are not aware of the principle of positive reinforcement can use it unknowingly to reinforce negative or undesirable behavior. Also, According to Barkly (1998), the symptoms, which the children suffer from, were most clearly exhibited when the students with ADHD were asked to modify their behavior after the request from others.

According to Hallahan et al. (2009), medication alone or behavioral management on its own is effective; however, in order to get the best results, parents should primarily try both medication and behavioral management together. Many studies have shown that the best course of action is to try the combination of both.

EFFECTS OF DIET ON ADHD

According to many health experts, diet plays a vital role in relieving ADHD symptoms. The types of diet that has been shown to have some positive effect on children with ADHD include the removal of food additives, refined sugars, casein and gluten, food allergies, as well as the increase intake of essential fatty acids (0mega-3 and omega-6).

Much research has been done in relation to diet and ADHD; however, the most researchers that have contributed to this topic include Feingold, Stevens, Su, and Pelsser.

Feingold (1973) believes that some children may have allergic reactions or sensitivities to certain types of foods that can cause or contribute to ADHD symptoms such as problems with behavior, learning and health.

During Feingold's career, he realized that children who consumed a high level of various food additives seemed to exhibit hyperactive symptoms. Therefore, he assumed that these foods were the cause of the hyperactivity in children. He also studied this relationship and found a connection.

Feingold developed a diet called 'The Kaiser-Permanente Diet' that has a naturalistic intervention for symptoms of ADHD and "work mainly to gradually remove artificial substances from a child's diet" (p.27, 1979). In other words, he bases his diet on eliminating foods that contain natural salicylates, artificial food colors (AFCs) and flavors. According to him, artificial preservatives (such as imitation vanilla which are unnatural) and food dyes, which can be found in ingredient listings and often appear as Red Dye # 40 or Yellow Dye # 5, should be removed. These include Butylated Hydroxyanisole (BHA), Butylated Hydroxytoluene (BHT), and Tertiary ButylHydroQuinone (TBHQ) which are synthetic preservatives made from petroleum- crude oil.

The diet also eliminates aspirin and foods with Salicylates, chemicals related to aspirin and which is a naturally occurring pesticide in particular food plants, also manufactured and used in many products such as medicines, perfumes and solvents.

Such foods for instance are cherries, apples, prunes, tangerines, cucumber, pickles, teas, oranges, green peppers, and peaches. However, during the initial weeks

of the program, foods containing salicylates which are removed may later be reintroduced and tested for tolerance, one at a time.

By 1979, he reported having treated over 600 children with the diet, and that his success rate had risen from 30% to 60-70% once he had begun eliminating the preservatives as well. In addition, according to Boris & Mandel (1994), 70% or more of hyperactive children responded positively to the removal of synthetic additives, especially when salicylates or allergens are removed.

Following 35 years of study in this filed, Stevens (2000) states that by improving diet, eliminating allergens, and adding minerals and supplements, might help diminish symptoms of hypersensitivity in children. She identified some problematic foods, which might possibly trigger allergic reactions and perhaps contribute to ADHD in children; among them are artificial food colorings and dyes found in processed foods or drinks (such as, sweetened fruits drinks and juices sodas, all cake mixes, candy, Jell-O, Ketchups and other sauces…etc) ,Yolk, Processed meats, Citrus fruits, Certain legumes (specifically Zucchini, rutabagas, squash, cucumbers and green peppers are often waxed and should be avoided as the chemicals are not water-soluble and can't be washed away), Soy and corn products (corn oil/syrup), Yeast, Sugar, Casein, Chocolate, Gluten, and Environmental allergens including fragrance, paint and pesticides.

Anderson (2008) explains that these kinds of allergies take place when the body's immune system mistakenly recognizes a protein as harmful (since they are resistant to digestion) and those that are not broken down in the digestive process fool the immune system into thinking that the protein is harmful. The immune system, thinking the organism is under attack, triggers an allergic reaction.

In addition, according to Laake, Compart & Silberberg (2009), gluten (found in wheat, rye, barley and other grains) and casein (mainly found in diary-products such as milk, yogurt and ice cream and also available in many baked goods and canned tuna) are two proteins that have the most common connection to mood disorders, behavioral disorders, and ADHD. Therefore, they should be eliminated from the child with ADHD's diet.

According to Stevens (2000), some kids get better when they start following a gluten and casein-free diet; however, the main problem is that different foods trigger behavioral problems in different children. Therefore, she states that parents should cut out all of these for two weeks, then reintroduce each one by one to see if there's a noticeable change in any of the ADHD symptoms (often within hours). If so, that food should be eliminated otherwise the child can return to eating it. By following this strategy, Stevens (2000) says that the child must get the nutrients he/she needs during those restrictive two weeks, which might involve taking supplements in addition to choosing numerous other substitute foods such as unsweetened fruit juices (orange, apple, pineapple, grape, grapefruit and tomato), unflavored gelatin, stone ground whole wheat flour, cold soy pressed or canola oil, pure extracts spices such as vanilla, orange, peppermint, lie and almond, unsweetened carob powder (instead of cocoa), raw and unprocessed nuts, Enriched rice milk or soy milk (if not sensitive to soy), fresh vegetables and fruits with low pesticides such as broccoli, bananas, canned peaches, orange juice, frozen peas, papayas, sweet potatoes, and baked goods without wheat and rye.

Stevens points out that Essential Fatty Acids (EFAs) must be consumed in the diet direct intake of EFA is most effective since it cannot be synthesized in our body. Tracing out the families of EFAs, it is worth noting that there are two forms of EFAs:

The Omega-6 fatty acids are found plentifully in soy, corn, safflower and sunflower oils and the Omega-3 fatty acids are found in canola oil, flaxseed oil, dark green leafy vegetables, some beans, and cold water fish like salmon, tuna and sardines.

