4.3.0 Analysis of Bioimpedance Parameters

Paired t-test is used to analysis the significant of bioimpedance parameters before and after treatment. Level of significant five percent is used. In this analysis, bioimpedance parameters are divided into two main groups. They are called main bioimpedance parameter and secondary bioimpedance parameter. These groups of bioimpedance parameter had been shown in Table 4.3.0.This grouping is done ease of analyzing and reporting. The result of the paired t-test on the analysis of bioimpedance parameters are shown in Table 4.3.0. There are no significant difference when $p>0.05$.

Table 4.3.0. Overall Comparisons of Bioimpedance Parameters before and After Treatment.

Main Bioimpedance Parameters	**P**	**Secondary Bioimpedance Parameters**	**P**
Impedance value at 5KHz	0.031	Percentage of fat	0.414
Impedance value at 50KHz	0.004	Min fat	0.204
Impedance value at 100KHz	0.000	Max fat	0.000
Impedance value at 200 KHz	0.000	Min lean	0.025
Reactance at 50 KHz	0.000	Max lean	0.005
Resistance at 50 KHz	0.000	Dry lean weight	0.643
Phase Angle at 50 KHz	0.736	Percentage of water	0.116
Basal metabolic rate	0.031	Min percentage of water	0.229
Intracellular water	0.000	Max percentage of water	0.229
Extra-cellular water	0.098	Water	0.000
Normal extra cellular water	0.734	Min water	0.906
Total body water volume	0.000	Max water	0.822
Min total body water volume	0.906	Density	0.000
Max total body water volume	0.842	Nutrition	0.000
Body cell mass	0.000	Third space value	0.000

4.3.1 Analysis of Bioimpedance Parameters between Genders

In this analysis the Bioimpedance parameters are compared according to female and male .The bioimpedance parameters also divided into two groups, main and secondary bioimpedance parameters. These groups of bioimpedance parameter are shown in table 4.3.1.1 and 4.3.1.2 respectively. This grouping is done ease of analyzing and reporting. In

SPSS data “1” means female and “2” means male. There are no significant difference when $p>0.05$.

Table 4.3.1.1 Comparisons of Main Bioimpedance Parameters Before and After Treatment between Genders.

Main Bioimpedance Parameters	P (Female)	P (Male)
Impedance value at 5 KHz	0.001	0.919
Impedance value at 50 KHz	0.000	0.231
Impedance value at 100 KHz	0.000	0.747
Impedance value at 200 KHz	0.000	0.853
Resistance at 50 KHz	0.000	0.765
Resistance at 50 KHz	0.758	0.874
Phase Angle at 50 KHz	0.004	0.466
Intracellular water	0.000	0.419
Normal value of intra cellular water	0.535	0.388
Extra-cellular water	0.058	0.811
Normal of extra cellular water	0.763	0.302
Total body water volume	0.000	0.540
Min total body water volume	0.664	0.414
Max total body water volume	0.451	0.457
Body cell mass	0.000	0.428
Basal metabolic	0.014	0.737

Table: 4.3.1.2 Comparisons of Secondary Bioimpedance Parameters Before and After Treatment between Genders.

Secondary Bioimpedance Parameters	P (Female)	P (Male)
Percentage of fat	0.000	0.717
Min fat	0.011	0.013
Max fat	0.000	1.000
Percenge of lean	0.000	0.717
Min lean	0.014	0.686
Max lean	0.003	0.516
Percentage of water	0.121	0.621
Min water	0.664	0.414
Max water	0.432	0.457
Dry lean weight	0.782	0.704
Density	0.000	0.733
Third space value	0.000	0.926
Nutrition	0.000	0.229

4.3.2 Analysis of Bioimpedance Parameters between BMI Group.

In this analysis the Bioimpedance parameters are compared according to BMI group. The bioimpedance parameters also divided into two groups, main and secondary bioimpedance parameters. These groups of bioimpedance parameter are shown in table 4.3.2.1 and 4.3.2.2 respectively. This grouping is done ease of analyzing and reporting. In SPSS data, BMI less than 20=group 1, BMI 20 to 25=group 2, BMI 25=30=group 3, BMI 30-35=group 4, BMI more than 35=group 5. There are no significant difference when $p>0.05$.

Table: 4.3.2.1 Comparisons of Main Bioimpedance Parameters before and After Treatment Between BMI Group.

Main Bioimpedance Parameters	P(1)	P (2)	P (3)	P (4)	P (5)
Impedance value at 5KHz	0.000	0.484	0.001	0.000	0.000
Impedance value at 50KHz	0.000	0.044	0.000	0.000	0.000
Impedance value at 100KHz	0.000	0.454	0.000	0.000	0.002
Impedance value at 200KHz	0.000	0.455	0.000	0.001	0.013
Resistance at 50KHz	0.000	0.448	0.000	0.000	0.000
Resistance at 50KHz	0.000	0.592	0.000	0.174	0.011
Phase Angle at 50 kHz	0.000	0.202	0.000	0.839	0.168
Intracellular water	0.000	0.268	0.000	0.023	0.063
Normal intra cellular water	0.000	0.241	0.786	0.016	0.323
Extra-cellular water	0.000	0.373	0.099	0.001	0.000
Normal extra cellular water	0.000	0.214	0.730	0.016	0.323
Total body water volume	0.000	0.297	0.001	0.003	0.000
Min total body water volume	0.000	0.235	0.760	0.041	0.323
Max total body water volume	0.000	0.248	0.769	0.009	0.052
Body cell mass	0.000	0.264	0.000	0.018	0.000
Basal metabolic rate	0.000	0.427	0.024	0.001	0.002

P(1) is BMI group 1(BMI less than 20), P(2) is BMI group 2(BMI 20 to 25), P(3) is BMI group 3(BMI 25 to 30), P(4) is BMI group 4(BMI 30 to 35), P(5) is BMI group 5(BMI greater than 35).

Table 4.3.2.2 Comparisons of Secondary Bioimpedance Parameters before and After Treatment Between BMI Group.

Secondary Bioimpedance Parameters	P (1)	P (2)	P (3)	P (4)	P (5)
Percentage of fat	0.000	0.493	0.001	0.739	0.000
Min fat	0.409	1.000	0.367	0.083	0.003
Max fat	0.302	0.774	0.000	0.004	0.000
Percenge of lean	0.332	0.493	0.001	0.739	0.000
Min lean	0.005	0.312	0.025	0.000	0.189
Max lean	0.034	0.334	0.004	0.000	0.014
Percentage of water	0.000	0.327	0.148	0.035	0.000
Min water	0.000	0.235	0.760	0.041	0.323
Max water	0.000	0.248	0.794	0.009	0.172
Dry lean weight	0.037	0.526	0.339	0.000	0.000
Density	0.345	0.413	0.000	0.297	0.019
Third space value	0.005	1.000	0.000	0.027	0.031
Nutrition	0.009	0.219	0.000	0.021	0.000

P(1) is BMI group 1(BMI less than 20), P(2) is BMI group 2(BMI 20 to 25), P(3) is BMI group 3(BMI 25 to 30), P(4) is BMI group 4(BMI 30 to 35), P(5) is BMI group 5(BMI greater than 35).

4.3.3 Analysis of Bioimpedance Parameters Between Age Group.

In this analysis the Bioimpedance parameters are compared according to age group. The bioimpedance parameters also divided into two groups, main and secondary bioimpedance parameters. These groups of bioimpedance parameter are shown in table 4.3.3.1 and 4.3.3.2. This grouping is done ease of analyzing and reporting. In SPSS data, age 21 to 30=group 1, age 31 to 50=group 2, age 51 to 70=group 3, age 71 to 90=group4. There are no significant difference when $p>0.05$.

Table 4.3.3.1 Comparisons of Main Bioimpedance Parameters Before and After Treatment Between Age Group.

Main Bioimpedance Parameters	P (1)	P (2)	P (3)	P (4)
Impedance value at 5 KHz	0.006	0.103	0.064	0.003
Impedance value at 50 KHz	0.001	0.017	0.087	0.960
Impedance value at 100 KHz	0.001	0.022	0.014	0.929
Impedance value at 200 KHz	0.001	0.045	0.016	0.816
Resistance at 50 KHz	0.001	0.018	0.009	0.951
Resistance at 50 KHz	0.001	0.630	0.489	0.666
Phase Angle at 50 KHz	0.001	0.216	0.263	0.870
Intracellular water	0.017	0.096	0.055	0.264
Normal intra cellular water	0.605	0.033	0.369	0.024
Extra-cellular water	0.124	0.498	0.369	0.012
Normal extra cellular water	0.590	0.034	0.348	0.024
Total body water volume	0.017	0.018	0.092	0.283
Min total body water volume	0.577	0.054	0.374	0.024
Max total body water volume	0.603	0.043	0.399	0.330
Body cell mass	0.018	0.080	0.054	0.648
Basal metabolic rate	0.069	0.293	0.446	0.734

P(1) is age group 1(age 21 to 30), P(2) is age group 2(age 31 to 50), P(3) is age group 3(age 51 to 70), P(4) is age group 4(age 71 to 90).

Table 4.3.3.2 Comparisons of Secondary Bioimpedance Parameters Before and After Treatment Between Age Group.

