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# ANTIAGING STUDY USING HAELAN 851® NUTRITIONAL PRODUCTS

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Researchers in California have studied 7,000 adults and noticed that some were young for their ages while others were old for their chronological age.[1] These people are said to have a biological age younger or older than their chronological age. Those people who ate well and followed positive health practices were physically comparable to those people 30 years younger who disregarded proper nutrition and positive health practices.

The evidence that diet might increase longevity in rats surfaced more than half a century ago[2] and recent evidence has indicated that the life span of test animals and insects could be doubled with nutritional diets of selected foods. In addition, the overall health of the test subjects, from cradle to the grave, proved to be superior to those in the control group who had poor diets.[3]

Food by it's very nature is a biological modifier. It affects our growth, development, quality and length of life. This nutritional study of 303 hospital patients confirms that while you cannot change the year of your birth or chronological age, you can alter your physiological age and the probable length of your life through superior nutrition. In summary, all foods have calories but some are better for you than others.

This clinical research on antiaging with superior nutritional products was conducted in China and was based on using the procedures outlined in the "Screening Regulations and Clinical Observation Procedures for Traditional Chinese Drugs for Delaying Senile Decay", which was developed and adopted at the 3rd National Traditional Chinese Gerontological Research Cooperative Conference held in June, 1986.

The general Information and methods employed in this nutritional study followed the following criteria:

**1. Choice of Cases:**

The choice of cases should conform to the following three conditions:

1. Age: senile period 60-69; pre-senile period 50-59
2. Observations are put chiefly on the patients suffering from syndromes of kidney deficiency and spleen deficiency.
3. All of the severe heart, lung, liver, kidney, brain and endocrine sufferers are excluded from the observed group.

**2. Clinic group divisions and methods of treatment:**

Random control test: On the basis of the "random division method", the subjects being studied were divided into three groups having the same conditions for their age (variance within 5 years), sex and differential diagnosis according to traditional Chinese medicine.

The 303 men and women involved in this program were studied by a Joint clinical research cooperative unit comprised of members from the following medical facilities:

1. Province Traditional Chinese Medical Research Institute
2. Province GCM Hot Spring Sanitarium
3. Fujian Medical Institute Attached to the No. 1 Hospital
4. Province Colliery Sanitarium

The test subjects were fed the same diet from hospital trays and in addition were given nutritional supplementation for a period of three months with monitoring and extended clinical observations, all in accordance with the tests and procedures listed hereinafter in Section 4.

The nutritional supplementation given to the test subjects was as follows:

Group A: Takes Haelan 851® Platinum formula oral liquid (lot No. 910729, 910730, 910731) 10 ml. three times per day.

Group B: Takes Haelan 851® Golden formula oral liquid (lot No. 910821, 910826, 910828) 10 ml. three times per day.

Group C: Takes Traditional Chinese Nutritional oral liquid (lot No. 900314) 10 ml. three times per day. (Control Group)

In addition, to the three groups established using the parameters of the "random division method " (Groups A, B, & C) described in Section 2 above, the following additional two groups of test subjects were feed the same diet from hospital trays and in addition were given the following nutritional supplementation for a period of three months The number of men and women in the five groups being studied totaled 303. There were 170 men and 133 women. All subjects were of Chinese descent.

Group D: Takes Haelan 851® Platinum formula oral liquid., 10 ml. three times per day.

Group E: Takes Haelan 851® Golden formula oral liquid, 10 ml. three times per day.

The statistical age and gender information of the five groups were as follows:

Group A - 62 cases (male 32, female 30) age: 58.8 +/- 5.9 years.

Group B - 62 cases (male 32, female 30) age 58.3 +/- 6.3 years.

Group C - 62 cases (male 32, female 30) age 58.7 +/- 5.7 years.

Group D - 50 cases (male 34, female 16) age 57.1 +/- 5.4 years.

Group E - 67 cases (male 40, female 27) age 59.7 +/- 5.5 years.

The patient's ages in three groups (A, B, & C) are basically the same and there was no obvious difference with the other two groups (D & E). P>0.1: Patient's in three groups (A, B, & C) are all the same, and group E is nearly the same, however group D is somewhat higher in the ratio of males to females.

**3. Standard of evaluation in traditional Chinese medical differential diagnosis and value of nutritional supplementation**

(1) Standard in traditional Chinese medical differential diagnosis.

On the basis of chart of "Differentiation about various senile decay syndromes of kidney and spleen deficiencies: appendix 1,

1/ Various types of kidney deficiencies must have two items in chief symptoms, any three items in minor symptoms and one item in pulse or observation diagnosis, or integral score> 13.

2/ Various types of spleen deficiencies must have two items in chief symptoms and two items in minor symptoms and one item in pulse or observation diagnosis, or integral score > 12.

3/ One or more item in pulse or observation diagnosis would be marked six scores. Without such symptoms marked 0 score.

4/ Minor symptoms; according to the mode of presentations as it occurred, whether remarkably or sustained; sometime light and sometimes heavy or discontinuously; and light or only once in a while; they are marked 3, 2 and 1 respectively.

Without such symptoms the patients would be marked 0 score. For chief symptoms, after the standard evaluation has been finished, double the scores.

(2) Standard for evaluating the benefits of the nutrition

1/ Obviously effective: integral score reduction >2/3
2/ Effective: integral score reduction from 1/3 to 2/3
3/ Ineffective: integral score reduction < 1/3

**4. Evaluation of nutritional benefits using modern scientific objective index.**

(1) Routine blood, routine urine, urine sugar, blood urea nitrogen, serum glutamic pyruvic transaminase.

(2) Blood total antioxidant ability, copper-zinc superoxide dismutase (Cu-Zn-SOD), manganese superoxide dismutase (Mn-SOD) lipperoxide (LPO), glutathione (GSH), glutathione peroxidase and urine hydroxyproline.

(3) Blood T-lymphocyte, total T - lymphocyte ($CD_3$), auxiliary T-lymnphocyte ($CD_4$), suppressing/killing T-lymphocyte ($CD_8$).

(4) Blood testosterone (T), estradiol ($E_2$), $T/E_2$

(5) Pulmonary function test: Vital capacity (VC), Forced vital capacity (FVC), forced expiatory volume in 1 second (FEV1%) maximum ventilate volume (MVV)

(6) Sphygmogram cardio-vessel function test: Statistical index including blood viscosity (V) cardiac output per minute (CO) left ventricle pump power effective index (VDEI), microcirculation half alternate time (ALT), microcirculation mean retarding time (TM) pulmonary arterial wedge pressure (PAMP) etc.

(7) Brain functions including : Directional remembering, associated learning, picture recognition free memory, unconscious reunderstanding, portrait characteristic memory, memory quotient (MQ) homological phrase speaking, heterological phrase speaking, black words reading, color words reading, words color reading and fluency in writing, etc.

**5. Methods of Observation.**

Before giving nutritional supplementation, each subject was medically examined and the results of the examinations were thoroughly recorded, including the subjects prior medical case history. All medical examinations were performed using modern scientific objectives and procedures.

During the nutritional testing, clinical observations and testing were performed once per week. At the end of the three months nutritional testing period, a comprehensively check and evaluation of the nutritional benefits were performed.

**6. Method of Statistics:**

Evaluate the difference between data obtained from both before and after nutritional supplementation with pair data average value t, and evaluate the difference between opposed groups with their sample average value t of corresponding two samples. Through rigid analysis, the statistical ranking data was obtained and recorded.

## RESULTS

**1. Clinical Value of Therapy**

**Analysis of value of therapy of syndrome of spleen-kidney deficiency** are shown in table 1. The extra case number in the "total" column are responsible for some cases having 2 or more items of syndrome simultaneously. **In most cases, the R value of various syndromes in the**

**nutritional supplemented groups are higher than the control groups, where kidney Qi deficiency, group A is remarkably higher than group C.** The other syndromes, due to lack of cases, are hardly possible to reach remarkableness. Total rate of effectiveness of spleen renal deficiencies syndromes are statically summarized in the "total" column, where group A obvious effective reaches to 31.3% and effective to 92.2%; and 18.4% and 97.7% for group B; 12.9% and 71.0% for group C; 25.9% and 81.5% for group D; 23.0% and 87.4% for group E respectively. After rigid analysis, both the values of the nutritional supplementation of group A and B are higher than group C, (control group) . that has very distinct means; group D and E are similar to A and B with indistinguishable differences.