According to Stevens (cited in Richardson 2003) children with lower levels of omega-3 fatty acids in their blood showed more problems with behavior, learning, and health than those with higher levels of total omega-3 fatty acids. Students with ADHD have 15% less DHA (docosahexaenoic acid) than regular students which also implies that there is a high possibility to reduce ADHD symptoms through DHA supplementation.

Stoll (2001) explains that a deficit in the Omega 3 contributes to ADHD by noting that the brain is about 60 percent fats, with Omega-3 essential fatty acids the most abundant fat in the brain. This essential fatty acid is extremely important because it allows for the communication and transmission to take place between brain cells; otherwise the brain will not function properly, hence enabling ADHD symptoms.

Su (2009) states that refined carbohydrates and sugar can worsen ADHD symptoms in a number of ways. When eaten, refined carbohydrates convert to sugar, quickly enter the bloodstream, and are quickly cleared by the flood of insulin they promote. Su also stated that "brain cells, which cannot store carbohydrates for energy, feel the sudden loss of fuel, and the sugar high becomes a sugar crisis as children become inattentive and agitated due to the drop in blood sugar" (p. 298, 2009).

According to Pelsser (2011), children with ADHD could experience a significant reduction in symptoms following a very restrictive diet. She placed a group of 50 children with ADHD on a restricted elimination diet (RED diet), over a

period of 5 weeks, to certain foods consisting of the least possible risk of allergic reaction – a combination of rice, white meat (turkey, lamb), lettuce, carrots, cauliflower, cabbage, beet, pears and water. Calcium was supplied daily via non-dairy rice drink with added calcium, ensuring that children were not at risk for nutrient deficiencies. The purpose of such restriction was to eliminate potentially offending foods and to observe any change in symptoms. 78 % of those kids responded by having fewer ADHD symptoms.

During a second phase of the study, offending foods were reintroduced and symptoms returned in those who had previously shown improvement. According to Pelsser (2011), most children diagnosed with ADHD are experiencing symptoms of food hypersensitivity therefore they do not need medication to manage the disorder.

Children following the RED diet would gradually have foods added back into their diet so as to determine which foods caused symptoms and needed to be permanently eliminated as opposed to foods which were tolerated well and did not cause symptoms. The results suggest that dietary interventions should be one of the first treatments attempted when a child is diagnosed with ADHD.

CHAPTER III

METHOD

This research project tries to tackle whether a correlation exists between changes in dieting and children diagnosed with ADHD. The methods used for this project will be explained in this chapter.

RESEARCH DESIGN

This pilot study was applied on a nine year old student with learning and behavioral problems and was completed using several approaches for data collection. These research methods were chosen as they were considered to be the most appropriate and effective way to gain an overview and also a more in-depth and descriptive account of the changes (if any) of the child with ADHD throughout and following the treatment phase.

INTERVIEW

Sharp and Howard view the interview as "providing higher quality information that is freer from bias than many other methods available" (p. 147, 1996). Craft (2000) believes that, unlike questionnaires, interviews provide a deeper knowledge of attitudes with the responder.

First, two interviews were conducted with Dr. Ralph Irani, an esteemed nutritionist dealing with ADHD children. Both interviews involved a discussion of ADHD symptoms and the possible correlation between a proper diet and ADHD. Finally, with the assumption that such a correlation did exist, the interviews highlighted a proposed treatment, or a change in diet, to improve learning and behavioral outcomes. The interviews were structured in such a way to answer the following open-ended questions. For example:

- What are the typical symptoms associated with ADHD?
- Is there any form of treatment other than medication to tackle ADHD?
- If yes, does a proper diet contribute to diminishing ADHD symptoms?
- If yes, what are considered "good" foods vs. "bad" foods associated with treating ADHD patients?
- How long before the treatment starts showing signs of improvement?

An interview was also conducted with the guardian of the child diagnosed with ADHD, focusing on the occurring symptoms that were highlighted in his behavior as well as gathering historical or medical records (if any) associated with him.

Some of the open-ended questions asked in the interview were as follows:

- What are the typical symptoms exhibited by this child?
- Has he ever been treated?
- If yes, is he on any kind of medication?
- If yes, what medication is being provided?
- What are his favorite dishes
- Has he ever been diagnosed with food allergies

These three interviews were conducted prior to the treatment to gather preliminary qualitative research data. These interviews sought to clarify, complement or expand upon issues emerging from other forms of data collection (stated below).

Qualitative single-subject design

Coolican (1999) states that a qualitative approach mainly focuses on meaning, descriptions and experiences (that are often described verbally). This study employed a qualitative single-subject research design. Gay & Airasian define Single Subject Research Designs (also referred to as single-case experimental designs) as "designs

that can be applied when the sample size is one or when a number of individuals are considered as one group. These designs are typically used to study the behavioral changes an individual exhibits as a result of some treatment" (p.383, 2003).

The research took place over a five-week period:

- The first two weeks, the "Pre-Intervention Treatment" phase comprised of two baseline observations targeting the child with ADHD which aimed at observing and documenting the behaviors demonstrated by the child before the initial treatment.
- During the "Intervention Treatment" phase, a period of two weeks comprised of two observations to determine if there were any gradual changes in the child's behavior while being treated.
- Finally, the last week, the "Post-Intervention Treatment" phase comprised of three post observations which aimed at seeing if any ADHD symptoms resurfaced through re-introducing some offending foods (with each visit targeting the reintroduction of one food during his snack hour after lunch).