Secondary Bioimpedance Parameters	P (1)	P (2)	P (3)	P (4)
Percentage of fat	0.007	0.003	0.350	0.075
Min fat	0.051	0.359	0.754	0.255
Max fat	0.000	0.071	0.099	1.000
Percenge of lean	0.008	0.003	0.350	0.075
Min lean	0.067	0.200	0.370	0.489
Max lean	0.030	0.116	0.244	1.000
Percentage of water	0.226	0.000	0.070	0.865
Min water	0.577	0.054	0.374	0.024
Max water	0.603	0.036	0.399	0.029
Dry lean weight	0.222	0.306	0.830	0.083
Density	0.002	0.000	0.267	0.613
Third space value	0.003	0.000	0.315	0.374
Nutrition	0.011	0.057	0.007	0.034

P(1) is age group 1(age 21 to 30), P(2) is age group 2(age 31 to 50), P(3) is age group 3(age 51 to 70), P(4) is age group 4(age 71 to 90).

4.3.4 Analysis of Bioimpedance Parameters for Disease Group.

In this analysis the Bioimpedance parameters are compared according to diseases group. The bioimpedance parameters also divided into two groups, main and secondary bioimpedance parameters. These groups of bioimpedance parameter are shown in table 4.3.4.1 and 4.3.4.2. This grouping is done ease of analyzing and reporting. For the analysis, only Arthritis, High blood pressure, Diabetes, Migraine and Stroke are selected because their high percentage. There are no significant difference when $p>0.05$.

Table 4.3.4.1 Comparisons of Main Bioimpedance Parameters Before and After Treatment between Diseases Group.

Main Bioimpedance Parameters	P (1)	P (2)	P (3)	P (4)	P(5)
Impedance value at 5 KHz	0.061	0.455	0.533	0.001	0.340
Impedance value at 50KHz	0.043	0.858	0.417	0.003	0.372
Impedance value at 100KHz	0.046	0.962	0.574	0.006	0.257
Impedance value at 200KHz	0.060	0.622	0.567	0.011	0.332
Resistance at 50KHz	0.046	0.846	0.436	0.005	0.212
Resistance at 50KHz	0.963	0.795	0.369	0.000	0.048
Phase Angle at 50KHz	0.264	0.838	0.306	0.000	0.364
Intracellular water	0.058	0.457	0.967	0.301	0.283
Normal intra cellular water	0.021	0.486	0.406	0.019	0.293
Extra-cellular water	0.090	0.608	0.288	0.001	0.386
Normal extra cellular water	0.021	0.430	0.369	0.019	0.244
Total body water volume	0.038	0.433	0.756	0.003	0.276
Min total body water volume	0.042	0.465	0.415	0.019	0.309
Max total body water volume	0.021	0.455	0.466	0.108	0.338
Body cell mass	0.058	0.426	0.936	0.009	0.281
Basal metabolic rate	0.139	0.376	0.788	0.004	0.919

P(1) is diseases group for arthritis patient, P(2) diseases group for high blood pressure patient, P(3) is diseases group for diabetes patient, P(4) is diseases group for migraine patient, P(5) is diseases group for stroke patient.

Table 4.3.4.2 Comparisons of Secondary Bioimpedance Parameters Before and After Treatment Between Diseases Group.

Secondary Bioimpedance Parameters	P (1)	P (2)	P (3)	P (4)	P(5)
Percentage of fat	0.110	0.328	0.929	0.006	0.920
Min fat	0.481	0.267	0.323	0.189	0.474
Max fat	0.143	0.748	0.474	0.019	0.160
Percenge of lean	0.110	0.301	0.884	0.006	0.920
Min lean	0.232	0.332	0.861	0.006	0.730
Max lean	0.163	0.333	0.806	0.019	0.543
Percentage of water	0.027	0.388	0.322	0.879	0.322
Min water	0.021	0.465	0.415	0.019	0.309
Max water	0.132	0.489	0.466	0.014	0.338
Dry lean weight	0.004	0.343	0.715	0.670	0.670
Density	0.013	0.186	0.534	0.582	0.881
Third space value	0.053	0.174	0.937	0.467	0.464
Nutrition	0.034	1.000	0.345	0.435	0.182

P(1) is diseases group for arthritis patient, P(2) diseases group for high blood pressure patient, P(3) is diseases group for diabetes patient, P(4) is diseases group for migraine patient, P(5) is diseases group for stroke patient.

4.3.5 Analysis of Bioimpedance Parameters for Occupation Group.

In this analysis the Bioimpedance parameters are compared according to occupation group. The bioimpedance parameters also divided into two groups, main and secondary bioimpedance parameters. These groups of bioimpedance parameter are shown in table 4.3.5.1 and 4.3.5.2. This grouping is done ease of analyzing and reporting. In SPSS data, Businessman indicate as=”1”, Housewife =”2”, Worker =”3”, Retired =”4”and Student =”5”. There are no significant difference when ($p>0.05$).

Table 4.3.5.1 Comparisons of Main Bioimpedance Parameters before and after Treatment Between occupations Group.

Main Bioimpedance Parameters	P (1)	P (2)	P (3)	P (4)	P(5)
Impedance value at 5KHz	0.328	0.015	0.372	0.021	0.002
Impedance value at 50KHz	0.655	0.990	0.056	0.026	0.001
Impedance value at 100KHz	0.890	0.865	0.069	0.003	0.001
Impedance value at 200KHz	0.944	0.692	0.112	0.003	0.001
Resistance at 50KHz	0.710	0.990	0.061	0.002	0.001
Resistance at 50KHz	0.272	0.331	0.930	0.672	0.001
Phase Angle at 50 KHz	0.097	0.403	0.126	0.131	0.001
Intracellular water	0.419	0.416	0.542	0.013	0.003
Normal value of intra cellular water	0.334	0.671	0.006	0.235	0.232
Extra-cellular water	0.491	0.626	0.250	0.077	0.029
Normal value of extra cellular water	0.334	0.671	0.015	0.261	0.206
Total body water volume	0.526	0.380	0.388	0.016	0.003
Min total body water volume	0.334	0.323	0.010	0.225	0.239
Max total body water volume	0.334	0.878	0.006	0.222	0.248
Body cell mass	0.489	0.405	0.510	0.014	0.003
Basal metabolic rate	0.394	0.525	0.450	0.032	0.006

P(1) is occupation group for businessman, P(2) occupation group for housewife, P(3) is occupation group for worker, P(4) is occupation group for retired, P(5) is occupation group for student.

Table 4.3.5.2 Comparisons of Secondary Bioimpedance Parameters Before and After Treatment between Occupation Group.

Secondary Bioimpedance Parameters	P (1)	P (2)	P (3)	P (4)	P(5)
Percentage of fat	0.454	0.428	0.112	0.026	0.003
Min fat	0.334	0.253	0.898	0.874	0.026
Max fat	1.000	0.838	0.207	0.001	0.000
Percenge of lean	0.454	0.428	0.107	0.026	0.003
Min lean	0.299	0.451	0.693	0.094	0.020
Max lean	0.375	0.615	0.978	0.029	0.008
Percentage of water	0.938	0.466	0.229	0.009	0.001
Min water	0.334	0.323	0.010	0.225	0.239
Max water	0.334	0.878	0.005	0.222	0.248
Dry lean weight	0.355	0.936	0.010	0.259	0.115
Density	0.334	0.019	0.013	0.029	0.001
Third space value	0.413	0.513	0.000	0.122	0.002
Nutrition	0.334	0.067	0.101	0.014	0.006

P(1) is occupation group for businessman, P(2) occupation group for housewife, P(3) is occupation group for worker, P(4) is occupation group for retired, P(5) is occupation group for student.

4.3.6 Analysis of Bioimpedance Parameters for the Number of Treatment Group.

In this analysis the Bioimpedance parameters are compared according to No of Treatment group. The bioimpedance parameters also divided into two groups, main and secondary bioimpedance parameters. These groups of bioimpedance parameter are shown in table 4.3.6.1 and 4.3.6.2. This grouping is done ease of analyzing and reporting. In SPSS data, no of treatment 1 to 2 times indicate as 1=, 3 to 4 times =2, 5 to 6 times =3, 7 to 13 times =4. There are no significant difference when ($p>0.05$).

Table 4.3.6.1 Comparisons of Main Bioimpedance Parameters before and after Treatment between numbers of Treatment Group.

Main Bioimpedance Parameters	P (1)	P (2)	P (3)	P (4)
Impedance value at 5KHz	0.002	0.088	0.481	0.858
Impedance value at 50KHz	0.001	0.028	0.099	0.504
Impedance value at 100KHz	0.001	0.010	0.169	0.154
Impedance value at 200KHz	0.001	0.015	0.331	0.198
Resistance at 50KHz	0.001	0.011	0.111	0.119
Resistance at 50KHz	0.000	0.248	0.025	0.979
Phase Angle at 50KHz	0.001	0.017	0.483	0.430
Intracellular water	0.009	0.044	0.559	0.089
Normal value of intra cellular water	0.668	0.925	0.084	0.323
Extra-cellular water	0.076	0.396	0.525	0.361
Normal value of extra cellular water	0.615	0.818	0.085	0.323
Total body water volume	0.010	0.050	0.264	0.123
Min total body water volume	0.575	0.824	0.087	0.323
Max total body water volume	0.771	0.970	0.124	0.323
Body cell mass	0.009	0.044	0.495	0.099
Basal metabolic rate	0.061	0.305	0.991	0.138

P(1) is number of treatment done group for 1 to 2 times treatment, P(2) number of treatment done group for 3 to 4 times treatment , P(3) is number of treatment done group for 5 to 6 times treatment, P(4) is number of treatment group for 7 to 13 times treatment.