Table 2 shows the integral variable analysis of spleen-renal deficiency syndrome. After the three months trial period, the integral values of both the nutritionally supplemented groups and the control group all have markedly declined but the nutritional supplemented group is much better.

2. Table 3 listed the **change of antioxygenic index** concerned. For all groups, the rise of GSH are all remarkable, and also in every lower index cases. For groups A, B, C, D, the rise of GSH-DX are also remarkable, but group E not so, this is probably due to the before therapy level was already much higher. For group A, B, C, the lower index cases raised remarkably. There only one case each in group D and E return to normal also. LPO: the A, B, C, D all decline obviously, while group E elevate remarkably, probably owing to its lower level before therapy; extra high index cases in groups B and D declined markedly, 1 case in group C and 2 cases in group E all return to normal, no extra high index case is discovered in group A. Mn-SOD: All groups are raised markedly, lower index cases in group A, B, C elevated markedly, 2 cases in group D return to normal. Serum total antioxidant ability, all cases in group C, D, E have elevated markedly, lower index cases in group B and C, elevated markedly, 1 case in group A and 2 cases in group D returned to normal.

3. **Change of urine hydroxyproline** is shown in table 4. Group A, B, C, and D have elevated markedly but group C not so remarkable; lower index cases in group B and C elevated markedly, 3 cases in group D return to the normal; 2 extra high index cases in Group A return to normal.

4. **Change of sex hormones** see table 5.

**(1) Men: Testosterone:** After checking it was discovered that Group C and D are elevated markedly, lower index cases 3 in group B, 2 in Group C, 2 in Group D return to normal. Estradiol: only group D is ascended markedly, extra high index case in group E declined markedly, 4 cases in group B and 2 cases in group C return to the normal. $T/E_2$ ratio, group A declined markedly; lower index cases have 2 in group B, 4 in group C, 3 in group D and 6 in group F all returned to the normal.

**(2) Women:** $E_2$ all have no notably change in various groups; the lower index cases, namely 1 in group A, 2 in group B, 1 in group C returned to normal. T check for group B declined markedly, extra high index cases in group Band D declined markedly. $T/E_2$ ratio all have no notably change in various groups, extra high cases for 3 in group A, 2 in group C return to the normal.

5. **T-Lymphocyte** listed in Table 6

$CD_3$ : all groups have elevated markedly. For lower index cases, all groups elevated markedly. $CD_4$ : all groups except E have elevated. For lower index cases group A, and C elevated markedly, 4 cases in group B, 3 cases in group E return to normal. $CD_8$, Group A, B, C, and D have elevated markedly, lower index cases all elevated markedly. $CD_4/CD_8$ ratio, only group B has elevated markedly; lower index cases in group A, B, C and D all returned to normal.

6. **Change in pulmonary functions** see Table 7. VC actually occupy estimating %, all groups except D are elevated markedly; extra low index cases, all groups, besides C, are elevated markedly. FVC actually occupy estimating %, all groups except E, are elevated markedly; lower index cases in all groups are elevated markedly $FEV_1$ %, groups A, and C declined markedly (fluctuated within normal range); extra low cases in group B elevated markedly, 1 case in group C is still too low after nutritional supplementation. MVV actually occupy estimating % elevated markedly in group A, B and C, extra low cases in group A, B, and E elevated markedly.

7. **Change of sphygmogram cardio-vessel functions:** Table 8 listed the change of blood viscosity, only group A has declined markedly; Extra high index cases in group C, D, and E declined markedly. Table 9 listed the change of cardiac output per minute , only group A has elevated remarkably; Extra low index cases in group B, and C elevated markedly; extra high cases of all groups have no notable change. Table 10 listed the change of VPEI, only group C has elevated markedly; lower index cases in group B, D, and E elevated markedly; extra high cases only group E declined markedly. Table 11 listed the change of ALT, all groups have no notable changes; slightly short cases in group B and E pronged markedly; slightly long cases in groups C, D, and E shortened remarkably, 3 cases each in group A, and B return to normal. Table 12 listed the changes of TM, all groups have no notable changes; deviate short cases in groups A, and E prolonged markedly; deviate long cases in group D, and E shortened remarkably, 3 cases each in group A and B return to normal. Table 13 listed the change of PAMMP, only group C has declined markedly; extra low index cases besides group A, all have elevated markedly; extra high cases in group B declined markedly, groups A, D, and E also have the tendency to decline, but group C still remains high.

8. **Change of brain functions** See Table 14. Only group A, B, and C, have information in this respect.

**(1) About Memory:**

According to the method of evaluating the memory test scores, higher test scores mean the brain is functioning better.

Directional remembering has been heightened markedly in group A and B but not in Group C. Associate learning in 3 groups all heightened markedly. Picture recognition free memory heightened markedly in group A and B, not so in group C. Unconscious reunderstanding in all 3 groups heightened markedly. Portrait characteristic memory, all have been heightened but not remarkable. Memory quotient heightened markedly in groups B and C but no notable change in group A, this is probably owing to its higher level of senility before nutritional supplementation.

**(2) About Language:**

According to the method of test scoring, the shorter the time the better the functions of language. Homological phrases speaking time required have been shortened markedly after therapy in group A and B, but not so in group C. Hetrological phrases speaking time, all shortened remarkably in 3 groups. Black words and colored words reading, no notable change in all 3 groups. Reading of color words, besides group C all shortened markedly, in 3 groups color reading, only group B shortened markedly but on higher average level before therapy. Time required for fluency in writing has been shortened remarkably in 3 groups.

**9. Observations for adverse side effects:**

(1) Glutamic pyruvic transaminase, no visible increase in all 5 groups.

(2) Urine protein and urine sugar, in comparison with before therapy no new changes. Blood urea nitrogen, no abnormal increase after therapy.

(3) Checked with electrocardiogram after nutritional supplementation, no new abnormality in all 5 groups.

(4) Routine blood check, no abnormality in all 5 groups.

(5) Partial cases have responded worse about taste sensation, but does influence nutritional continuation.

It is demonstrated that Haelan 851 Platinum formula and Golden formula nutritional products have no visible bad reaction for heart, liver, kidney, and blood-bearing system.

## TYPICAL CASES

**Case 1. Madam Wong,** female, 60 years old, retired cadre has the symptoms of :

1/ Severe lassitude of loin and knee.
2/ Moderate fever and insomnia
3/ Dryness of throat and mouth
4/ Trichomadesis
5/ Severe amnesia

After orally taking Haelan 851® Platinum nutritional formula for one month, 2/ and 3/ disappeared, 1/ lightened notably. Taken after 4 months, 4/ and 5/ also improved distinctly, biochemical antisenility index improved markedly. LPO declined and oxygenic activity strengthened. $CD_3$ elevated markedly, cardio function vessel elasticity ameliorated clearly, overload of left ventricle decreased definitely. Brain memory functions strengthened obviously, functions of speaking and writing fluently ascended outstandingly.

**Case 2. Madam Lin**, female, 57 years old, retired nurse, has the syndrome of kidney Qi deficiency as diagnosed by traditional Chinese doctor, the symptoms are:

1/ Lassitude of loin and knee
2/ Lassitude and fatigue.
3/ Frequent urination.
4/ Continuous dripping of urine after urination.
5/ Amnesia
6/ Gray haired
7/ Pale tongue with swollen and whitish coating

After nutritional supplementation with Haelan 851® Golden formula for 3 months, there are 4 individual items clearly lightened in degree of severity, 4/ disappeared, 6/ have black hair borne among white background, LPO index decreased apparently, GSH, GSH-PX, Mn-SOD, Cu-Zn-SOD, total antioxygenic activity, urine hydroxyproline, all elevated markedly serum T value declined, $E_2$ value decreased, $CD_3$, $CD_4$, $CD_8$ all ascended markedly.