The research took place at the child's home because it was considered to be comfortable and familiar to the child whereby the researcher's observations were made in the afternoon following his snack in every intervention. The timing was chosen on purpose so as to be able to observe the child's behavior while he was studying with his tutor and afterwards playing with his friends.

QUESTIONNAIRE

Craft states that "using more than one source of information and more than one data collection method and being systematic and careful in your evaluation will help to ensure that your findings are credible" (p.75, 2000). Wilson and McLean (cited in Cohen et al.) state that "the questionnaire is a widely used and useful instrument for collecting survey information, providing structured, often numerical

data, being able to be administered without the presence of the researcher, and often being comparatively straightforward to analyze"(p.245, 2000). Having said that, and in addition to the interview conducted with the guardian of the child during the "Pre-Intervention Treatment" phase, a questionnaire "Black Listed Foods" (Appendix I) was provided. These black listed foods were chosen in this questionnaire by building on the literature reviews and in consultation with the Professional Nutritionist. The guardian was asked to tick any of these foods (that fall under the closed-ended question) if they were being provided to the child on a weekly basis. In addition, the questionnaire comprised of an open-ended question related to the mostly common foods provided to him on daily basis.

FOODS AND MOOD JOURNALS

In the During -Intervention Treatment" phase, the guardian of the child was provided with a daily food regiment for two weeks, a "Good Foods and Mood Journal" (Appendix II) which was developed by the child's guardian and the researcher, based on extensive research and in consultation with the professional nutritionist. Accordingly, the guardian was asked to note down the behavior of the child on each meal (breakfast, lunch, snack and dinner) on a daily basis in the "Good Foods and Mood Journal[1]" (Appendix II). The purpose of this exercise was to monitor his behavior while eating at the dining table with the rest of the family and to gather a detailed account of all occurring symptoms being manifested by the nine year old. Additionally, the student was provided with a snack that could be eaten anywhere in the house without having to sit and be monitored at the dining table as this was complemented by the two observations provided by the researcher.

[1] The diet includes a natural addition by the nutritionist, "Bio-Strath", which improves concentration, general health and the body's own power of resistance.

It is worth noting here, that building on the literature review discussed previously, the provisions of the diet were based on foods free from Gluten, Casein, common salicylates related foods, sugar and artificial colorings.

During the "Post-intervention Treatment" phase, a different diet "Offending Foods and Mood Journal[2]" (Appendix III) was provided for one week which aimed at re-introducing some offending foods for snack. These were specifically chosen since, based on the Questionnaire provided to the guardian, they were the most foods that her child had on a daily basis. After re-introducing these "offending foods" in the diet, the guardian was asked to note down the child's mood and all changes in symptoms exhibited (if any). According to the nutritionist, each offending food had to be re-introduced every 24 hours (no less) to confirm that they were no longer in his system, hence enabling us to monitor the symptoms in an effective manner.

CONFIDENTIALITY ISSUES

Upon the request of the child's guardian and during the "Pre-intervention Treatment" phase, two contracts were drawn. The first contract, "Statement of Confidentiality" (Appendix IV) was signed by the researcher confirming the non-disclosure of confidential information to retain the privacy of the child as well as the provision of a sound diet that will not pose a threat to the child's health; and the second contract, "consent form for the child's observation", was signed by the guardian of the child.

[2] Bio-Strath was also provided in the diet

To sum up, the research and methodology of this study comprised of the following:

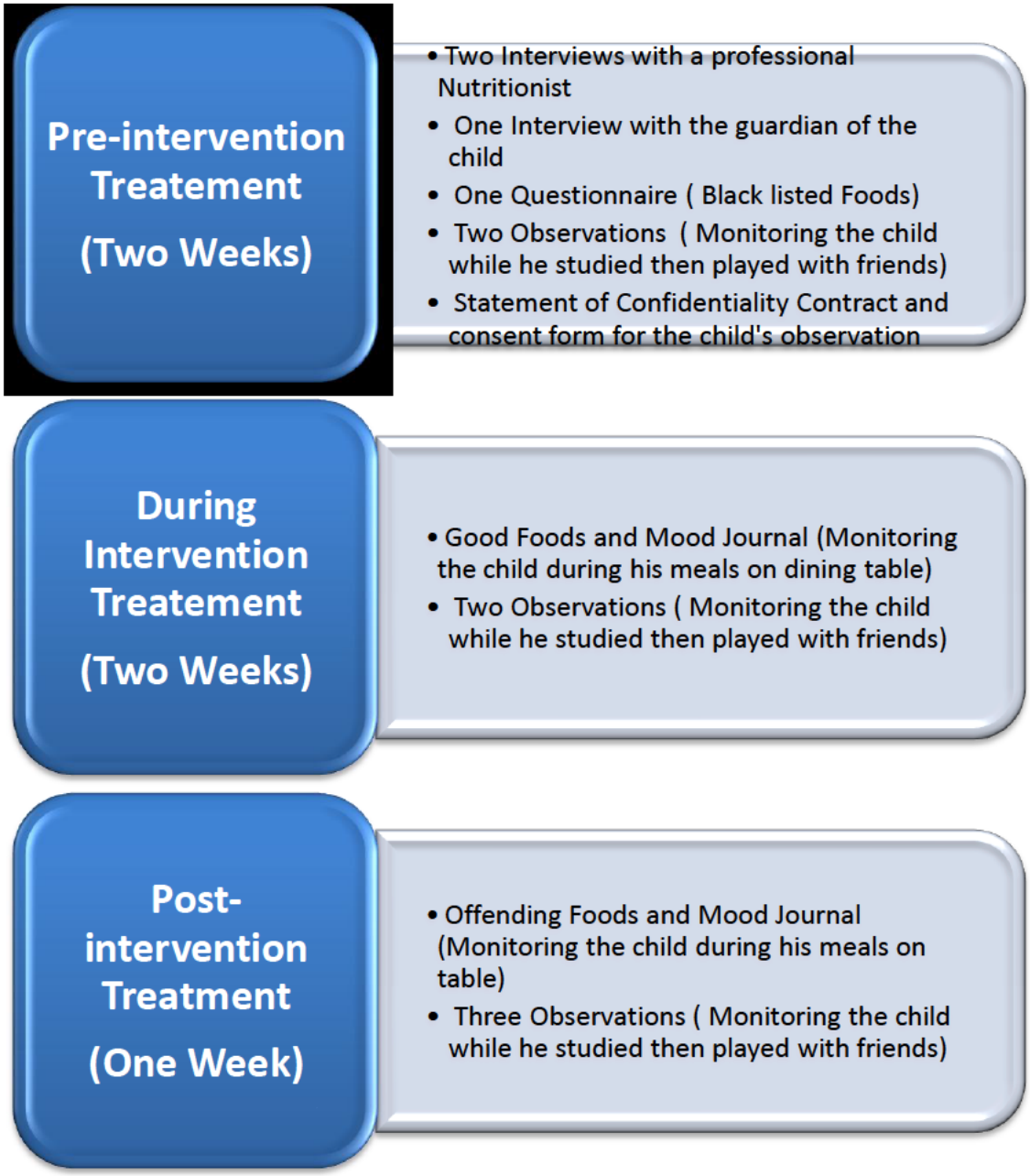

Fig. 3.1 Research and Methodology

CHAPTER IV

The convergence of the research, the questionnaire and food and mood journals provided as well as the observation that took place before, for five consecutive weeks, leads us to analyze the data and conclude that we have attained a critical level of validity which will be discussed in this chapter.

PRE-INTERVENTION TREATMENT

During this phase, and before starting the diet (or treatment), both the questionnaire and the interview with the guardian of the child showed that the child had never been treated nor was he on medication. In addition, no supplements were ever provided to him. The results also indicate that the child was eating the following offending foods, with each food being given on a weekly basis:

- ✓ Chocolate
- ✓ All cake mixes
- ✓ Candy
- ✓ Sugar
- ✓ Sweetened fruit juices
- ✓ Salty foods (crackers, chips…etc)
- ✓ Artificial sauces like Ketchups, BBQ and Mayonnaise
- ✓ Junk Food
- ✓ Processed meats
- ✓ Citrus fruits (Oranges, grapefruits)
- ✓ Green peppers
- ✓ Tomato with skin
- ✓ Corn oil (as the guardian uses it for cooking purposes).

In addition, the results show that the child has the following foods on a daily basis:

- ✓ Bread , cereal, cereal bars (gluten based)
- ✓ Milk and cheese (casein based)
- ✓ Soda (Artificial colorings)

During the two observations that were undertaken during this phase, it was noted that the child's ADHD symptoms were many fold and they were highlighted when he was studying with a tutor, eating with family members on table or playing with his friends:

For instance, while he was studying, the child exhibited ADHD symptoms that were mostly characterized by the fact that he barely stayed focused as the tutor had to repeat the same instruction almost six times as he was mainly playing with any object on his desk (pen, pencil, ruler). In addition, when the tutor gave him homework to deliver on time, he simply could not complete the task on a timely manner and was always behind in his homework despite the fact that he used to spend excessive time trying to achieve his task. Throughout his studies, he simply did not seem to listen and was easily distracted by any external stimuli and ran frantically to answer the door bell or the telephone. If the tutor managed to get his attention after failing miserably many times, he would carelessly make mistakes, thus failing to give close attention to details of his homework and often blurted out answers before the question has been completed, showing signs of frustration.

In addition, based on the guardian's mood journal, results showed that while eating, and while the mother was serving others food during lunch before him, the child had difficulty waiting his turn, fidgeted with his hands and feet and talked

excessively. It was noticed that when his questions were not being answered directly, he exhibited strong mood swings and emotional ups and downs.

While playing with his friends, the child was always on the go to find another game within a short period of time when starting the previous one and he had difficulty waiting for his turn when others held the joystick while playing a video game. He didn't seem to listen when his friends were talking and often interrupted them while looking at the television screen without making eye contact.

DURING- INTERVENTION TREATMENT

A comparison of the Pre-Intervention Treatment and the During- Intervention Treatment observations, along with the journal that was provided by the guardian of the child, indicate that the latter has benefitted from the diet, whereby the symptoms associated with ADHD started to diminish starting on the 9^{th} day.

During his studies for instance, although the tutor had to repeat the same instruction, the frequency of her repeating decreased from six to two times only. He also stopped playing with his pencil and seemed more attentive by keeping his hands to himself while trying to solve the exercise given by his tutor. However, he still interrupted the tutor's questions by blurting out answers but at a much less frequent rate than before. Accordingly, he seemed to listen more than before. However, he was still distracted by external stimuli. For instance, while he was trying to focus on his studies, someone knocked on his bedroom door, he lost focus and directed his attention to see who was entering the room instead of continuing to solve the exercise that was given to him. The benefits in this case were portrayed in the fact that he did not leave his seat and instead he went back to focusing on what he was doing after seeing that it was only the guardian that was knocking to check up on him. While the tutor gave him an exercise to complete at a certain hour, it was shown that he would

almost complete the entire project on time by making fewer mistakes. He was simply focusing on his homework but still had difficulty finishing the entire task. However, he would still make mistakes but these were not careless and it was noticed that he would put an effort in paying more attention than before to the details provided in his studies.