Table 4.3.6.2 Comparisons of Secondary Bioimpedance Parameters Before and After Treatment between numbers of Treatment Group.

Secondary Bioimpedance Parameters	P (1)	P (2)	P (3)	P (4)
Percentage of fat	0.012	0.058	0.126	0.299
Min fat	0.017	1.000	0.734	0.811
Max fat	0.002	0.015	0.165	0.002
Percenge of lean	0.012	0.061	0.111	0.299
Min lean	0.061	0.279	1.000	0.193
Max lean	0.038	0.150	0.691	0.086
Percentage of water	0.001	0.230	0.036	0.248
Min water	0.575	0.824	0.087	0.323
Max water	0.771	0.970	0.109	0.323
Dry lean weight	0.416	0.947	0.446	0.268
Density	0.003	0.012	0.004	0.767
Third space value	0.005	0.004	0.002	0.941
Nutrition	0.004	0.008	0.184	0.249

P(1) is number of treatment done group for 1 to 2 times treatment, P(2) number of treatment done group for 3 to 4 times treatment , P(3) is number of treatment done group for 5 to 6 times treatment, P(4) is number of treatment group for 7 to 13 times treatment.

4.4.5 Comparison of Bioimpedance Parameters with Patient's BMI Group.

In this section Comparison of Bioimpedance Parameters with Patient's BMI Group are shown here. For ease of reporting and analysis BMI group divided into five groups here.BMI less than 20 in group 1,BMI 20 to 25 in group 2,BMI 25 to 30 in group 3,BMI 30 to BMI greater than 35 in group 5. In this part BMI 1 mean BMI less than 20 are selected for analysis. Here actually BMI group 1 is selected for male and female and need to analyze for the factor age group, number of treatment and diseases group what's there significance. Table 4.4.5.1-4.4.5.8 analyzed about this comparison. Most of the cases significance is same but sometimes it will differ. For analysis the bioimpedance parameters are divided into two groups here. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. Independent T test and ANOVA test was used here for this analysis. The value of P should be less than 5% for significance.

Table 4.4.5.1 Comparisons of Main Bioimpedance Parameters before Treatment for Female BMI group 1.

Main Bioimpedance Parameters	Overall (p)	Age Grp(p)	No of treatment (p)	Diseases Grp(p)
Impedance value at 5KHz	0.000	0.003	0.493	0.297
Impedance value at 50KHz	0.035	0.000	0.000	0.027
Impedance value at 100KHz	0.041	0.000	0.774	0.021
Impedance value at 200KHz	0.009	0.189	0.493	0.001
Reactance at 50KHz	0.000	0.014	0.312	0.367
Resistance at 50KHz	0.297	0.000	0.334	0.000
Phase Angle at 50KHz	0.027	0.323	0.327	0.001
BMR	0.021	0.172	0.235	0.025
ICW	0.367	0.000	0.248	0.004
Normal ICW	0.000	0.019	0.526	0.148
ECW	0.001	0.031	0.413	0.760
Normal ECW	0.025	0.000	0.000	0.794
TBW	0.004	0.083	0.219	0.339
Min TBW	0.148	0.004	0.004	0.030
Max TBW	0.760	0.739	0.006	0.070
BCM	0.006	0.000	0.015	0.009

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.5.2 Comparisons of Secondary Bioimpedance Parameters before Treatment for Female BMI group 1.

Secondary Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment (p)	Diseases Grp(p)
Percentage of fat	0.002	0.014	0.002	0.202
Min fat	0.037	0.000	0.037	0.268
Max fat	0.015	0.002	0.015	0.241
Percentage o lean	0.002	0.014	0.002	0.373
Max lean	0.522	0.674	0.522	0.214
Min lean	0.640	0.733	0.640	0.297
Percentage of water	0.038	0.000	0.038	0.312
Min water	0.016	0.000	0.016	0.334
Max water	0.012	0.000	0.012	0.327
Dry lean weight	0.025	0.312	0.025	0.235
Density	0.006	0.013	0.006	0.248
Third space	0.123	0.000	0.002	0.526
Nutrition	0.342	0.090	0.342	0.413

Table 4.4.5.3. Comparisons of Main Bioimpedance Parameters after Treatment for Female BMI group 1.

Main Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment(p)	Diseases Grp(p)
Impedance value at 5KHz	0.007	0.000	0.005	0.002
Impedance value at 50KHz	0.048	0.004	0.080	0.038
Impedance value at 100KHz	0.002	0.002	0.007	0.005
Impedance value at 200KHz	0.000	0.000	0.006	0.002
Reactance at 50KHz	0.000	0.000	0.809	0.009
Resistance at 50KHz	0.000	0.000	0.460	0.007
Phase Angle at 50KHz	0.339	0.006	0.009	0.400
BMR	0.047	0.000	0.007	0.809
ICW	0.015	0.000	0.006	0.019
Normal ICW	0.009	0.000	0.800	0.006
ECW	0.006	0.000	0.015	0.009
Normal ECW	0.905	0.035	0.008	0.809
TBW	0.009	0.000	0.090	0.050
Min TBW	0.002	0.089	0.045	0.151
Max TBW	0.045	0.045	0.046	0.437

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.5.4 Comparisons of Secondary Bioimpedance Parameters after Treatment. For Female BMI group 1.

Secondary Bioimpedance Parameters	Overall (P)	Age Grp(P)	No of treatment(p)	Diseases Grp(P)
Percentage of fat	0.003	0.000	0.851	0.046
Min fat	0.372	0.000	0.475	0.143
Max fat	0.509	0.000	0.346	0.160
Min lean	0.003	0.000	0.269	0.150
Max lean	0.730	0.000	0.454	0.151
Dry lean weight	0.597	0.000	0.000	0.437
Percentage of water	0.000	0.039	0.001	0.453
Min percentage of water	0.028	0.000	0.431	0.011
Max percentage of water	0.031	0.000	0.960	0.273
Water	0.705	0.000	0.261	0.299
Min water	0.000	0.000	0.942	0.097
Max water	0.000	0.045	0.411	0.420
Density	0.019	0.050	0.889	0.136
Nutrition	0.089	0056	0.192	0.373
Third space value	0.009	0.076	0.258	0.229

Table 4.4.5.5 Comparisons of Main Bioimpedance Parameters before Treatment for male BMI group 1.

Main Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment (p)	Diseases Grp(p)
Impedance value at 5KHz	0.768	0.046	0.013	0.477
Impedance value at 50KHz	0.345	0.143	0.008	0.949
Impedance value at 100KHz	0.877	0.160	0.003	0.001
Impedance value at 200KHz	0.900	0.150	0.001	0.541
Reactance at 50KHz	0.788	0.151	0.006	0.370
Resistance at 50KHz	0.000	0.437	0.000	0.043
Phase Angle at 50 KHz	0.001	0.453	0.000	0.018
BMR	0.899	0.011	0.000	0.021
ICW	0.045	0.273	0.046	0.515
Normal ICW	0.098	0.299	0.030	0.000
ECW	0.045	0.097	0.017	0.107
Normal ECW	0.411	0.420	0.081	0.014
TBW	0.056	0.136	0.056	0.000
Min TBW	0.897	0.373	0.048	0.002
Max TBW	0.258	0.229	0.014	0.904
BCM	0.953	0.281	0.046	0.008

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.5.6 Comparisons of Secondary Bioimpedance Parameters before Treatment for Male BMI group 1.

Secondary Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment (p)	Diseases Grp(p)
Percentage of fat	0.002	0.014	0.002	0.890
Min fat	0.037	0.000	0.037	0.655
Max fat	0.015	0.002	0.015	0.890
Percentage o lean	0.002	0.014	0.002	0.944
Max lean	0.522	0.674	0.522	0.710
Min lean	0.640	0.733	0.640	0.272
Percentage of water	0.038	0.000	0.038	0.097
Min water	0.016	0.000	0.016	0.419
Max water	0.012	0.000	0.012	0.334
Dry lean weight	0.025	0.312	0.025	0.491
Density	0.006	0.013	0.006	0.334
Third space	0.045	0.000	0.002	0.526
Nutrition	0.342	0.090	0.342	0.334

Table 4.4.5.7 Comparisons of Main Bioimpedance Parameters after Treatment for Male BMI group 1.

Main Bioimpedance Parameters	Overall (p)	Age Grp(p)	No of treatment(p)	Diseases Grp(p)
Impedance value at 5KHz	0.112	0.026	0.021	0.002
Impedance value at 50KHz	0.898	0.874	0.026	0.001
Impedance value at 100KHz	0.207	0.001	0.003	0.001
Impedance value at 200KHz	0.107	0.026	0.003	0.001
Reactance at 50KHz	0.693	0.094	0.002	0.001
Resistance at 50KHz	0.978	0.029	0.672	0.001
Phase Angle at 50 KHz	0.229	0.009	0.131	0.001
BMR	0.010	0.225	0.013	0.003
ICW	0.005	0.222	0.235	0.232
Normal ICW	0.010	0.259	0.077	0.029
ECW	0.013	0.029	0.261	0.206
Normal ECW	0.000	0.122	0.016	0.003
TBW	0.101	0.014	0.225	0.239
Min TBW	0.014	0.003	0.222	0.248
Max TBW	0.032	0.006	0.489	0.466
BCM	0.006	0.001	0.657	0.002

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.5.8 Comparisons of Secondary Bioimpedance Parameters after Treatment for Male BMI group 1.