## DISCUSSION AND SUMMARY

1. There could have been a better arrangement for the random control test. The nutritionally supplemented groups with Haelan 851® Platinum and Golden Formula Nutritional products and the control groups in many respects have marked contrastibility, however in spite of these differences the conclusions are convincible that the Haelan 851® Platinum and Golden Formula nutritionally supplemented groups were improved better than the control group..

The therapeutic effect of the expanded clinical therapy group is basically the same as the therapy group, thus confirmed that the therapy effects are stable. As the change of objective index are also basically the same, hence it is worthy for compliment the result of the latter.

2. On the side of traditional Chinese medicine clinical value of therapy, the therapeutic effect of Haelan 851® Golden and Platinum Formula nutritional oral liquids are both prefer to their contrast groups. Integral scores of kidney and spleen deficiency syndromes are all decreased markedly in both groups, but therapy group declined more in extent; explaining stranger force as spleen and kidney tonics. Oral liquid Golden Formula and Platinum Formula Haelan 851® nutritional products have basically about the same clinical curative effects. Among the objects of kidney deficiency syndromes, kidney Qi deficiency suffers hold the chief position, "Yin" and "Yang" deficiencies are in the minor parts, we consider that oral nutritional liquids 851 types Golden and Platinum chiefly possess the effects of "supplementing life essence and reinforcing kidney" Hence, in accordance with the principle of "Yin-Yang interdependency", they are all indicated the useful for treating Qi-Yin-Yang deficiency syndrome of the kidneys. Among the objects of spleen deficiency suffers, the spleen Qi deficiency type outnumbering the other (Yin & Yang deficiency types) very much. We believe that the effect "elevating spleen and replenishing

Qi" can be regard as positive, and the effect" replenishing spleen Yang and nourishing spleen Yin" needs further advanced observations. Through clinical practice of traditional Chinese medicine, we believe that the traditional Chinese medical functions of Haelan 851® Golden and Platinum type nutritional oral liquids should be "supplementing life essence, reinforcing kidney, elevating spleen and replenishing Qi".

3. In the light of analyzing the modern scientific objective index changeability before and after nutritional supplementation, we summarize the action of Haelan 851® Platinum type Oral Nutritional Liquid as follows:

1/ Reinforcing antioxidant ability of tissue, clearing free radicals, elevating the levels of glutathione, glutathion per-oxidase, Mn-SOD, Cu-Zn-SOD, ascending serum total antioxidant ability, declining peroxidize lipid in serum.

2/ Increasing the content of urine hydroxyproine, denotes superiority in anabolism and catabolism of collagen.

3/ Effect on sex-hormones, elevating testosterone level and estradiol level in man's blood.

4/ Elevating total T-lymphocyte level, not only the auxiliary T-lymphocyte level but the suppressing/killing T-lymphocyte level also.

5/ Improving pulmonary function, expressed as elevating of vital capacity and max. ventilate volume.

6/ Improving pulmonary functions expressed as lowering blood viscosity and elevating cardiac output per minute.

7/ Improving brain functions: Improving directional remembering, associated learning, picture recognition free memory and unconscious reunderstanding in the field of memory functions. Improving homological phrases speaking, heterological phrases speaking, words color reading and fluency of writing in the field of language functions.

A comparison is made between the Haelan 851® Golden and Platinum Nutritional formulas. Both are fermented soybean protein beverages with differences in handling and pretreatment processing of the soybeans. The nutritional results on the test groups are essentially the same in the majority of aspects, though differing on minor points. . On the parts of hormone responsibility, lowering blood viscosity, and increasing cardiac output per minute etc., the Platinum formula nutritional supplementation was more obvious than the Golden Formula, but alternatively, in the elevating of $CD_4/CD_8$ ratio, brain functions and memory quotient, color reading, etc. Golden type nutritional formula is the rather distinct one.

The nutritional profile results of the control group is similar with that of therapy group, but in the points of elevating urine hydroxyproline, maximum ventability volume and brain functions, oral liquids Golden and Platinum nutritional formulas occupy the dominant position. Golden type does well in elevating $CD_4/CD_8$ ratio, Platinum type shows the outstanding in lowering blood viscosity and elevating cardiac output per minute; but in the points of elevating VPEI and lowering PAMP, the control group expressed the best results.

4. Judging from the analysis of of this nutritionsl supplemental study , Haelan 851® Platinum and Golden Nutritional Oral Liquids possess the functions of "supplementing life essence, reinforcing kidney, elevating spleen and replenishing Qi". In general, it is said that "kidney is the fundamentally of the natal body, and the spleen is the essentially of the postnatal body". They are closely related with senile decay. Now, both the syndromes of kidney and spleen deficiency are being improved obviously with Haelan 851® nutritional oral liquids and thus should result in the action of delaying senile decay and improve longevity..

In accordance with modern scientific medical analysis, Haelan 851® nutritional oral liquids can improve the tissue's antioxidant ability, clear away free radicals, promote metabolism of collagen, improve internal circulation of sex hormones, strengthening T-lymphocyte functions, ameliorating pulmonary functions and functions of the cardiovascular system and brain. There are various senile theories prevailing now a days, such as the theories of free radicals, cross-connection, immunology, viscera function feeblation, etc.; anyhow, all can explain the postponement of senile decay functions obtained with the use of Haelan 851® Golden and Platinum Oral Liquid nutritional supplementation in this study..

5. Haelan 851® Golden and Platinum type oral nutritional liquids both possess the definite effects of retarding the progress of aging and can safely to be taken without any undesirable side effects.

References:

1. N.B. Belloc and L. Breslow, RELATIONSHIP OF PHYSICAL HEALTH STATUS AND HEALTH PRACTICES, Preventive Medicine 1 (1972): 409-421

2. C.M. McCay, M.F. Crowell, and L.A. Maynard, THE EFFECT OF RETARDED GROWTH UPON THE LENGTH OF LIFE SPAN AND UPON THE ULTIMATE BODY SIZE, Journal of Nutrition 10 (1935): 63-79.

3. Commissioner of Patents & Trademarks, Washington, D.C. 20231, U.S. Patent #4,887,739

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## VARIOUS TYPES OF SYNDROMES OF KIDNEY WEAKNESS AND SPLEEN WEAKNESS

| DIAGNOSIS BY OBSERVATION AND PULSE | DIAGNOSIS BY INTERROGATION | |
|---|---|---|
| | MAJOR SYMPTOMS | MINOR SYMPTOMS |
| **KIDNEY QI DEFICIENCY** | | |
| Pale Complexion | Lassitude of loin and knees | Frequent urination in the night, or continuous dripping |
| Pale swollen tongue with whiteish coating | Fatigue and weariness | Spontaneous perspiration |
| Thready pulse | | Shortness of breath |
| | | Tinnitus or deafness |
| | | Amnesia |
| | | Decreased sexual desire |
| **KIDNEY YIN DEFICIENCY** | | |
| Latent red on cheeks | Lassitude of loin and knees | Dizziness and tinnitus |
| Reddened tongue with little coating | Fever and Irratibility | Night sweat |
| Thready and rapid pulse | | Dry mouth and throat |
| | | Constipation |
| | | Amnesia |
| | | Decreased sexual desire |
| **KIDNEY YANG DEFICIENCY** | | |
| Debility and dropsy in feature | Lassitude of loin and knees | Frequent urination in night |
| Pale, swollen, smooth tongue | Afraid of cold and cold limbs | Lassitude |
| Whitish thick fur | | Shortness of breath with asthma |
| Sunken and slow pulse | | Watery stool |
| | | Amnesia |
| | | Decreased sexual desire |
| **SPLEEN QI DEFICIENCY** | | |
| Sallow complexion | Weary limbs | Indigestion |
| Pale swollen tongue with whitish coating | Distension of abdomen and sound in intestines | Vomiting and adverse flow of stomach qi |
| Thready pulse | | Watery stool |
| | | Loss of appetite |

| DIAGNOSIS BY OBSERVATION AND PULSE | DIAGNOSIS BY INTERROGATION | |
|---|---|---|
| | MAJOR SYMPTOMS | MINOR SYMPTOMS |
| **SPLEEN YIN DEFICIENCY** | | |
| Sallow complexion | Weary limbs | |
| Deep red dry tongue or dryness in the mid-tongue | Dryness of the mouth and fondness of drink | Hunger and anorexia |
| Thready and rapid pulse | | Vomiting and adverse flow of stomach qi |
| | | Dry Stool |
| | | Abdomen distension at night |
| **SPLEEN YAN DEFICIENCY** | | |
| Sallow complexion | Weary limbs | Aversion to cold and fond of warm |
| Pale, swollen and tender tongue with wihte and smooth coating | Cold and pain in abdomen | Flashing thin saliva in mouth |
| Sunken and slow pulse | | Watery stool |
| | | Loss of appetite |