While eating, he showed signs of calmness by waking up in a better mood and no longer showed signs of anger and frustration when not served before other family members. He waited his turn with less hand and feet fidgeting. He looked relaxed, knowing that he will eat when his turn came, and hence effectively applied better table manners. He would still interrupt people on the table; however he would do it once instead of several times as displayed previously. He still got distracted by external stimuli however, when the phone rang, instead of leaving his seat abruptly, he would ask permission to answer it with sheer excitement. Another time, he got up when he heard the phone rang but directly sat back down instead of leaving his seat and answering the phone. He also talked less excessively and appeared more attentive to the conversations held on the table. When his father arrived from Nigeria, he talked excessively about his activities however, that was due to the fact that he missed him tremendously and this was reinforced by the fact that he did not once interrupt his father while speaking.

In addition, he would still nag but for a relevant purpose such as to have pancakes or chocolate and once this was provided to him (home-made free from offending ingredients), he would eat them full heartedly. Overall, the child seemed happier, relaxed and appeared more focused while sitting on the dining table.

Finally, while playing with his friends, the child was still loud in engaging with them but he would stick to the same video game without having to change it

within minutes of starting it. In addition, he less often interrupted his friends while talking and this time by making eye contact. He seemed more relaxed with wider self-esteem. In addition, he waited his turn to play instead of fighting over the joystick and instead looked at the television by showing signs of excitement when his friend was winning.

POST- INTERVENTION TREATMENT

During this phase, by including three offending foods, mainly food coloring, casein and gluten products, with each being re-introduced in the diet as a snack every 48 hours, the child's ADHD symptoms re-surfaced and usually within two hours after eating the offending food.

For instance, while he was studying, the child re-exhibited a short attention spans and showed signs of boredom and frustration with the tasks being presented by the instructor. The latter had to repeat the same instructions up to three times, with each time being faced with the child's sound interruption, such as buzzing or humming before being able to grab his full attention again. Additionally, he was having difficulty focusing on the details of his homework by making a few careless mistakes. Furthermore, He still got distracted by some external stimuli (such as the colors of his new pens) however; he showed no signs of running to answer every time the doorbell or phone rang.

While eating, the child also exhibited ADHD symptoms as he would fidget with his hands while waiting to be served, and sometimes swinging back and forth in his chair. In addition, he would talk excessively and interrupt other members of his family by asking random questions such as "Why do I have to study? When are my friends coming over? What is for dinner tonight? Can I please not eat fruits today?" It is worth mentioning that while the guardian of the child was answering his questions,

he would interrupt her with another question without allowing her to finish her reply. At other times, it was shown that he barely made the effort on focusing on the questions asked and showed no interest in the conversation. In addition, he showed signs of crankiness at the thought of having a tutor over to study. He sometimes showed physical pains such as abdominal pains and had difficulty finishing his food.

While playing with his friends, he showed some signs of boredom and impatience. For instance, as he was playing a racing game with his friend, he suddenly got up and changed the game while his playmate was still in the middle of it. At other times, he refrained from sharing his joystick but once he was forced to by his guardian, he became cranky and loud while waiting for his turn.

RESULTS

Results indicate that, before starting the treatment, foods that were provided to the child whether weekly or daily, were mostly offending foods. When an intervention treatment, characterized by a sound and modified diet was used, the symptoms of the child improved dramatically. A modified diet in our case did not mean restricted whereby the child was only allowed to eat limited foods as suggested by Pelsser (2011) in the RED diet. The reasons were due to the fact that both the guardian and the professional nutritionist thought that it was very restrictive for the nine year old child and that they wanted to define a "moderate" diet that could be used in the course of his life time.

Accordingly, as a starting point, the foods that were provided during the "Intervention Treatment" phase were free from preservatives, some Salicylates, and artificial colorings, hence confirming that the child with ADHD did benefit from Feingold's (1985) diet.

However, although some of the fruits and vegetables used in this diet (such as apples, cherries, almonds and grapes) were associated with Salicylates; the child did not show any negative symptoms when provided with them. This states that the type of the fruits that constitutes this category might depend on the child, specifically meaning that some may develop an allergic reaction to apples for instance and others to cherries or some may simply not, such as in our case. Although Feingold's diet has received many reviews, it is worth noting that his diet is complex and requires constant guidance and monitoring from a professional nutritionist.

The modified diet also eliminated all ingredients found in Laura's study (specifically regarding gluten and casein products, sugar, chocolate, citrus fruits, processed meats, soy or corn products, yeast, yolk and certain legumes).

Although this diet seemed a little restrictive at first, a closer look shows that people can substitute these products with healthier choices found at mostly all local stores and also resort to homemade meals.

For instance, in the casein family, almond milk is known to be one of the most nutritionally valuable milk substitutes available today. It is high in a number of vitamins and minerals, including vitamin E, manganese, magnesium, phosphorous, potassium, selenium, iron, fiber, zinc and calcium. In addition, as was noted by the professional nutritionist, some cheeses, although they contain casein, are least harmful and these are mainly ricotta cheese, fetta, cottage and goat cheese that could be incorporated twice a week with the aim of getting the proper nutrients. However, for the sake of attaining critical validity in this study, we refrained from incorporating them in the diet and resorted to almond milk instead.

In the gluten category, we can substitute these foods with gluten-free breads, rice cakes, rice cereals, homemade pancakes or crepes, unsalted rice chips, foods that any child would enjoy as a main meal or a snack.