Secondary Bioimpedance Parameters	Overall (P)	Age Grp (P)	No of treatment(p)	Diseases Grp(P)
Percentage of fat	0.428	0.112	0.481	0.858
Min fat	0.253	0.898	0.099	0.504
Max fat	0.838	0.207	0.169	0.154
Min lean	0.428	0.107	0.331	0.198
Max lean	0.451	0.693	0.111	0.119
Dry lean weight	0.615	0.978	0.025	0.979
Percentage of water	0.466	0.229	0.483	0.430
Min percentage of water	0.323	0.010	0.559	0.089
Max percentage of water	0.878	0.005	0.084	0.323
Water	0.936	0.010	0.525	0.361
Min water	0.019	0.013	0.085	0.323
Max water	0.513	0.000	0.264	0.123
Density	0.067	0.101	0.087	0.323
Nutrition	0.495	0.099	0.124	0.323
Third space value	0.991	0.138	0.125	0.354

4.4.6 Comparison of Bioimpedance Parameters with Patient's BMI 2 Group.

In this section Comparison of Bioimpedance Parameters with Patient's BMI Group are shown here. For ease of reporting and analysis BMI group divided into five groups here.BMI less than 20 in group 1,BMI 20 to 25 in group 2,BMI 25 to 30 in group 3,BMI 30 to BMI greater than 35 in group 5. In this part BMI 2 mean BMI 20 to 25 are selected for analysis. Here actually BMI group 2 is selected for male and female and need to analyze for the factor age group, number of treatment and diseases group what's there significance. Table 4.4.6.1-4.4.6.8 analyzed about this comparison. Most of the cases significance is same but sometimes it will differ. For analysis the bioimpedance parameters are divided into two groups here. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. Independent T test and ANOVA test was used here for this analysis. The value of P should be less than 5% for significance.

Table 4.4.6.1 Comparisons of Main Bioimpedance Parameters before Treatment for Female BMI group 2.

Main Bioimpedance Parameters	Overall (p)	Age Grp(p)	No of treatment (p)	Diseases Grp(p)
Impedance value at 5KHz	0.372	0.021	0.328	0.015
Impedance value at 50KHz	0.056	0.026	0.655	0.990
Impedance value at 100KHz	0.069	0.003	0.890	0.865
Impedance value at 200KHz	0.112	0.003	0.944	0.692
Reactance at 50KHz	0.061	0.002	0.710	0.990
Resistance at 50KHz	0.930	0.672	0.272	0.331
Phase Angle at 50KHz	0.126	0.131	0.097	0.403
BMR	0.542	0.013	0.419	0.416
ICW	0.006	0.235	0.334	0.671
Normal ICW	0.250	0.077	0.491	0.626
ECW	0.015	0.261	0.334	0.671
Normal ECW	0.388	0.016	0.526	0.380
TBW	0.010	0.225	0.334	0.323
Min TBW	0.006	0.222	0.334	0.878
Max TBW	0.510	0.014	0.489	0.405
BCM	0.450	0.032	0.394	0.525

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.6.2 Comparisons of Secondary Bioimpedance Parameters before Treatment for Female BMI group 2.

Secondary Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment (p)	Diseases Grp(p)
Percentage of fat	0.002	0.014	0.002	0.533
Min fat	0.037	0.000	0.037	0.417
Max fat	0.015	0.002	0.015	0.574
Percentage o lean	0.002	0.014	0.002	0.567
Max lean	0.522	0.674	0.522	0.436
Min lean	0.640	0.733	0.640	0.369
Percentage of water	0.038	0.000	0.038	0.306
Min water	0.016	0.000	0.016	0.967
Max water	0.012	0.000	0.012	0.406
Dry lean weight	0.025	0.312	0.025	0.288
Density	0.006	0.013	0.006	0.369
Third space	0.003	0.000	0.002	0.756
Nutrition	0.342	0.090	0.342	0.415

Table 4.4.6.3. Comparisons of Main Bioimpedance Parameters after Treatment for Female BMI group 2.

Main Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment(p)	Diseases Grp(p)
Impedance value at 5KHz	0.533	0.001	0.061	0.455
Impedance value at 50KHz	0.417	0.003	0.043	0.858
Impedance value at 100KHz	0.574	0.006	0.046	0.962
Impedance value at 200KHz	0.567	0.011	0.060	0.622
Reactance at 50KHz	0.436	0.005	0.046	0.846
Resistance at 50KHz	0.369	0.000	0.963	0.795
Phase Angle at 50 KHz	0.306	0.000	0.264	0.838
BMR	0.967	0.301	0.058	0.457
ICW	0.406	0.019	0.021	0.486
Normal ICW	0.288	0.001	0.090	0.608
ECW	0.369	0.019	0.021	0.430
Normal ECW	0.756	0.003	0.038	0.433
TBW	0.415	0.019	0.042	0.465
Min TBW	0.466	0.108	0.021	0.455
Max TBW	0.936	0.009	0.058	0.426

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.6.4 Comparisons of Secondary Bioimpedance Parameters after Treatment. For Female BMI group 2.

Secondary Bioimpedance Parameters	Overall (P)	Age Grp(P)	No of treatment(p)	Diseases Grp(P)
Percentage of fat	0.006	0.920	0.929	0.328
Min fat	0.189	0.474	0.323	0.267
Max fat	0.019	0.160	0.474	0.748
Min lean	0.006	0.920	0.884	0.301
Max lean	0.006	0.730	0.861	0.332
Dry lean weight	0.019	0.543	0.806	0.333
Percentage of water	0.879	0.322	0.322	0.388
Min percentage of water	0.019	0.309	0.415	0.465
Max percentage of water	0.014	0.338	0.466	0.489
Water	0.670	0.670	0.715	0.343
Min water	0.582	0.881	0.534	0.186
Max water	0.467	0.464	0.937	0.174
Density	0.435	0.182	0.345	1.000
Nutrition	0.467	0.167	0.367	0.187
Third space value	0.487	0.156	0.342	0.398

Table 4.4.6.5 Comparisons of Main Bioimpedance Parameters before Treatment for male BMI group 2.

Main Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment (p)	Diseases Grp(p)
Impedance value at 5K	0.000	0.717	0.484	0.001
Impedance value at 50K	0.011	0.013	0.044	0.000
Impedance value at 100K	0.000	1.000	0.454	0.000
Impedance value at 200K	0.000	0.717	0.455	0.000
Reactance at 50K	0.014	0.686	0.448	0.000
Resistance at 50K	0.003	0.516	0.592	0.000
Phase Angle at 50 kHz	0.121	0.621	0.202	0.000
BMR	0.664	0.414	0.268	0.000
ICW	0.432	0.457	0.241	0.786
Normal ICW	0.782	0.704	0.373	0.099
ECW	0.000	0.733	0.214	0.730
Normal ECW	0.000	0.926	0.297	0.001
TBW	0.000	0.229	0.235	0.760
Min TBW	0.522	0.674	0.522	0.769
Max TBW	0.640	0.733	0.640	0.000

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.6.6 Comparisons of Secondary Bioimpedance Parameters before Treatment for Male BMI group 2.

Secondary Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment (p)	Diseases Grp(p)
Percentage of fat	0.002	0.014	0.002	0.061
Min fat	0.037	0.000	0.037	0.043
Max fat	0.015	0.002	0.015	0.046
Percentage o lean	0.002	0.014	0.002	0.060
Max lean	0.522	0.674	0.522	0.046
Min lean	0.640	0.733	0.640	0.963
Percentage of water	0.038	0.000	0.038	0.264
Min water	0.016	0.000	0.016	0.058
Max water	0.012	0.000	0.012	0.021
Dry lean weight	0.025	0.312	0.025	0.090
Density	0.006	0.013	0.006	0.021
Third space	0.043	0.000	0.002	0.038
Nutrition	0.342	0.090	0.342	0.042

Table 4.4.6.7 Comparisons of Main Bioimpedance Parameters after Treatment for Male BMI group 2.

Main Bioimpedance Parameters	Overall (p)	Age Grp(p)	No of treatment(p)	Diseases Grp(p)
Impedance value at 5K	0.000	0.717	0.328	0.929
Impedance value at 50K	0.011	0.013	0.267	0.323
Impedance value at 100K	0.000	1.000	0.748	0.474
Impedance value at 200K	0.000	0.717	0.301	0.884
Reactance at 50K	0.014	0.686	0.332	0.861
Resistance at 50K	0.003	0.516	0.333	0.806
Phase Angle at 50 kHz	0.121	0.621	0.388	0.322
BMR	0.664	0.414	0.465	0.415
ICW	0.432	0.457	0.489	0.466
Normal ICW	0.782	0.704	0.343	0.715
ECW	0.000	0.733	0.186	0.534
Normal ECW	0.000	0.926	0.174	0.937
TBW	0.000	0.229	1.000	0.345
Min TBW	0.001	0.345	0.005	0.245
Max TBW	0.004	0.001	0.004	0.287

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.6.8 Comparisons of Secondary Bioimpedance Parameters after Treatment for Male BMI group 2.