**Table 1 - ANALYSIS OF EFFECTS OF VARIOUS SYNDROMES OF KIDNEY-SPLEEN DEFICIENCY**

| | | Group A | Group B | Group C | Group D | Group E |
|---|---|---|---|---|---|---|
| KIDNEY QI DEFICIENCY | NUMBER OF CASES | 37 | 35 | 30 | 20 | 41 |
| | OBVIOUSLY EFFECTIVE | 10 | 2 | 1 | 4 | 8 |
| | EFFECTIVE | 22 | 33 | 21 | 12 | 28 |
| | INEFFECTIVE | 5 | 0 | 8 | 4 | 5 |
| | R | 0.5418* | 0.5155. | 0.3923. | 0.4926. | 0.5235. |
| KIDNEY YANG DEFICIENCY | NUMBER OF CASES | 7 | 12 | 9 | 7 | 5 |
| | OBVIOUSLY EFFECTIVE | 3 | 5 | 4 | 3 | 2 |
| | EFFECTIVE | 4 | 7 | 1 | 4 | 3 |
| | INEFFECTIVE | 0 | 0 | 4 | 0 | 1 |
| | R | 0.5418. | 0.5366. | 0.4185. | 0.5418. | 0.4512. |
| KIDNEY YIN DEFICIENCY | NUMBER OF CASES | 12 | 23 | 15 | 10 | 27 |
| | OBVIOUSLY EFFECTIVE | 4 | 3 | 1 | 1 | 5 |
| | EFFECTIVE | 8 | 19 | 12 | 6 | 18 |
| | INEFFECTIVE | 0 | 1 | 3 | 3 | 3 |
| | R | 0.6193. | 0.5114. | 0.4215. | 0.3915. | 0.5240. |
| SPLEEN QI DEFICIENCY | NUMBER OF CASES | 8 | 14 | 5 | 5 | 7 |
| | OBVIOUSLY EFFECTIVE | 3 | 4 | 2 | 3 | 1 |
| | EFFECTIVE | 5 | 10 | 2 | 2 | 5 |
| | INEFFECTIVE | 0 | 0 | 1 | 0 | 1 |
| | R | 0.5369. | 0.4945. | 0.4820. | 0.6436. | 0.3791. |
| SPLEEN YANG DEFICIENCY | NUMBER OF CASES | 0 | 2 | 2 | 6 | 5 |
| | OBVIOUSLY EFFECTIVE | | 1 | 0 | 3 | 2 |
| | EFFECTIVE | | 1 | 0 | 21 | 21 |
| | INEFFECTIVE | | 0 | 2 | | |
| | R | | | | | |
| SPLEEN YIN DEFICIENCY | NUMBER OF CASES | 0 | 1 | | 2 | 1 |
| | OBVIOUSLY EFFECTIVE | | 0 | | 0 | 1 |
| | EFFECTIVE | | 0 | | 0 | 0 |
| | INEFFECTIVE | | 1 | | 2 | 0 |
| | R | | | | | |
| TOTAL | NUMBER OF CASES | 64 | 87 | 62 | 54 | 87 |
| | OBVIOUSLY EFFECTIVE | 20 | 16 | 8 | 14 | 20 |
| | EFFECTIVE | 39 | 69 | 36 | 30 | 56 |
| | INEFFECTIVE | 5 | 2 | 18 | 10 | 11 |
| | R | 05515** | .05207** | 0.3941. | 0.4881. | 0.4990. |

*** Denotes P Value Obtained From Comparing Group A with C, and Group B with C**
*** Means 0.01 < P < 0.05 ** Means P < 0.01**

## Table 2 - ANALYSIS OF THE CHANGE IN INTEGRAL OF SPLEEN AND KIDNEY DEFICIENCY

| CLASS: | Type of Group | No. of Cases | Before Nutritional Supplementation | After Nutrition ( Before - After Change) |
|---|---|---|---|---|
| KIDNEY QI Deficiency | Group A | 37 | 20.05 ± 4.24 | 9.35 ± 4.36** (10.70 ±4.07) * ^ ^ |
| | Group B | 35 | 20.57 ± 3.48 | 10.06 ± 3.30** (10.51 ±2.62)* ^ ^ |
| | Group C | 30 | 20.6 ± 4.2 | 12.0 ± 0.43 (8.6 ±3.9) ^ ^ |
| | Group D | 20 | 22.75 ± 5.38 | 11.6 ± 4.22 (11.15 ±5.36)^ ^ |
| | Group E | 39 | 23.45 ± 3.7 | 11.7 ± 1.54 (11.73 ±5.9) ^ ^ |
| KIDEN YANG Deficiency | Group A | 7 | 22.14 ± 4.74 | 4.78 ±11.29 (17.36 ±7.06)* ^ ^ |
| | Group B | 12 | 23.33 ± 5.57 | 5.57 ± 4.49** (17.36 ±4.96) * + |
| | Group C | 9 | 22.6 ± 6.1 | 13.3 ± 4.8 ^ ^ ( 9.3 ±4.8 ) ^ ^ |
| | Group D | 7 | 24.29 ± 6.52 | 7.71 ± 3.59 (16.77 ±6.13) ^ ^ |
| | Group E | 6 | 23 ± 5.4 | 9.5 ± 3.4 (13.5 ±5.8) ^ ^ |
| KIDEN YIN Deficiency | Group A | 12 | 21.58 ± 3.40 | 8.58 ± 3.06 ^ ^ (13 ±2.22) ^ ^ |
| | Group B | 23 | 19.78 ± 3.5 | 8.52 ± 3.40 ^ ^ (11.26 ±2.91) ^ ^ |
| | Group C | 26 | 21.7 ± 3.4 | 11.6 ±.3.4 (10.1 ±3.6) ^ ^ |
| | Group D | 10 | 22.7 ± 5.58 | 11.8 ±4.47 (10.9 ±5.97) ^ ^ |
| | Group E | 24 | 23.79 ± 5.42 | 11.33 ±4.33 (12.45 ±5.4) ^ ^ |
| KIDEN QI Deficiency | Group A | 8 | 18.8 ± .5.22 | 11 ±2.92 ( 7.8 ±2.91) ^ ^ |
| | Group B | 14 | 18.43 ± 5.71 | 7.79 ±3.29 (10.64 ±4.86) ^ ^ |
| | Group C | 5 | 19.2 ± 5.0 | 9.0 ±6.6 ^ (10.2 ±2.8) ^ |
| | Group D | 8 | 18.25 ± 5.57 | 7.3 ±2.3 ^ ^ (10.87 ±4.6 ) ^ ^ |
| | Group E | | | |
| KIDEN YANG Deficiency | Group A | 0 | | |
| | Group B | 2 | 21 ± 4.24 | 7.0 ±1.41 (14 ±5.57) |
| | Group C | 2 | 23 ± 2.8 | 16.5 ±2.1 (6.5 ±0.7) ^ |
| | Group D | 6 | 26.33 ± 2.58 | 10 ±5.93 (16.33 ±6.73) ^ ^ |
| | Group E | 5 | 25.6 ± 2.07 | 11.2 ±5.26 (14.4 ±6.02) ^ |
| KIDEN YIN Deficiency | Group A | 0 | | |
| | Group B | 1 | 15 | 11 |
| | Group C | 0 | | |
| | Group D | 2 | 19.5 + 6.36 | 8 ± 4.25 (11.5 ±2.12) |
| | Group E | 1 | 16 | 2 |