We can also substitute artificial food colorings and dyes found in processed foods or drinks with natural unsweetened juices, unsweetened jams, homemade cakes, organic fruits, homemade sauces (such as guacamole), homemade salad dressings which included Mustard, white vinegar and olive oil. In addition, we recommend Daiya cheese products which are listed as dairy, lactose and casein free, gluten free, soy free and cholesterol free.

While cooking, we advised the guardian to use flax seed or primrose oil which are High sources of Omega oils instead of corn oil.

Most fruits and vegetables were included, provided that they were either organic or washed carefully (excluding the ones mentioned in the black listed foods found in Appendix I). Other offending food products mentioned earlier were also substituted and can be found in more details in the diet (Appendix II).

By eliminating all of Steven's offending foods from the diet, the symptoms of the child diminished noticeably. However, due to the fact that, before the initial treatment, the child was being provided with gluten based foods, casein based foods and artificial food colorings on a daily basis, this prompted us to choose these daily accustomed products and re-introduce them in the post-intervention treatment to test their effects. By re-introducing these three offending foods, we confirmed that they induced ADHD symptoms, meaning that the child's symptoms, although less in frequency than the pre-intervention treatment phase, re-surfaced. This lower frequency was mainly attributed to the fact that these offending foods were provided to him in small doses and only once every 48 hours as a snack, while maintaining a

healthy and modified full meal diet during the day. Although some children may exhibit symptoms following the re-introduction of these foods for a more lasting period (more than 48 hours), this strategy was a valuable instrument to assess that ADHD is truly induced by food, even if in small doses, therefore a strict monitoring mechanism is crucial.

CHAPTER V

INTRODUCTION

The goal of this proposal was to determine if changes in diet, without medication or behavior alteration, reduce the hyperactivity, inattentiveness and impulsivity of a nine year old child. This chapter will focus on discussing the limitations and concluding with a set of recommendations.

RECOMMENDATION

One way of keeping track of what foods seem to have the most positive or negative effects is to keep a Food and Mood Journal. Every day the guardian should record how the child behaves following a specific meal. Using this strategy enabled us to, at the end of the treatment (during and post treatment phases), use this information to eliminate harmful foods and increase the beneficial ones. This sold strategy could be used for additional research on the remaining offending foods specified in earlier chapters (such as chocolate, yolk, corn, sugar…etc) which could demonstrate similar outcomes.

Based on this study, we can highlight that the RED diet, which is much more restrictive than the diet used in this study, could evidently decrease the symptoms of the child if applied properly. This is mainly due to the fact that this RED consists only of foods with the least possible risk of allergic reaction – a combination of rice, white meat (turkey, lamb), lettuce, carrots, cauliflower, cabbage, beet, pears and water- In other words, it consists of removing all offending ingredients found in Feingold and Stevens diet.

In addition, it is recommended that if one does not want to resort to a professional nutritionist for the provision of a modified diet or to abide by a restrictive

diet (RED), the child can use Dr. Irani's diet (see Appendix II) as a starting point. It is worth noting that children who may want to follow it do not need to take vitamins as they are provided with the adequate daily nutrients. However, according to Dr. Ralph Irani, it is advised that they compliment this diet with a natural supplement, Bio-Strath (one pill three times a day before each meal) as it is said to increase concentration and the attention span of any child and not only children struggling with ADHD.

RECOMMENDED FUTURE RESEARCH

As a future recommendation, a specific diet, such as the Irani diet, for children with ADHD should be done on a larger population.

Only five weeks were used in the application of the diet due to the limited time; however it should be applied over a longer period of time to obtain more effective and reliable results.

LIMITATIONS

Although the diet can be successful and yield positive results, some limitations should be taken into consideration.

The diet may take longer than medication to show an effect on the student, and in this study it took almost ten days to show an improvement. Also, the products in the diet (such as the gluten free foods) are more expensive than the regular ingredients, therefore, this diet alternative may not be affordable to the public at large. Finally, this method is time consuming and needs much effort and constant supervision. In addition, one has to be creative in incorporating daily new dishes for children with ADHD so as to avoid possible negative behaviors such as irritation, and boredom with being provided with a strict diet.

CONCLUSION

In conclusion, although following this strategy and putting in place a modified diet requires a lot of patience and time, it is worth the effort given its effectiveness. Following this study, the child looked and felt more relaxed and focused and the guardian had found hope again in determining what foods can or cannot contribute to these symptoms. Therefore, a person dealing with ADHD may achieve positive results with determination, confidence, and a modified diet accompanied by strict monitoring means.

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APPENDIX I

BLACK LISTED FOODS

1- Have you been providing the child with any of these foods on a weekly basis?

Please tick those that fall under this question:

- Currants
- Plums
- Prunes
- Cloves
- Tangerines
- Coffee
- Cucumber
- Pickles
- Teas
- Green peppers
- Tomato with skin
- Peaches
- Sweetened fruit drinks
- Sodas
- All cake mixes
- Candy (jelly beans)
- Jell-O
- Artificial sauces like Ketchups, BBQ and Mayonnaise
- Junk Food
- Eggs
- Processed meats
- Citrus fruits (Oranges, grapefruits)
- Zucchini
- Rutabagas
- Squash
- Cucumbers
- Green peppers
- Yeast
- corn and corn oil/syrup
- Salty foods (crackers, chips…etc)
- Sugar
- Full Fat Milk
- All kinds of cheeses
- Chocolate
- Wheat, rye and barley (Bread , cereal, cereal bars for instance)

2- What are the most common foods provided to your child on a daily basis?