Secondary Bioimpedance Parameters	Overall (P)	Age Grp (P)	No of treatment (p)	Diseases Grp(P)
Percentage of fat	0.000	0.493	0.001	0.739
Min fat	0.409	1.000	0.367	0.083
Max fat	0.302	0.774	0.000	0.004
Min lean	0.332	0.493	0.001	0.739
Max lean	0.005	0.312	0.025	0.000
Dry lean weight	0.034	0.334	0.004	0.000
Percentage of water	0.000	0.327	0.148	0.035
Min percentage of water	0.000	0.235	0.760	0.041
Max percentage of water	0.000	0.248	0.794	0.009
Water	0.037	0.526	0.339	0.000
Min water	0.345	0.413	0.000	0.297
Max water	0.005	1.000	0.000	0.027
Density	0.009	0.219	0.000	0.021
Nutrition	0.016	0.000	0.016	0.045
Third space value	0.012	0.000	0.012	0.009

4.4.7 Comparison of Bioimpedance Parameters with Patient's BMI 3 Group.

In this section Comparison of Bioimpedance Parameters with Patient's BMI Group are shown here. For ease of reporting and analysis BMI group divided into five groups here.BMI less than 20 in group 1,BMI 20 to 25 in group 2,BMI 25 to 30 in group 3,BMI 30 to BMI greater than 35 in group 5. In this part BMI 3 mean BMI 25 to 30 are selected for analysis. Here actually BMI group 3 is selected for male and female and need to analyze for the factor age group, number of treatment and diseases group what's there significance. Table 4.4.7.1-4.4.7.8 analyzed about this comparison. Most of the cases significance is same but sometimes it will differ. For analysis the bioimpedance parameters are divided into two groups here. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. Independent T test and ANOVA test was used here for this analysis. The value of P should be less than 5% for significance.

Table 4.4.7.1 Comparisons of Main Bioimpedance Parameters before Treatment for Female BMI group 3.

Main Bioimpedance Parameters	Overall (p)	Age Grp(p)	No of treatment (p)	Diseases Grp(p)
Impedance value at 5KHz	0.007	0.003	0.350	0.075
Impedance value at 50KHz	0.051	0.359	0.754	0.255
Impedance value at 100KHz	0.000	0.071	0.099	1.000
Impedance value at 200KHz	0.008	0.003	0.350	0.075
Reactance at 50KHz	0.067	0.200	0.370	0.489
Resistance at 50K Hz	0.030	0.116	0.244	1.000
Phase Angle at 50 KHz	0.226	0.000	0.070	0.865
BMR	0.577	0.054	0.374	0.024
ICW	0.603	0.036	0.399	0.029
Normal ICW	0.222	0.306	0.830	0.083
ECW	0.002	0.000	0.267	0.613
Normal ECW	0.003	0.000	0.315	0.374
TBW	0.011	0.057	0.007	0.034
Min TBW	0.012	0.056	0.002	0.014
Max TBW	0.045	0.034	0.522	0.674
BCM	0.007	0.076	0.002	0.768

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.7.2 Comparisons of Secondary Bioimpedance Parameters before Treatment for Female BMI group 3.

Secondary Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment (p)	Diseases Grp(p)
Percentage of fat	0.002	.014	0.002	0.002
Min fat	0.037	.000	0.037	0.001
Max fat	0.015	.002	0.015	0.001
Percentage o lean	0.002	.014	0.002	0.001
Max lean	0.522	.674	0.522	0.001
Min lean	0.640	.733	0.640	0.001
Percentage of water	0.038	.000	0.038	0.001
Min water	0.016	.000	0.016	0.003
Max water	0.012	0.000	0.012	0.232
Dry lean weight	0.025	0.312	0.025	0.029
Density	0.006	0.013	0.006	0.206
Third space	0.002	0.000	0.002	0.003
Nutrition	0.342	0.090	0.342	0.239

Table 4.4.7.3. Comparisons of Main Bioimpedance Parameters after Treatment for Female BMI group 3.

Main Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment(p)	Diseases Grp(p)
Impedance value at 5KHz	0.001	0.919	0.007	0.003
Impedance value at 50KHz	0.000	0.231	0.051	0.359
Impedance value at 100KHz	0.000	0.747	0.000	0.071
Impedance value at 200KHz	0.000	0.853	0.008	0.003
Reactance at 50KHz	0.000	0.765	0.067	0.200
Resistance at 50KHz	0.758	0.874	0.030	0.116
Phase Angle at 50 KHz	0.004	0.466	0.226	0.000
BMR	0.000	0.419	0.577	0.054
ICW	0.535	0.388	0.603	0.036
Normal ICW	0.058	0.811	0.222	0.306
ECW	0.763	0.302	0.002	0.000
Normal ECW	0.000	0.540	0.003	0.000
TBW	0.664	0.414	0.011	0.057
Min TBW	0.451	0.457	0.874	0.030
Max TBW	0.890	0.567	0.466	0.226

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.7.4 Comparisons of Secondary Bioimpedance Parameters after Treatment. For Female BMI group 3.

Secondary Bioimpedance Parameters	Overall (P)	Age Grp(P)	No of treatment(p)	Diseases Grp(P)
Percentage of fat	0.328	0.929	0.006	0.110
Min fat	0.267	0.323	0.189	0.481
Max fat	0.748	0.474	0.019	0.143
Min lean	0.301	0.884	0.006	0.110
Max lean	0.332	0.861	0.006	0.232
Dry lean weight	0.333	0.806	0.019	0.163
Percentage of water	0.388	0.322	0.879	0.027
Min percentage of water	0.465	0.415	0.019	0.021
Max percentage of water	0.489	0.466	0.014	0.132
Water	0.343	0.715	0.670	0.004
Min water	0.186	0.534	0.582	0.013
Max water	0.174	0.937	0.467	0.053
Density	1.000	0.345	0.435	0.034
Nutrition	0.090	0.608	0.288	0.001
Third space value	0.021	0.430	0.369	0.019

Table 4.4.7.5 Comparisons of Main Bioimpedance Parameters before Treatment for Male BMI group 3.

Main Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment (p)	Diseases Grp(p)
Impedance value at 5KHz	0.001	0.000	0.088	0.884
Impedance value at 50KHz	0.000	0.000	0.034	0.861
Impedance value at 100KHz	0.000	0.000	0.002	0.806
Impedance value at 200KHz	0.000	0.001	0.013	0.322
Reactance at 50KHz	0.000	0.000	0.000	0.415
Resistance at 50KHz	0.000	0.174	0.011	0.466
Phase Angle at 50 KHz	0.000	0.839	0.168	0.715
BMR	0.000	0.023	0.063	0.534
ICW	0.786	0.016	0.323	0.937
Normal ICW	0.099	0.001	0.000	0.345
ECW	0.730	0.016	0.323	0.182
Normal ECW	0.001	0.003	0.000	0.678
TBW	0.760	0.041	0.323	0.600
Min TBW	0.769	0.009	0.052	0.890
Max TBW	0.000	0.018	0.000	0.678
BCM	0.034	0.004	0.003	0.002

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.7.6 Comparisons of Secondary Bioimpedance Parameters before Treatment for Male BMI group 3.

Secondary Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment (p)	Diseases Grp(p)
Percentage of fat	0.002	0.014	0.002	0.920
Min fat	0.037	0.000	0.037	0.474
Max fat	0.015	0.002	0.015	0.160
Percentage o lean	0.002	0.014	0.002	0.920
Max lean	0.522	0.674	0.522	0.730
Min lean	0.640	0.733	0.640	0.543
Percentage of water	0.038	0.000	0.038	0.322
Min water	0.016	0.000	0.016	0.309
Max water	0.012	0.000	0.012	0.338
Dry lean weight	0.025	0.312	0.025	0.670
Density	0.006	0.013	0.006	0.881
Third space	0.012	0.000	0.002	0.464
Nutrition	0.342	0.090	0.342	0.182

Table 4.4.7.7 Comparisons of Main Bioimpedance Parameters after Treatment for Male BMI group 3.

Main Bioimpedance Parameters	Overall (p)	Age Grp(p)	No of treatment(p)	Diseases Grp(p)
Impedance value at 5KHz	0.110	0.328	0.929	0.006
Impedance value at 50KHz	0.481	0.267	0.323	0.189
Impedance value at 100KHz	0.143	0.748	0.474	0.019
Impedance value at 200KHz	0.110	0.301	0.884	0.006
Reactance at 50KHz	0.232	0.332	0.861	0.006
Resistance at 50KHz	0.163	0.333	0.806	0.019
Phase Angle at 50 KHz	0.027	0.388	0.322	0.879
BMR	0.021	0.465	0.415	0.019
ICW	0.132	0.489	0.466	0.014
Normal ICW	0.004	0.343	0.715	0.670
ECW	0.013	0.186	0.534	0.582
Normal ECW	0.053	0.174	0.937	0.467
TBW	0.034	1.000	0.345	0.435
Min TBW	0.025	0.979	0.691	0.456
Max TBW	0.483	0.430	0.036	0.546

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.7.8 Comparisons of Secondary Bioimpedance Parameters after Treatment for Male BMI group 3.