**^ Denotes P Value From Comparing The Before and After Nutrition Conditions Within The Same Group**

**^ Means 0.01 < P < 0.05 ^ ^ Means P < 0.01**

*** Denotes P Value Obtained From Comparing Group A with C, and Group B with C**

*** Means 0.01 < P < 0.05 * * Means P < 0.01**

**+ Denotes P Value Obtained From Comparing Group A with B**

**+ Means 0.01 < P < 0.05 + + Means P < 0.01**

**Table 3 - TOTAL ANALYSIS OF CHANGES IN ANTI-OXYGENIC INDEX**

| | Type of Group | No. of Cases | Before Nutritional Supplementation | After Nutrition ( Before - After Change) |
|---|---|---|---|---|
| GSH mg/gHb | Group A | 62 | 2.435 ± 0.432 | 3.077 ± 0.447 (-0.642 ± 0.661) ^ ^ |
| | Group B | 62 | 2.521 ± 0.770 | 3.143 ± 0.503 (-0.622 ± 0.907) ^ ^ |
| | Group C | 62 | 2.48 ± 0.54 | 3.13 ± 0.48 (-0.64 ± 0.73 ) ^ ^ |
| | Group D | 50 | 2.436 ± 0.336 | 2.8891 ± 0.611 (0.453 ± 0.692)^ ^ |
| | Group E | 67 | 2.274 ± 0.394 | 2.966 ± 0.427 (-0.069 ± 0.583)^ ^ |
| GSH- Px u/gHb | Group A | 62 | 642.2 ± 183.3 | 826.3 ± 120.5 (-184.1 ± 211.3)^ ^ |
| | Group B | 62 | 624.5 ± 121.4 | 777.1 ± 139.4 (-152.6 ± 169.4)^ ^ |
| | Group C | 62 | 651.0 ± 211.9 | 786.4 ± 184.3 (-135.4 ± 297.2)^ ^ |
| | Group D | 50 | 634.8 ± 149.5 | 710.8 ± 160.4 (-76.0 ±251.8) ^ |
| | Group E | 67 | 681.2 ± 261.6 | 712.7 ± 204.6 ( 31.5 ± 311.4) |
| LPO n mol/L | Group A | 62 | 5.780 ± 1.233 | 4.339 ± 0.213 (1.441 ± 1.696) ^ ^ |
| | Group B | 62 | 5.856 ± 1.972 | 4.435 ± 1.048 (1.421 ± 1.877) ^ ^ |
| | Group C | 62 | 5.71 ± 1.54 | 4.15 ± 0.88 (1.56 ± 1.75) ^ ^ |
| | Group D | 50 | 5.816 ± 1.930 | 4.252 ± 0.928 (1.564 ± 2.249) ^ ^ |
| | Group E | 67 | 4.205 ± 1.113 | 5.606 ± 2.048 (-1.401 ± 2.249) ^ ^ |
| MnSOD Nu/ml | Group A | 62 | 42.65 ± .13.08 | 60.38 ± 5.85 (-17.73 ± 14.61) ^ ^ |
| | Group B | 62 | 46.61 ± 11.83* | 58.51 ± 10.13 (-11.90 ± 16.49)+ * ^^ |
| | Group C | 62 | 40.80 ± 11.01 | 58.29 ± 7.96 (-17.49 ± 13.82) ^ ^ |
| | Group D | 50 | 41.18 ± 10.14 | 48.02 ± 13.86 (-6.84 ± 15.51 ) |
| | Group E | 67 | 43.50 ± 9.69 | 62.30 ± 8.97 (-18.80 ± 12.90) ^ ^ |
| Cu-ZnSOD u/gHb | Group A | 62 | 1125 ± 215 | 1336 ± 211 (-211 ± 183) ^ ^ |
| | Group B | 62 | 1135 ± 149 | 1359 ± 134 (-224 ± 189) ^ ^ |
| | Group C | 62 | 1156 ± 195 | 1319 ± 156 (-163 ± 226) ^ ^ |
| | Group D | 50 | 1177 ± 176 | 1230 ± 141 (-53 ± 171) ^ |
| | Group E | 67 | 1122 ± 169 | 1289 ± 187 (-167 ± 281) ^ ^ |
| TOTAL ANTI-OXYGENIC ACTIVITY % | Group A | 50 | 30 ± 3.94 | 30.56 ± 4.19 (-0.56 ± 4.44) |
| | Group B | 62 | 29.44 ± 4.82 | 30.06 ± 5.39 (0.62 ± 4.35 |
| | Group C | 62 | 29.18 ± 4.56 | 30.39 ± 3.83 (-1.21 ± 4.39) ^ |
| | Group D | 50 | 28.32 ± 4.88 | 30.61 ± 3.80 (-2.24 ± 4.79) ^ ^ |
| | Group E | 67 | 28.21 ± 5.56 | 30.61 ± 3.56 (-2.40 ± 4.58) ^ ^ |

**^ Denotes P Value From Comparing The Before and After Nutrition Conditions Within The Same Group**

**^ Means 0.01 < P < 0.05 ^ ^ Means P < 0.01**

*** Denotes P Value Obtained From Comparing Group A with C, and Group B with C**

*** Means 0.01 < P < 0.05 * * Means P < 0.01**

**+ Denotes P Value Obtained From Comparing Group A with B**

**+ Means 0.01 < P < 0.05 * * Means P < 0.01**

**Table 4 - ANALYSIS OF URINE HYDROXYPROLINE/CREATININE CHANGE (UNIT: u mol/L/mmol/L)**

| | Type of Group | No. of Cases | Before Nutritional Supplementation | After Nutrition ( Before - After Change) |
|---|---|---|---|---|
| TOTAL SAMPLES u mol/L/mmol/L | Group A | 62 | 4.787 ± 3.370 | 7.286 ± 4.059 (-2.499 ± 3.509)^^ |
| | Group B | 62 | 4.654 ± 3.709 | 7.563 ± 4.275 (-2.909 ± 3.438)^^ |
| | Group C | 60 | 5.959 ± 7.825 | 7.435 ± 5.547 (-1.476 ± 8.653) |
| | Group D | 50 | 4.989 ± 3.222 | 6.780 ± 3.391 (-1.791 ± 3.202)^^ |
| | Group E | 66 | 6.138 ± 3.644 | 8.604 ± 4.802 (-2.466 ± .4.520)^ |

**^ Denotes P Value From Comparing Before and After Nutrition Conditions Within The Same Group**

**^ Means 0.01 < P < 0.05 ^ ^ Means P < 0.01**

*** Denotes P Value Obtained From Comparing Group A with C, and Group B with C**

*** Means 0.01 < P < 0.05 * * Means P < 0.01**

**+ Denotes P Value Obtained From Comparing Group A with B**

**+ Means 0.01 < P < 0.05 + + Means P < 0.01**

## Table 5 - TOTAL ANALYSIS IN CHANGES OF SEX HORMONE LEVELS

(Unit: nmol/L)