APPENDIX II

GOOD FOODS AND MOOD JOURNAL

7.2.1 **Day 1**

Foods		Mood journal
Breakfast	Rice Cakes and almond milk	Fidgets with hands on table
Lunch	Mloukhiyyeh, brown rice and lamb meat	Can't sit still on the chair
Snack	Watermelon slices	
Dinner	Shrimps with cooked vegetables and boiled potatoes	Cannot wait for his turn to eat

7.2.2 **Day 2**

Foods		Mood Journal
Breakfast	Melon and kiwi	Has difficulty staying focused on our conversation
Lunch	Lamb chops with brown rice and green salad	Constantly playing with his food in his plate
Snack	Rice Cakes	
Dinner	Vegetable soup (broccoli, carrots, zucchini)	Cranky and in a bad mood

7.2.3 **Day 3**

	Foods	Mood Journal
Breakfast	Pancakes or crepes using the following ingredients: ½ cup rice flour ¼ cup bran flour ¼ oat flour 2 tablespoons cornmeal 1 tsp baking powder ½ cup Almond milk 1 Tablespoon Oil 2 Tablespoon Vanilla	Constantly tapping his fork and spoon loudly on the table
Lunch	Spinach stew with lamb meat and brown rice	Interrupts the discussion between his siblings
Snack	Bowl of fruits (pear, kiwi)	
Dinner	Gluten free Toast and slices of smoked salmon with olive oil	Talks excessively

7.2.4 **Day 4**

	Foods	Mood Journal
Breakfast	Special K (gluten free/ No added Sugar) and almond milk	Does not seem to listen
Lunch	Pea stew and Lamb meat with brown rice (Bazella)	Blurts out answers before the question is completed
Snack	Boiled potatoes and olive oil	
Dinner	Lamb meat Balls on gluten free bread	Crying, says that he misses chocolate

7.2.1 **Day 5**

	Foods	Mood Journal
Breakfast	Almond Milk Raw cashews	Has difficulty staying still while eating
Lunch	Grilled fish with green salad	Hears the doorbell and leaves his seat to run towards the door
Snack	Home-made casein and gluten free chocolate cake (oat flour and dark chocolate spread)	
Dinner	Vegetable Soup	Has difficulty focusing on questions asked

7.2.6 **Day 6**

	Foods	Mood Journal
Breakfast	Special K (Gluten free and no added sugar) pineapple slices	Feeling angry and saying that he wants to eat 'cheerios'
Lunch	Fried Lamb Meat French Fries (mustard)	Fighting with his sister
Snack	Grilled vegetables (zucchini, carrots, potatoes) and balsamic sauce	
Dinner	Gluten free bread with Thym and olive oil	While eating the sandwich, he kept saying to make a second and third one

7.2.7 **Day 7**

	Foods	Mood Journal
Breakfast	Rice cakes Melon slices	swings back and forth with his chair
Lunch	Loubiyeh and Lamb meat stew Brown Rice	Squishes his food with the fork and takes longer than usual to finish his plate
Snack	Fresh vegetables (carrots, cauliflower, mushrooms) with homemade guacamole sauce Guacamole (Avocado dip) o 2 ripe avocados, peeled and stones removed o 1 ripe tomato chopped without skin (optional) o 1 clove garlic, crushed o 1/4 red onion, finely chopped o 1 tablespoon coriander and/or parsley, chopped o Cracked black pepper to taste	
Dinner	White fish and Green Salad	Left his food and Ran towards the telephone when it started ringing

7.2.8 **Day 8**

	Foods	Mood Journal
Breakfast	Special K (gluten free/ No added Sugar) Almond Milk	Became stubborn about not wanting to eat his breakfast
Lunch	Beans and Lamb meat stew (Fassouliya) Green salad	Gulped down his food very fast because he was excited to go out
Snack	Fresh carrot juice	
Dinner	Smoked salmon Sandwich (Gluten free bread)	Crying and cranky, says he wants chocolate

7.2.9 **Day 9**

	Foods	Mood Journal
Breakfast	Rice cakes and Almond Milk	Shows first signs of calmness, woke up in a better mood then usual and ate his breakfast without nagging
Lunch	White Pasta (gluten/ Casein free): • 1 cup cooked gluten free macaroni • ¼ cup finely chopped onion • 1 tablespoon unsweetened margarine • 1 tablespoon corn starch • Dash black pepper • 1 ¼ cup Rice Milk	Interrupted his sister while she was speaking, only once instead of several times as displayed previously
Snack	Home-made casein and gluten free chocolate cake	
Dinner	Steamed baby shrimps with Avocado dip with green salad	The phone rang and asked for permission to answer it instead of leaving his seat abruptly

7.2.10 **Day 10**

	Foods	Mood Journal
Breakfast	Almond milk and kiwi	Appeared more focused when spoken to then previous mornings
Lunch	Vegetable stew (with chopped lamb meat) and brown rice	While eating his lunch, he kept saying that he also wants a toasted cheese sandwich
Snack	Watermelon Slices	
Dinner	Mjaddara (Brown Rice)	Appeared happier than the usual

7.2.11 **Day 11**

Foods		Mood Journal
Breakfast	Special K (gluten free/ No added Sugar) A pear	Appeared less cranky, ate his breakfast
Lunch	Loubiyeh and brown rice, green salad	Waited for his turn to be served by fidgeting with one leg instead of both
Snack	Almonds	
Dinner	Gluten free bread and Thym and olive oil	Talked less excessively; appeared more attentive to the conversations held on the table

7.2.12 **Day 12**

Foods		Mood Journal
Breakfast	Rice cakes and Almond Milk	Listened to his sister speak without interrupting her
Lunch	Grape leaves (Warak Inab) stew with lamb meat and Brown Rice	The phone rang and he got up but directly sat back down instead of leaving his seat and answering the phone
Snack	Raw Almonds	
Dinner	Vegetable Soup	He did not eat his entire soup, he said he was not hungry (in a reasonable way)