Secondary Bioimpedance Parameters	Overall (P)	Age Grp (P)	No of treatment(p)	Diseases Grp(P)
Percentage of fat	0.328	0.015	0.372	0.021
Min fat	0.655	0.990	0.056	0.026
Max fat	0.890	0.865	0.069	0.003
Min lean	0.944	0.692	0.112	0.003
Max lean	0.710	0.990	0.061	0.002
Dry lean weight	0.272	0.331	0.930	0.672
Percentage of water	0.097	0.403	0.126	0.131
Min percentage of water	0.419	0.416	0.542	0.013
Max percentage of water	0.334	0.671	0.006	0.235
Water	0.491	0.626	0.250	0.077
Min water	0.334	0.671	0.015	0.261
Max water	0.526	0.380	0.388	0.016
Density	0.334	0.323	0.010	0.225
Nutrition	0.334	0.878	0.006	0.222
Third space value	0.489	0.405	0.510	0.014

4.4.8 Comparison of Bioimpedance Parameters with Patient's BMI 4 Group.

In this section Comparison of Bioimpedance Parameters with Patient's BMI Group are shown here. For ease of reporting and analysis BMI group divided into five groups here.BMI less than 20 in group 1,BMI 20 to 25 in group 2,BMI 25 to 30 in group 3,BMI 30 to BMI greater than 35 in group 5. In this part BMI 4 mean BMI 30 to 35 are selected for analysis. Here actually BMI group 4 is selected for male and female and need to analyze for the factor age group, number of treatment and diseases group what's there significance. Table 4.4.8.1-4.4.8.8 analyzed about this comparison. Most of the cases significance is same but sometimes it will differ. For analysis the bioimpedance parameters are divided into two groups here. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. Independent T test and ANOVA test was used here for this analysis. The value of P should be less than 5% for significance.

Table 4.4.8.1 Comparisons of Main Bioimpedance Parameters before Treatment for Female BMI group 4.

Main Bioimpedance Parameters	Overall (p)	Age Grp(p)	No of treatment (p)	Diseases Grp(p)
Impedance value at 5KHz	0.481	0.858	0.126	0.299
Impedance value at 50KHz	0.099	0.504	0.734	0.811
Impedance value at 100KHz	0.169	0.154	0.165	0.002
Impedance value at 200KHz	0.331	0.198	0.111	0.299
Reactance at 50KHz	0.111	0.119	1.000	0.193
Resistance at 50KHz	0.025	0.979	0.691	0.086
Phase Angle at 50 KHz	0.483	0.430	0.036	0.248
BMR	0.559	0.089	0.087	0.323
ICW	0.084	0.323	0.109	0.323
Normal ICW	0.525	0.361	0.446	0.268
ECW	0.085	0.323	0.004	0.767
Normal ECW	0.264	0.123	0.002	0.941
TBW	0.087	0.323	0.184	0.249
Min TBW	0.124	0.323	0.008	0.234
Max TBW	0.495	0.099	0.012	0.278
BCM	0.991	0.138	0.045	0.234

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.8.2 Comparisons of Secondary Bioimpedance Parameters before Treatment for Female BMI group 4.

Secondary Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment (p)	Diseases Grp(p)
Percentage of fat	0.002	0.014	0.002	0.328
Min fat	0.037	0.000	0.037	0.267
Max fat	0.015	0.002	0.015	0.748
Percentage o lean	0.002	0.014	0.002	0.301
Max lean	0.522	0.674	0.522	0.332
Min lean	0.640	0.733	0.640	0.333
Percentage of water	0.038	0.000	0.038	0.388
Min water	0.016	0.000	0.016	0.465
Max water	0.012	0.000	0.012	0.489
Dry lean weight	0.025	0.312	0.025	0.343
Density	0.006	0.013	0.006	0.186
Third space	0.001	0.000	0.002	0.174
Nutrition	0.342	0.090	0.342	1.000

Table 4.4.8.3. Comparisons of Main Bioimpedance Parameters after Treatment for Female BMI group 4.

Main Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment(p)	Diseases Grp(p)
Impedance value at 5KHz	0.919	0.001	0.717	0.686
Impedance value at 50KHz	0.231	0.000	0.013	0.516
Impedance value at 100KHz	0.747	0.000	1.000	0.621
Impedance value at 200KHz	0.853	0.000	0.717	0.414
Reactance at 50KHz	0.765	0.000	0.686	0.457
Resistance at 50KHz	0.874	0.758	0.516	0.704
Phase Angle at 50 kHz	0.466	0.004	0.621	0.733
BMR	0.419	0.000	0.414	0.926
ICW	0.388	0.535	0.457	0.229
Normal ICW	0.811	0.058	0.704	0.121
ECW	0.302	0.763	0.733	0.664
Normal ECW	0.540	0.000	0.926	0.432
TBW	0.414	0.664	0.229	0.782
Min TBW	0.457	0.451	0.717	0.414
Max TBW	0.428	0.000	0.686	0.457

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.8.4 Comparisons of Secondary Bioimpedance Parameters after Treatment. For Female BMI group 4.

Secondary Bioimpedance Parameters	Overall (P)	Age Grp(P)	No of treatment(p)	Diseases Grp(P)
Percentage of fat	0.001	0.000	0.739	0.000
Min fat	0.000	0.000	0.083	0.003
Max fat	0.000	0.000	0.004	0.000
Min lean	0.000	0.001	0.739	0.000
Max lean	0.000	0.000	0.000	0.189
Dry lean weight	0.000	0.174	0.000	0.014
Percentage of water	0.000	0.839	0.035	0.000
Min percentage of water	0.000	0.023	0.041	0.323
Max percentage of water	0.786	0.016	0.009	0.172
Water	0.099	0.001	0.000	0.000
Min water	0.730	0.016	0.297	0.019
Max water	0.001	0.003	0.027	0.031
Density	0.760	0.041	0.021	0.000
Nutrition	0.769	0.009	0.717	0.686
Third space value	0.000	0.018	0.013	0.516

Table 4.4.8.5 Comparisons of Main Bioimpedance Parameters before Treatment for male BMI group 4.

Main Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment (p)	Diseases Grp(p)
Impedance value at 5KHz	0.064	0.003	0.007	0.003
Impedance value at 50KHz	0.087	0.960	0.051	0.359
Impedance value at 100KHz	0.014	0.929	0.000	0.071
Impedance value at 200KHz	0.016	0.816	0.008	0.003
Reactance at 50KHz	0.009	0.951	0.067	0.200
Resistance at 50KHz	0.489	0.666	0.030	0.116
Phase Angle at 50 kHz	0.263	0.870	0.226	0.000
BMR	0.055	0.264	0.577	0.054
ICW	0.369	0.024	0.603	0.036
Normal ICW	0.369	0.012	0.222	0.306
ECW	0.348	0.024	0.002	0.000
Normal ECW	0.092	0.283	0.003	0.000
TBW	0.374	0.024	0.011	0.057
Min TBW	0.399	0.330	0.003	0.007
Max TBW	0.054	0.648	0.960	0.051
BCM	0.446	0.960	0.051	0.003

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.8.6 Comparisons of Secondary Bioimpedance Parameters before Treatment for Male BMI group 4.

Secondary Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment (p)	Diseases Grp(p)
Percentage of fat	0.002	0.014	0.002	0.001
Min fat	0.037	0.000	0.037	0.003
Max fat	0.015	0.002	0.015	0.006
Percentage o lean	0.002	0.014	0.002	0.011
Max lean	0.522	0.674	0.522	0.005
Min lean	0.640	0.733	0.640	0.000
Percentage of water	0.038	0.000	0.038	0.000
Min water	0.016	0.000	0.016	0.301
Max water	0.012	0.000	0.012	0.019
Dry lean weight	0.025	0.312	0.025	0.001
Density	0.006	0.013	0.006	0.019
Third space	0.007	0.000	0.002	0.003
Nutrition	0.342	0.090	0.342	0.019

Table 4.4.8.7 Comparisons of Main Bioimpedance Parameters after Treatment for Male BMI group 4.

Main Bioimpedance Parameters	Overall (p)	Age Grp(p)	No of treatment(p)	Diseases Grp(p)
Impedance value at 5KHz	0.075	0.103	0.064	0.007
Impedance value at 50KHz	0.255	0.017	0.087	0.051
Impedance value at 100KHz	1.000	0.022	0.014	0.000
Impedance value at 200KHz	0.075	0.045	0.016	0.008
Reactance at 50KHz	0.489	0.018	0.009	0.067
Resistance at 50KHz	1.000	0.630	0.489	0.030
Phase Angle at 50KHz	0.865	0.216	0.263	0.226
BMR	0.024	0.096	0.055	0.577
ICW	0.029	0.033	0.369	0.603
Normal ICW	0.083	0.498	0.369	0.222
ECW	0.613	0.034	0.348	0.002
Normal ECW	0.374	0.018	0.092	0.003
TBW	0.034	0.054	0.374	0.011
Min TBW	0.056	0.043	0.399	0.293
Max TBW	0.009	0.080	0.054	0.446

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.8.8 Comparisons of Secondary Bioimpedance Parameters after Treatment for Male BMI group 4.

Secondary Bioimpedance Parameters	Overall (P)	Age Grp (P)	No of treatment(p)	Diseases Grp(P)
Percentage of fat	0.075	0.003	0.001	0.533
Min fat	0.255	0.359	0.003	0.417
Max fat	1.000	0.071	0.006	0.574
Min lean	0.075	0.003	0.011	0.567
Max lean	0.489	0.200	0.005	0.436
Dry lean weight	1.000	0.116	0.000	0.369
Percentage of water	0.865	0.000	0.000	0.306
Min percentage of water	0.024	0.054	0.301	0.967
Max percentage of water	0.029	0.036	0.019	0.406
Water	0.083	0.306	0.001	0.288
Min water	0.613	0.000	0.019	0.369
Max water	0.374	0.000	0.003	0.756
Density	0.034	0.057	0.019	0.415
Nutrition	0.622	0.090	0.108	0.466
Third space value	0.846	0.004	0.009	0.936

4.4.9 Comparison of Bioimpedance Parameters with Patient's BMI 5 Group.

In this section Comparison of Bioimpedance Parameters with Patient's BMI Group are shown here. For ease of reporting and analysis BMI group divided into five groups here.BMI less than 20 in group 1,BMI 20 to 25 in group 2,BMI 25 to 30 in group 3,BMI 30 to BMI greater than 35 in group 5. In this part BMI 5 mean BMI more than 35 are selected for analysis. Here actually BMI group 5 is selected for male and female and need to analyze for the factor age group, number of treatment and diseases group what's there significance. Table 4.4.9.1-4.4.9.8 analyzed about this comparison. Most of the cases significance is same but sometimes it will differ. For analysis the bioimpedance parameters are divided into two groups here. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. Independent T test and ANOVA test was used here for this analysis. The value of P should be less than 5% for significance.