| : | Type of Group | No. of Cases | Before Nutritional Supplementation | After Nutrition ( Before - After Change) |
|---|---|---|---|---|
| T (MALE) nmol/L | Group A | 30 | 20.67 ± 7.32 | 20.01 ± 7.22 (0.66 ± 4.62) |
| | Group B | 30 | 20.04 ± 5.15 | 20.28 ± 4.53 (-0.24 ± 0.1) |
| | Group C | 30 | 19.89 ± 6.41 | 23.62 ± 6.87 (-3.74 ± 7.34)^ ** |
| | Group D | 34 | 19.87 ± 8.49 | 22.11 ± 7.50 (-2.24 ± 4.69)^ ^ |
| | Group E | 41 | 19.04 ± 6.18 | 20.96 ± 7.40 (-1.92 ± 5.82) |
| T (FEMALE) nmol/L | Group A | 31 | 1.002 ± 0.423 | 0.901 ± 0.337 (0.101 ± 0.419) |
| | Group B | 32 | 1.280 ± 0.615 | 1.102 ± 0.454 (0.178 ± 0.417) ^ |
| | Group C | 32 | 1.21 ± 0.48 | 1.19 ± 0.69 (0.02 ± 0.64) |
| | Group D | 16 | 1.111 ± 0.566 | 0.964 ± 0.309 (0.148 ± 0.650) |
| | Group E | 26 | 0.890 ± 0.287 | 0.898 ± 0.316 (-0.08 ± 0.352) |
| E2 (MALE) nmol/L | Group A | 30 | 0.066 ± 0.025 | 0.098 ± 0.087 (-0.032 ± 0.093) |
| | Group B | 30 | 0.090 ± 0.100 | 0.067 ± 0.030 (0.023 ± 0.106) |
| | Group C | 30 | 0.113 ± 0.163 | 0.084 ± .0.062 (0.029 ± 0.168) |
| | Group D | 34 | 0.055 ± 0.027 | 0.071 ± 0.034 (-0.016 ± 0.032) ^ |
| | Group E | 41 | 0.064 ± 0.031 | 0.074 ± 0.036 (-0.010 ± 0.040) |
| E2 (FEMALE) nmol/L | Group A | 31 | 0.016 ± .0.014 | 0.032 ± 0.117 (-0.016 ± 0.117) |
| | Group B | 32 | 0.166 ± 0.539 | 0.136 ± 0.309 (0.03 ± 0.358) |
| | Group C | 32 | 0.074 ± 0.185 | 0.101 ± 0.272 (-0.027 ± 0.146) |
| | Group D | 15 | 0.032 ± 0.056 | 0.034 ± 0.050 (-0.002 ± 0.071) |
| | Group E | 26 | 0.113 ± 0.240 | 0.046 + 0.067 (0.067 ± 0.236) |
| T/E2 RATIO (MALE) | Group A | 30 | 345.2 ± 130.7 | 285.01 + 149.6^ (60.2 ± 158.7) ^ |
| | Group B | 30 | 321.1 ± 124.3 | 317.9 ± 128.7 (3.2 ± 108.2) |
| | Group C | 30 | 314.6 ± 127.3 | 387.0 ± 258.9 (-72.4 ± 259.0) |
| | Group D | 34 | 467.3 ± 326.0 | 387.3 ± 220.5 (780 ± 337.1) |
| | Group E | 40 | 380.0 ± 255.7 | 316.8 ± 254.8 (63.2 ± 205.2)* |
| T/E2 RATIO (FEMALE) | Group A | 32 | 94.38 ± 77.21 | 84.49 ± 46.4883 (9.89 ±70.68) |
| | Group B | 32 | 96.72 ± 59.59 | 76.97 ± 62.61 (19.75 ± 62.19) |
| | Group C | 32 | 83.88 ± 59.26 | 96.68 ± 90.90 (-12.80 ±100.85) |
| | Group D | 16 | 74.91 ± 46.48 | 56.78 ± 51.7848 (18.13 ± 70.06) |
| | Group E | 26 | 62.97 ± 45.14 | 71.93 + 63.89 (-8.96 ± 63.37) |

**^ Denotes P Value from Comparing The Before and After Nutrition Conditions Within The Same Group**

**^ Means $0.01 < P < 0.05$ ^ ^ Means $P < 0.01$**

*** Denotes P Value Obtained From Comparing Group A with C, and Group B with C**

*** Means $0.01 < P < 0.05$ * * Means $P < 0.01$**

**+ Denotes P Value Obtained From Comparing Group A with B**

**+ Means $0.01 < P < 0.05$ + + Means $P < 0.01$**

## Table 6 - TOTAL ANALYSIS OF THE CHANGE IN IMMUNE INDEX

| Cell Types: | Type of Group | No. of Cases | Before Nutritional Supplementation | After Nutrition ( Before - After Change) |
|---|---|---|---|---|
| CD 3 Cells - % | Group A | 49 | 56.08 ± 10.46 | 62.16 ± 11.55 (-6.08 ± 15.97) ^ ^ |
| | Group B | 62 | 55.18 ± 15.2386 | 62.26 ± 12.07 (-7.08 ± 14.99) ^ ^ |
| | Group C | 62 | 53.63 ± 9.46 | 62.68 ± 12.06 (-9.05 ± 16.09) ^ ^ |
| | Group D | 50 | 56.42 ± 11.80 | 62.95 ± 13.41 (-6.53 ± 14.57) ^ ^ |
| | Group E | 60 | 55.8 ± 11.65 | 65.22 ± 8.54 (-9.42 ± 14.57) ^ ^ |
| CD 4 Cells - % | Group A | 60 | 35.4 ± 8.24 | 46.35 ± 6.71 (-10.95 ± 9.93) ^ ^ |
| | Group B | 62 | 37.97 ± 7.44* | 46.34 ± 4.89 (-8.37 ± 10.45) ^ ^ |
| | Group C | 62 | 34.53 ± 8.45 | 44.02 ± 8.43 (-9.49 ± 11.48) ^ ^ |
| | Group D | 50 | 36.68 ± 8.51 | 41.63 ± 10.24 (-4.95 ±13.46) ^ |
| | Group E | 49 | 37.88 ± 8.44 | 40.57 ± 9.75 (-2.69 ± 13.68) |
| CD 8 Cells - % | Group A | 60 | 25.88 ± 7.79 | 35.47 ± 6.01 (-9.59 ± 10.63) ^ ^ |
| | Group B | 62 | 26.44 ± 6.46 | 33.26 ± 7.12*++ (-6.82±8.31)+^ ^ |
| | Group C | 62 | 25.24 ± 7.06 | 30.60 ± 7.61 (-5.35 ± 10.07) ^ ^ |
| | Group D | 50 | 28.52 ± 8.09 | 32.1 ± 9.51 (-3.58 ± 12.55) ^ |
| | Group E | 49 | 27.20 ± 6.84 | 30.97 ± 8.32 (-3.77 ± 11.24) |
| CD 4 Cells to CD 8 Cells Ratio (CD4/CD8) | Group A | 61 | 1.456 ± .0491 | 1.334 ± 0.222 (0.122 ± 0.543) |
| | Group B | 62 | 1.314 ± 0.35 + | 1.51 ± 0.54* (-0.200 ± 0.662)^ ^ |
| | Group C | 62 | 1.23 ± 0.65 | 1.28 ± 0.66 (-0.05 ± 0.576) |
| | Group D | 50 | 1.433 ± 0.426 | 1.394 ± 0.3153 (0.039 ± 0.501) |
| | Group E | 49 | 1.504 ± 0.617 | 1.579 ± 0.2564 (-0.75 ± 0.676) |