7.2.13 **Day 13**

Foods		Mood Journal
Breakfast	Watermelon and Kiwi slices	He was nagging and saying that he wants to eat pancakes for breakfast instead of fruits
Lunch	Lamb shops with baked potatoes	Seemed relaxed and less hyper than usual
Snack	Fresh cashews	
Dinner	Smoked Salmon salad with olive oil	Felt sleepy and exhausted because he woke up very early and played a lot of sports

7.2.14 **Day 14**

Foods		Mood Journal
Breakfast	Gluten free bread with Thym and olive oil	Finished his sandwich in two minutes and asked for another one
Lunch	Spinach stew with lamb meat and brown rice with green salad	Very excited because his father was coming back to Lebanon after being away for two weeks in Nigeria
Snack	Fresh fruits	
Dinner	Boiled Zuchini and Eggplant with Fried Lamb meat and caramelized Onions in Mustard	Was feeling very happy and talked excessively with his father about his activities during the last two weeks however he did not interrupt his dad while he was speaking back to him

APPENDIX III

OFFENDING FOODS AND MOOD JOURNAL

7.3.1 **Day 15**

	Foods	Mood Journal
Breakfast	Watermelon Slices	Listened to his mother speak without interrupting
Lunch	Baked fish, baked sweet potatoes, steamed vegetables	Waited for his turn to eat without fidgeting his legs or arms
Snack	Slices of Gruyere Cheese in gluten free bread	
Dinner	Gluten free bread with thym and olive oil and green salad	Drumming with the fork on table and speaking loudly

7.3.2 **Day 16**

	Foods	Mood Journal
Breakfast	Rice cakes with almond milk	Seemed a bit cranky and jumped from one random question to another such as " can I not eat fruits today, what's for dinner tonight…etc?"
Lunch	Lentil- Mjaddara (with brown rice)	Interrupting his siblings while talking
Snack	Almonds	During studies, he was not willing to listen to the tutor as she had to repeat the same question up to four times before grabbing his attention
Dinner	Vegetable Soup	Sat quietly on chair but seemed a bit cranky

7.3.3 **Day 17**

Foods		Mood Journal
Breakfast	Pancakes (gluten free) Fresh carrot juice	Felt happy and excited to eat pancakes
Lunch	Mloukhiyyeh, brown rice and Lamb meat	Starts nagging that he wants chocolate cake and becomes easily cranky
Snack	Sugar free jello	While playing with his friends he showed early signs of boredom by changing the game three times
Dinner	Feta cheese and gluten free bread	Was complaining about his abdominal pains and had difficulty swallowing his sandwich

7.3.4 **Day 18**

Foods		Mood Journal
Breakfast	Gluten free bread with unsweetened jam and Almond milk	Has difficulty staying still on his chair stating that he wants to go back to his room and play on his computer
Lunch	Pea stew and Lamb meat with brown rice (Bazella)	Swings back and forth with his chair
Snack	Watermelon slices	Difficulty focusing on the details of his homework, making careless mistakes and mostly was drawn to focus on the colors of his pencil
Dinner	Lentil salad	While his mother was asking him questions, the door bell rang, he didn't get up but kept his eyes locked on the door to see who it was instead of paying attention to his mother.

7.3.5 **Day 19**

	Foods	Mood Journal
Breakfast	Gluten free toasted bread and unsweetened margarine (Casein free) Almond Milk	Does not seem to listen while being talked to on the dining table
Lunch	Spinach, Lamb meat and brown rice	listened when he was spoken to but talked excessively
Snack	Cornflakes with Almond Milk	Constantly interrupted his friends while they were talking
Dinner	Vegetable Soup	Drumming with fork and knife on table asking for something else to eat apart from soup

7.3.6 **Day 20**

	Foods	Mood Journal
Breakfast	Rice Cakes A pear	Showed several intervals of buzzing on table instead of listening when being asked a question
Lunch	Loubiyeh and lamb meat (stew) with brown rice	Crying on table says he's tired and doesn't want to study in the afternoon
Snack	Home-made casein and gluten free chocolate cake	Easily got distracted by external stimuli however; he showed no signs of running to answer every time the doorbell or when the phone rang.
Dinner	Gluten free bread with Thyme and olive oil	Fidgeting with both legs

7.3.7 **Day 21**

Foods		Mood Journal
Breakfast	Thyme sandwich (gluten free bread)	Has difficulty focusing on questions asked
Lunch	Fried Lamb meat and Brown Rice	Playing with his food in his plate
Snack	Fresh fruits	While studying, he was humming rarely showing any signs of interest to his homework
Dinner	Grilled salmon and cooked vegetables	Was sleepy and decided to go to bed early

APPENDIX IV

STATEMENT OF CONFIDENTIALITY

THE EFFECTS OF DIET SUPPLEMENTATION ON CHILDREN WITH ADHD

I, the undersigned, hereby declare that I shall execute my responsibilities impartially and objectively in drafting this proposal.
By making this declaration, I confirm that I have familiarized myself with the information available to date concerning this study.
I also confirm that a diet will be provided based on a professional nutritionist's guidance dealing with ADHD children, as well as based on extensive research, therefore confirming that the diet will not pose a threat to the child's health.
In addition, I agree to hold in trust any information or documents (Confidential Information) specified by the guardian of the child during the course or as a result of this five week study.
I also agree that information shall be used only for the purposes of raising awareness of the effect of Diet supplementation on children with ADHD and that no names in relation to this study will be disclosed to any third party.

Linda Saab