Table 4.4.9.1 Comparisons of Main Bioimpedance Parameters before Treatment for Female BMI group 5.

Main Bioimpedance Parameters	Overall (p)	Age Grp(p)	No of treatment (p)	Diseases Grp(p)
Impedance value at 5KHz	0.006	0.920	0.328	0.929
Impedance value at 50KHz	0.189	0.474	0.267	0.323
Impedance value at 100KHz	0.019	0.160	0.748	0.474
Impedance value at 200KHz	0.006	0.920	0.301	0.884
Reactance at 50KHz	0.006	0.730	0.332	0.861
Resistance at 50KHz	0.019	0.543	0.333	0.806
Phase Angle at 50 KHz	0.879	0.322	0.388	0.322
BMR	0.019	0.309	0.465	0.415
ICW	0.014	0.338	0.489	0.466
Normal ICW	0.670	0.670	0.343	0.715
ECW	0.582	0.881	0.186	0.534
Normal ECW	0.467	0.464	0.174	0.937
TBW	0.435	0.182	1.000	0.345
Min TBW	0.267	0.323	0.189	0.474
Max TBW	0.748	0.474	0.019	0.160
BCM	0.301	0.884	0.006	0.920

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.9.2 Comparisons of Secondary Bioimpedance Parameters before Treatment for Female BMI group 5.

Secondary Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment (p)	Diseases Grp(p)
Percentage of fat	0.002	0.014	0.002	0.002
Min fat	0.037	0.000	0.037	0.001
Max fat	0.015	0.002	0.015	0.001
Percentage o lean	0.002	0.014	0.002	0.001
Max lean	0.522	0.674	0.522	0.001
Min lean	0.640	0.733	0.640	0.001
Percentage of water	0.038	0.000	0.038	0.001
Min water	0.016	0.000	0.016	0.003
Max water	0.012	0.000	0.012	0.232
Dry lean weight	0.025	0.312	0.025	0.029
Density	0.006	0.013	0.006	0.206
Third space	0.002	0.000	0.002	0.003
Nutrition	0.342	0.090	0.342	0.239

Table 4.4.9.3. Comparisons of Main Bioimpedance Parameters after Treatment for Female BMI group 5.

Main Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment(p)	Diseases Grp(p)
Impedance value at 5KHz	0.110	0.350	0.075	0.103
Impedance value at 50KHz	0.481	0.754	0.255	0.017
Impedance value at 100KHz	0.143	0.099	1.000	0.022
Impedance value at 200KHz	0.110	0.350	0.075	0.045
Reactance at 50KHz	0.232	0.370	0.489	0.018
Resistance at 50KHz	0.163	0.244	1.000	0.630
Phase Angle at 50KHz	0.027	0.070	0.865	0.216
BMR	0.021	0.374	0.024	0.096
ICW	0.132	0.399	0.029	0.033
Normal ICW	0.004	0.830	0.083	0.498
ECW	0.013	0.267	0.613	0.034
Normal ECW	0.053	0.315	0.374	0.018
TBW	0.034	0.007	0.034	0.054
Min TBW	0.045	0.004	0.045	0.043
Max TBW	0.056	0.012	0.067	0.080
BCM	0.005	0.056	0.045	0.047

Table 4.4.9.4 Comparisons of Secondary Bioimpedance Parameters after Treatment. For Female BMI group 5.

Secondary Bioimpedance Parameters	Overall (P)	Age Grp(P)	No of treatment (p)	Diseases Grp (P)
Percentage of fat	0.064	0.003	0.001	0.919
Min fat	0.087	0.960	0.000	0.231
Max fat	0.014	0.929	0.000	0.747
Min lean	0.016	0.816	0.000	0.853
Max lean	0.009	0.951	0.000	0.765
Dry lean weight	0.489	0.666	0.758	0.874
Percentage of water	0.263	0.870	0.004	0.466
Min percentage of water	0.055	0.264	0.000	0.419
Max percentage of water	0.369	0.024	0.535	0.388
Water	0.369	0.012	0.058	0.811
Min water	0.348	0.024	0.763	0.302
Max water	0.092	0.283	0.000	0.540
Density	0.374	0.024	0.664	0.414
Nutrition	0.399	0.330	0.451	0.457
Third space value	0.054	0.648	0.476	0.453

Table 4.4.9.5 Comparisons of Main Bioimpedance Parameters before Treatment for male BMI group 5.

Main Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment (p)	Diseases Grp(p)
Impedance value at 5KHz	0.717	0.001	0.000	0.000
Impedance value at 50KHz	0.013	0.000	0.000	0.000
Impedance value at 100KHz	1.000	0.000	0.000	0.002
Impedance value at 200KHz	0.717	0.000	0.001	0.013
Reactance at 50KHz	0.686	0.000	0.000	0.000
Resistance at 50KHz	0.516	0.000	0.174	0.011
Phase Angle at 50 kHz	0.621	0.000	0.839	0.168
BMR	0.414	0.000	0.023	0.063
ICW	0.457	0.786	0.016	0.323
Normal ICW	0.704	0.099	0.001	0.000
ECW	0.733	0.730	0.016	0.323
Normal ECW	0.926	0.001	0.003	0.000
TBW	0.739	0.332	0.041	0.323
Min TBW	0.000	0.005	0.009	0.052
Max TBW	0.000	0.034	0.018	0.000
BCM	0.002	0.024	0.001	0.002

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.9.6 Comparisons of Secondary Bioimpedance Parameters before Treatment for Male BMI group 5.

Secondary Bioimpedance Parameters	Overall (p)	Age Grp (p)	No of treatment (p)	Diseases Grp(p)
Percentage of fat	0.002	0.014	0.002	0.045
Min fat	0.037	0.000	0.037	0.002
Max fat	0.015	0.002	0.015	0.050
Percentage o lean	0.002	0.014	0.002	0.007
Max lean	0.522	0.674	0.522	0.000
Min lean	0.640	0.733	0.640	0.012
Percentage of water	0.038	0.000	0.038	0.056
Min water	0.016	0.000	0.016	0.000
Max water	0.012	0.000	0.012	0.000
Dry lean weight	0.025	0.312	0.025	0.001
Density	0.006	0.013	0.006	0.000
Third space	0.002	0.000	0.002	0.174
Nutrition	0.342	0.090	0.342	0.006

Table 4.4.9.7 Comparisons of Main Bioimpedance Parameters after Treatment for Male BMI group 5.

Main Bioimpedance Parameters	Overall (p)	Age Grp(p)	No of treatment(p)	Diseases Grp(p)
Impedance value at 5KHz	0.493	0.001	0.739	0.000
Impedance value at 50KHz	1.000	0.367	0.083	0.409
Impedance value at 100KHz	0.774	0.000	0.004	0.302
Impedance value at 200KHz	0.493	0.001	0.739	0.332
Reactance at 50KHz	0.312	0.025	0.000	0.005
Resistance at 50KHz	0.334	0.004	0.000	0.034
Phase Angle at 50 kHz	0.327	0.148	0.035	0.000
BMR	0.235	0.760	0.041	0.000
ICW	0.248	0.794	0.009	0.000
Normal ICW	0.526	0.339	0.000	0.037
ECW	0.413	0.000	0.297	0.345
Normal ECW	1.000	0.000	0.027	0.005
TBW	0.219	0.000	0.021	0.009
Min TBW	0.106	0.001	0.004	0.012
Max TBW	0.013	0.000	0.003	0.004

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.9.8 Comparisons of Secondary Bioimpedance Parameters after Treatment for Male BMI group 5.

Secondary Bioimpedance Parameters	Overall (P)	Age Grp (P)	No of treatment(p)	Diseases Grp(P)
Percentage of fat	0.064	0.003	0.493	0.001
Min fat	0.087	0.960	1.000	0.367
Max fat	0.014	0.929	0.774	0.000
Min lean	0.016	0.816	0.493	0.001
Max lean	0.009	0.951	0.312	0.025
Dry lean weight	0.489	0.666	0.334	0.004
Percentage of water	0.263	0.870	0.327	0.148
Min percentage of water	0.055	0.264	0.235	0.004
Max percentage of water	0.369	0.024	0.248	0.000
Water	0.369	0.012	0.526	0.339
Min water	0.348	0.024	0.413	0.000
Max water	0.092	0.283	1.000	0.000
Density	0.374	0.024	0.219	0.760
Nutrition	0.399	0.330	0.007	0.794
Third space value	0.054	0.648	0.054	0.002

4.5 Interaction of Bioimpedance Parameters with Demographic Variables.

In this section the interaction of Bioimpedance Parameters with demographic variables such as gender, occupation, diseases, number of treatment are shown. The significance value of P should be less than 5%.

4.5.2 Interaction of Bioimpedance Parameters with Patient's Age Group.

According to age group the interaction between gender, BMI group and diseases groups for the main and secondary bioimpedance parameters before and after test are shown here. In this section mainly the interaction between age group, BMI group and diseases group according to female main bioimpedance parameters are shown. Most of the case the value of P is significant and some cases it's not. For significance the value of P should be $P<0.05$.