**^ Denotes P Value From Comparing The Before and After Nutrition Conditions Within The Same Group**

**^ Means 0.01 < P < 0.05 ^ ^ Means P < 0.01**

*** Denotes P Value Obtaianed From Comparing Group A with C, and Group B with C**

*** Means 0.01 < P < 0.05 * * Means P < 0.01**

**+ Denotes P Value Obtained from Comparing Group A with B**

**+ Means 0.01 < P < 0.05 + + Means P < 0.01**

## Table 7 - TOTAL ANALYSIS IN CHANGES OF VITAL CAPACITY AND PULMONARY VENTILATION

| | Type of Group | No. of Cases | Before Nutritional Supplementation | After Nutrition ( Before - After Change) |
|---|---|---|---|---|
| ACTUAL ESTIMATED % VC | Group A | 60 | 0.8369 ± 0.1647 | 0.8815 ± 0.1696 (-0.0446±0.1235) ^ ^ |
| | Group B | 61 | 0.8578 ± 0.1636 | 0.8837 ± 0.1619 (-0.0260 ±0.0816)^** |
| | Group C | 62 | 0.853 ± 0.178 | 0.882 ± 0.181 (-0.2877 ±0.1043)^** |
| | Group D | 49 | 0.8324 ± 0.1706 | 0.8566 ± 0.2056 (-0.0242 ± 0.1803) |
| | Group E | 49 | 0.8212 ± 0.1634 | 0.8523 ± 0.1482 (-0.031 ± 0.0707) ^ ^ |
| ACTUAL ESTIMATED % FVC | Group A | 56 | 0.7888 ± 0.1812 | 0.8508 ± 0.1697 (-0.062 ± 0.1096) ^ ^ |
| | Group B | 54 | 0.8162 ± 0.1711 | 0.8689 ± 0.1774 (-0.0527 ± 0.1041) ^ |
| | Group C | 49 | 0.8175 ± 0.1942 | 0.8504 ± 0.1925 (-0.0329 ± 0.1042)^ ^ |
| | Group D | 26 | 0.8127 ± 0.1877 | 0.8667 ± 0.1832 (-0.0540 ± 0.0840) ^^ |
| | Group E | 30 | 0.7591 ± 0.2046 | 57.4160 ± 222.2 (-56.6569 ±212.186) |
| FEV 1 % | Group A | 60 | 0.8584 ± 0.0876 | 0.8275 ± 0.0797 (0.0309 ± 0.0822)^ ^ |
| | Group B | 61 | 0.8612 ± 0.0992 | 0.8422 ± 0.0744 (0.01893 ± 0.0892) |
| | Group C | 62 | 0.8579 ± 0.0614 | 0.8103 ± 0.1331 ( 0.0475 ± 0.1234)^ ^ |
| | Group D | 49 | 0.8138 ± 0.1142 | 0.8323 ± 0.0942 (-0.0185 ± 0.0816) |
| | Group E | 49 | 0.7862 ± 0.1153 | 0.7654 ± 0.1482 ( 0.0216 ± 0.1572) |
| ACTUAL ESTIMATED % MVV | Group A | 60 | 0.8683 ± 0.1983 | 0.8912 ± 0.1836 (-0.2285 ± 0.0864) ^ |
| | Group B | 61 | 0.9004 ± 0.2004 | 0.9397 ± 0.2024 (-0.0393±0.1347)^++ |
| | Group C | 62 | 0.8842 ± 0.2182 | 0.8980 ± 0.1930 (-0.0138 ± 0.1459)** |
| | Group D | 49 | 0.8764 ± 0.1794 | 0.9084 ± 0.1689 (-0.0320 ± 0.1686)^ ^ |
| | Group E | 49 | 0.8132 ± 0.213 | 0.8323 ± 0.2042 (-0.1912 ± 0.1157) |

**^ Denotes P Value From Comparing Before and After Nutrition Conditions Within The Same Group**

**^ Means 0.01 < P < 0.05 ^ ^ Means P < 0.01**

*** Denotes P Value Obtained From Comparing Group A with C, and Group B with C**

*** Means 0.01 < P < 0.05 * * Means P < 0.01**

**+ Denotes P Value Obtained From Comparing Group A with B**

**+ Means 0.01 < P < 0.05 + + Means P < 0.01**

**Table 8 - ANALYSIS IN CHANGE IN BLOOD VISCOSITY (V)**
**(UNIT: CENTIPOISE)**

| | Type of Group | No. of Cases | Before Nutritional Supplementation | After Nutrition ( Before - After Change) |
|---|---|---|---|---|
| TOTAL SAMPLES | Group A | 60 | 3.906 ± 0.589 | 3.725 ± 0.609 (0.181 ± 0.607) ^ |
| | Group B | 62 | 3.978 ± 0.540 | 3.944 ± 0.629 (0.034 ± 0.725) |
| | Group C | 62 | 3.86 ± 0.77 | 3.812 ± 0.621 (0.052 ± 0.85) |
| | Group D | 50 | 3.858 ± 0.613 | 3.853 ± 0.631 (0.005 ± 0.713) |
| | Group E | 49 | 3.610 ± 0.615 | 3.923 ± 0.832 (0.113 ± .918) |

**TABLE 9 - ANALYSIS IN CHANGE OF CARDIAC OUTPUT PER MINUTE (CO)**
**(UNIT: LITER/MINUTE)**

| | Type of Group | No. of Cases | Before Nutritional Supplementation | After Nutrition ( Before - After Change) |
|---|---|---|---|---|
| TOTAL SAMPLES | Group A | 60 | 7.203 ± 1.989 | 7.670 ± 1.932 (-0.467 ±1.405)^ |
| | Group B | 62 | 6.943 ± 2.285 | 7.075 ± 2.129 ( 0.132 ± 2.099) |
| | Group C | 62 | 6.95 ± 1.963 | 7.324 ± 2.078 (-0.369 ± 1.785) |
| | Group D | 50 | 7.016 ± 2.223 | 7.293 ± 2.639 (-0.267 ± 1.963) |
| | Group E | 49 | 7.812 ± 3.547 | 20.779 ± 92.24 (-12.967 ± 92.90) |

**TABLE 10 - ANALYSIS IN CHANGE OF LEFT VENTRICLE PUMP POWER EFFECTIVE INDEX (VPEI)**
**(UNIT: KG/MIN/$M^2$)**

| | Type of Group | No. of Cases | Before Nutritional Supplementation | After Nutrition ( Before - After Change) |
|---|---|---|---|---|
| TOTAL SAMPLES | Group A | 60 | 88.29 ± 21.36 | 91.60 ± 21.61 (- 3.31 ± 13.36) |
| | Group B | 62 | 89.09 ± 24.20 | 89.95 ± 21.66 ( 0.86 ± 18.68) |
| | Group C | 62 | 86.18 ± 16.51 | 90.66 ± 17.19 (- 4.48 ± 15.27)^ |
| | Group D | 50 | 88.08 ± 31.14 | 86.97 ± 28.34 ( 1.11 ± 32.91) |
| | Group E | 49 | 93.31 ± 27.11 | 93.27 ± 20.76 (0.04 ± 20.24) |

**^ Denotes P Value From Comparing Before and After Nutrition Conditions Within The Same Group**
**^ Means 0.01 < P < 0.05 ^ ^ Means P < 0.01**
*** Denotes P Value Obtained From Comparing Group A with C, and Group B with C**
*** Means 0.01 < P < 0.05 * * Means P < 0.01**
**+ Denotes P Value Obtained From Comparing Group A with B**
**+ Means 0.01 < P < 0.05 + + Means P < 0.01**

**Table 11 - ANALYSIS IN CHANGES OF MICRO-CIRCULATION HALF ALTERNATE TIME (ALT) (UNIT: SECONDS)**

| | Type of Group | No. of Cases | Before Nutritional Supplementation | After Nutrition ( Before - After Change) |
|---|---|---|---|---|
| TOTAL SAMPLES | Group A | 60 | 13.39 ± 3.78 | 13.17 ±2.58 ( 0.22 ±2.52) |
| | Group B | 62 | 13.48 ± 3.09 | 13.0 ±4.32 (-0.07 ±4.14) |
| | Group C | 62 | 14.29 ± 3.22 | 13.87 ±3.03 ( 0.42 ±3.27) |
| | Group D | 50 | 14.71 ± 3.86 | 14.04 ±3.26 ( 0.67 ±3.42) |
| | Group E | 49 | 14.31 ± 3.96 | 13.729 ±2.86 ( 0.58 ±3.18) |

**TABLE 12 - ANALYSIS IN CHANGES OF MICRO-CIRCULATION MEAN RETARDING TIME (TM) (UNIT: SECONDS)**

| | | | | |
|---|---|---|---|---|
| TOTAL SAMPLES | Group A | 60 | 19.61 ± 4.65 | 19.12 ± 3.81 ( 0.48 ±3.52) |
| | Group B | 62 | 19.55 ± 5.80 | 19.53 ± 5.06 ( 0.03 ±4.46) |
| | Group C | 62 | 20.76 ± 4.76 | 19.89 ± 4.47 ( 0.87 ±4.74) |
| | Group D | 50 | 20.95 ± 6.34 | 20.5 ± 5.57 (0.90 ±4.98) |
| | Group E | 49 | 20.43 ± 5.22 | 19.37 ± 5.13 (1.06 ±5.39) |

**TABLE 13 - ANALYSIS IN CHANGE OF PULMONARY ARTERIAL WEDGE PRESSURE (PAHP) (UNIT: MMHG)**

| | | | | |
|---|---|---|---|---|
| TOTAL SAMPLES | Group A | 52 | 8.404 ± 3.258 | 8.919 ± 3.160 (- 0.515 ±4.011) |
| | Group B | 60 | 7.955 ± 3.277 | 8.671 ± 3.0980 (- 0.716 ±4.119) |
| | Group C | 52 | 8.32 ± 2.46 | 7.08 ± 3.42 ( 1.24 ± 3.29) ^ ^ |
| | Group D | 40 | 8.362 ± 4.743 | 8.193 ± 4.167 ( 0.169 ±3.598) |
| | Group E | 29 | 9.261 ± 3.132 | 8.327 ± 3.147 ( 0.936 ±3.861) |

**^ Denotes P Value From Comparing Before and After Nutrition Condiitons Within The Same Group**

**^ Means 0.01 < P < 0.05 ^ ^ Means P < 0.01**

*** Denotes P Value Obtained From Comparing Group A with C, and Group B with C**

*** Means 0.01 < P < 0.05 * * Means P < 0.01**

**+ Denotes P Value Obtained From Comparing Group A with B**

**+ Means 0.01 < P < 0.05 + + Means P < 0.01**

Table 14 - TOTAL ANALYSIS OF CHANGES IN BRAIN FUNCTIONS

| | Type of Group | No. of Cases | Before Nutritional Supplementation | After Nutrition (Before - After Change) |
|---|---|---|---|---|
| DIRECTIONAL REMEMBERING (MINUTES) | Group A | 48 | 13.17 ± 6.41 | 15.63 ± 5.74 (-2.46 ± 6.64) ^ |
| | Group B | 42 | 12.5 ± 4.59 | 14.55 ± 5.41 ( 2.05 ± 5.34) ^ |
| | Group C | 40 | 12.1 ± 5.33 | 11.85 ± 5.41 ( 0.25 ± 5.22) |
| DIRECTIONAL REMEMBERING (MINUTES) | Group A | 44 | 13.27 ± 4.37 | 16.84 ± 5.13 (-3.57 ± 4.39)^ ^ |
| | Group B | 40 | 12.3 ± 2.46 | 14.88 ± 2.37 ( 2.58 + 4.55)^ ^ |
| | Group C | 37 | 11.11 ± 3.89 | 13.10 ± 4.53 (-2.0 ± 4.08)^ ^ |
| PICTURE FREE MEMORY (MINUTES) | Group A | 48 | 16.46 ± 6.35 | 20.69 ± 7.07 (-4.23 ± 7.51)^ ^ |
| | Group B | 49 | 15.90 ± 4.75 | 20.45 ± 5.17 (-4.55 ± 6.75)^ ^ |
| | Group C | 40 | 16.48 ± 5.65 | 17.28 ± 5.40 (-0.7 ± 5.42) |
| UNCONSCIOUS REUNDERSTAN-DING ( MIN). | Group A | 45 | 22.6 ± 5.95 | 27.71 ± 5.27 (-5.11 ± 6.30)^ ^ |
| | Group B | 48 | 22.96 ± 4.80 | 28.15 ± 5.50 (-5.19 ± 7.65)^ ^ |
| | Group C | 40 | 21.28 ± 6.87 | 27.4 ± 7.04 (-6.12 ± 6.92)^ ^ |
| PORTRAIT CHARACTER MEMORY (MIN) | Group A | 40 | 16.25 ± 4.24 | 16.88 ± 5.15 (-0.63 ± 5.22) |
| | Group B | 44 | 16.05 ± 3.56 | 14.77 ± 3.04 ( 1.78 ± 5.88) |
| | Group C | 39 | 14.15 ± 4.59 | 14.03 ± 3.44 ( 0.13 ± 4.10) |
| MEMORY QUOTIENT (MQ) | Group A | 46 | 103.35 ± 92.53 | 103.02 ± 18.26 (0.33 ± 88.54) |
| | Group B | 50 | 82.52 ± 14.12 | 97.18 ± 3.27 (-14.66 ± 14.07) ^ |
| | Group C | 40 | 85.88 ± 16.31 | 93.45 ± 14.43 (-7.57 ± 10.76)^ ^ |
| HOMOLOGICAL PHRASE SPEAK-ING (SECONDS) | Group A | 47 | 3.9647 ± .4594 | 3.5087 ± 1.2059 (1.459 ± 1.2838^^ |
| | Group B | 50 | 3.8068 ± .4457 | 3.5144 ± 1.3446 (0.2124 ± 1.0149 ^ |
| | Group C | 40 | 3.6905 ± .4129 | 3.3215 ± 0.8393 (0.369 ± 1.1927) |
| HETROLOGICAL PHRASE SPEAK-ING (SECONDS) | Group A | 47 | 5.67 ± 3.75 | 4.31 ± 2.39 (1.36 ± 4.00) |
| | Group B | 47 | 6.96 ± 4.16 | 4.99 ± 3.78 (1.97 ± 3.24) ^ ^ |
| | Group C | 39 | 7.86 ± 6.33 | 5.88 ± 4.29 (1.98 ± 6.00) ^ |
| BLACK WORDS READING (SECONDS) | Group A | 45 | 17.53 ± 5.23 | 17.59 ± 4.61 (-0.06 ± 3.84) |
| | Group B | 43 | 17.98 ± 5.69 | 18.27 ± 4.43 (-0.29 ± 3.83) |
| | Group C | 40 | 17.77 ± 5.73 | 17.45 ± 5.28 (0.32 ± 4.93) |
| COLOR WORDS READING (SECONDS) | Group A | 45 | 25.28 ± 9.28 | 22.92 ± 8.10 (2.36 ± 8.52) |
| | Group B | 43 | 24.05 ± 8.01 | 22.24 ± 5.70 (1.81 ± 6.57) |
| | Group C | 40 | 23.25 ± 8.20 | 22.54 ± 8.11 (0.71 ± 4.57) |
| WORDS COLOR READING (SECONDS) | Group A | 46 | 47.76 ± 10.99 | 43.02 ± 9.85 (4.74 ± 9.41) ^ ^ |
| | Group B | 51 | 53.01 ± 11.83 | 47.75 ± 12.59 (5.26 ± 9.08) ^ ^ |
| | Group C | 40 | 51.62 ± 14.61 | 49.80 ± 14.56 (1.82 ± 12.44) |
| COLOR READING (SECONDS) | Group A | 47 | 27.48 ± 9.35 | 25.37 ± 9.01 (2.11 ± 9.37) |
| | Group B | 52 | 31.45 ± 12.28 | 27.90 ± 12.22 (3.55 ± 7.65) ^ ^ |
| | Group C | 40 | 27.95 ± 7.31 | 24.90 ± 9.99 (3.05 ± 10.86) |
| FLUENCY IN WRITING (SECONDS) | Group A | 43 | 29.17 ± 16.42 | 20.21 ± 12.18 (8.96 ± 13.26)^ ^ |
| | Group B | 39 | 33.15 ± 30.15 | 21.35 ± 13.55 (11.8 ± 20.38)^ ^ |
| | Group C | 39 | 32.22 ± 27.07 | 27.34 ± 24.45 (4.88 ± 7.21) ^ ^ |

^ Denotes P Value From Comparing The Before and After Nutrition Conditions Within The Same Group

^ Means 0.01 < P < 0.05 ^ ^ Means P < 0.01

* Denotes P Value Obtained From Comparing Group A with C, and Group B with C

* Means 0.01 < P < 0.05 * * Means P < 0.01

+ Denotes P Value Obtained From Comparing Group A with B

+ Means 0.01 < P < 0.05 + + Means P < 0.01