Table 4.5.2.1 Interaction of Main Bioimpedance Parameters before Treatment for Age Group1.

Main Bioimpedance Parameters	Gender (p)	BMI Grp (p)	Disease (p)
Impedance value at 5KHz	0.003	0.053	0.000
Impedance value at 50KHz	0.008	0.118	0.000
Impedance value at 100KHz	0.011	0.166	0.000
Impedance value at 200KHz	0.010	0.189	0.000
Reactance at 50KHz	0.008	0.124	0.000
Resistance at 50KHz	0.026	0.009	0.000
Phase Angle at 50 kHz	0.016	0.919	0.052
BMR	0.257	0.209	0.254
ICW	0.086	0.055	0.187
Normal ICW	0.612	0.121	0.084
ECW	0.111	0.105	0.192
Normal ECW	0.536	0.242	0.057
TBW	0.130	0.034	0.241
Min TBW	0.081	0.039	0.152
Max TBW	0.263	0.201	0.258
BCM	0.345	0.234	0.234

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table4.5.2.2 Interaction of Main Bioimpedance Parameters after Treatment for Age Group 1.

Main Bioimpedance Parameters	Gender (p)	BMI Grp (p)	Disease (p)
Impedance value at 5KHz	0.002	0.365	0.046
Impedance value at 50KHz	0.056	0.780	0.143
Impedance value at 100KHz	0.078	0.994	0.160
Impedance value at 200K Hz	0.098	0.855	0.150
Reactance at 50KHz	0.032	0.809	0.151
Resistance at 50KHz	0.122	0.000	0.437
Phase Angle at 50 kHz	0.087	0.629	0.011
BMR	0.088	0.414	0.273
ICW	0.234	0.073	0.299
Normal ICW	0.012	0.453	0.097
ECW	0.034	0.111	0.420
Normal ECW	0.004	0.540	0.136
TBW	0.003	0.046	0.373
Min TBW	0.870	0.077	0.229
Max TBW	0.056	0.409	0.281
BCM	0.234	0.423	0.567

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.2.3 Comparisons of Secondary Bioimpedance Parameters before Treatment for Age Group 1.

Secondary Bioimpedance Parameters	Gender (p)	BMI Grp (p)	Disease (p)
Percentage of fat	0.078	0.560	0.001
Min fat	0.890	0.450	0.670
Max fat	0.767	0.670	0.000
Percentage of lean	0.036	0.067	0.001
Min lean	0.080	0.030	0.100
Max lean	0.082	0.890	0.095
Percentage of water	0.359	0.090	0.550
Min water	0.190	0.000	0.241
Max water	0.031	0.080	0.152
Dry lean weight	0.094	0.020	0.019
Density	0.946	0.070	0.890
Third space value	0.056	0.670	0.000
Nutrition	0.043	0.000	0.895

Table 4.5.2.4 Interactions of Secondary Bioimpedance Parameters after Treatment for Age Group 1.

Secondary Bioimpedance Parameters	Gender (p)	BMI Grp (p)	Disease (p)
Percentage of fat	0.056	0.900	0.001
Min fat	0.358	0.005	0.000
Max fat	0.727	0.056	0.000
Percentage of lean	0.056	0.087	0.001
Min lean	0.040	0.004	0.100
Max lean	0.042	0.000	0.095
Percentage of water	0.319	0.045	0.000
Min water	0.130	0.050	0.241
Max water	0.081	0.075	0.152
Dry lean weight	0.004	0.056	0.019
Density	0.046	0.098	0.000
Third space value	0.156	0.090	0.000
Nutrition	0.093	0.000	0.275

Table 4.5.2.5 Interaction of Main Bioimpedance Parameters before Treatment for Age Group 2.

Main Bioimpedance Parameters	Gender (p)	BMI Grp (p)	Disease (p)
Impedance value at 5KHz	0.310	0.000	0.900
Impedance value at 50KHz	0.342	0.089	0.080
Impedance value at 100KHz	0.287	0.001	0.078
Impedance value at 200KHz	0.259	0.008	0.560
Reactance at 50KHz	0.337	0.097	0.890
Resistance at 50KHz	0.223	0.780	0.002
Phase Angle at 50 kHz	0.295	0.980	0.005
BMR	0.326	0.000	0.890
ICW	0.343	0.560	0.000
Normal ICW	0.499	0.930	0.900
ECW	0.335	0.340	0.870
Normal ECW	0.518	0.050	0.000
TBW	0.348	0.002	0.700
Min TBW	0.309	0.003	0.050
Max TBW	0.331	0.090	0.760
BCM	0.345	0.456	0.456

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.2.6 Interactions of Secondary Bioimpedance Parameters before Treatment for Age Group 2.

Secondary Bioimpedance Parameters	Gender (p)	BMI Grp (p)	Disease (p)
Percentage of fat	0.636	0.098	0.005
Min fat	1.000	0.067	0.056
Max fat	0.632	0.000	0.000
Min lean	0.630	0.009	0.090
Max lean	0.452	0.067	0.000
Dry lean weight	0.558	0.008	0.067
Percentage of water	0.296	0.078	0.000
Min water	0.348	0.000	0.089
Max water	0.307	0.089	0.078
Dry lean weight	0.458	0.086	0.000
Density	0.371	0.045	0.000
Nutrition	0.139	0.002	0.009
Third space value	0.059	0.001	0.008

Table 4.5.2.7 Interaction of Main Bioimpedance Parameters after Treatment for Age Group 2.

Main Bioimpedance Parameters	Gender (p)	BMI Grp (p)	Disease (p)
Impedance value at 5KHz	0.250	0.000	0.000
Impedance value at 50KHz	0.219	0.009	0.001
Impedance value at 100KHz	0.206	0.000	0.000
Impedance value at 200KHz	0.191	0.000	0.000
Reactance at 50KHz	0.216	0.070	0.000
Resistance at 50KHz	0.478	0.008	0.006
Phase Angle at 50 kHz	0.219	0.000	0.000
BMR	0.232	0.000	0.000
ICW	0.424	0.000	0.000
Normal ICW	0.432	0.000	0.000
ECW	0.414	0.000	0.000
Normal ECW	0.318	0.032	0.000
TBW	0.415	0.021	0.000
Min TBW	0.382	0.003	0.003
Max TBW	0.224	0.007	0.002
BCM	0.225	0.678	0.345

Note: BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table4.5.2.8 Interactions of Secondary Bioimpedance Parameters after Treatment for Age 2.

Secondary Bioimpedance Parameters	Gender (p)	BMI Grp (p)	Disease (p)
Percentage of fat	0.250	0.000	0.090
Min fat	0.219	0.009	0.001
Max fat	0.206	0.000	0.670
Min lean	0.191	0.000	0.000
Max lean	0.216	0.070	0.890
Dry lean weight	0.478	0.008	0.006
Percentage of water	0.219	0.000	0.900
Min percentage of water	0.232	0.000	0.000
Max percentage of water	0.424	0.000	0.450
Water	0.432	0.000	0.900
Min water	0.414	0.000	0.000
Max water	0.318	0.032	0.980
Density	0.415	0.021	0.000
Nutrition	0.382	0.003	0.003
Third space value	0.224	0.007	0.002

Table 4.5.2.9 Interaction of Main Bioimpedance Parameters before Treatment for Age Group 3.

Main Bioimpedance Parameters	Gender (p)	BMI Grp (p)	Disease (p)
Impedance value at 5KHz	0.561	0.001	0.000
Impedance value at 50KHz	0.298	0.001	0.000
Impedance value at 100KHz	0.451	0.004	0.000
Impedance value at 200KHz	0.510	0.002	0.000
Reactance at 50KHz	0.497	0.003	0.000
Resistance at 50KHz	0.978	0.000	0.000
Phase Angle at 50 KHz	0.697	0.057	0.000
BMR	0.038	0.000	0.000
ICW	0.001	0.000	0.000
Normal ICW	0.033	0.000	0.000
ECW	0.003	0.000	0.000
Normal ECW	0.239	0.000	0.000
TBW	0.001	0.000	0.000
Min TBW	0.001	0.000	0.000
Max TBW	0.039	0.000	0.000
BCM	0.345	0.234	0.645

Note: BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.2.10 Comparisons of Secondary Bioimpedance Parameters before Treatment for Age Group 3.

Secondary Bioimpedance Parameters	Gender (p)	BMI Grp (p)	Disease (p)
Percentage of fat	0.005	0.000	0.000
Min fat	0.030	0.000	0.008
Max fat	0.002	0.000	0.000
Min lean	0.005	0.000	0.006
Max lean	0.704	0.093	0.000
Dry lean weight	0.458	0.014	0.007
Percentage of water	0.001	0.000	0.000
Min water	0.001	0.000	0.000
Max water	0.001	0.000	0.006
Dry lean weight	0.700	0.986	0.000
Density	0.010	0.000	0.000
Nutrition	0.001	0.000	0.078
Third space value	0.083	0.000	0.000

Table 4.5.2.11 Interaction of Main Bioimpedance Parameters after Treatment for Age Group 3.

Main Bioimpedance Parameters	Gender (p)	BMI Grp (p)	Disease (p)
Impedance value at 5KHz	0.906	0.004	0.000
Impedance value at 50KHz	0.833	0.008	0.002
Impedance value at 100KHz	0.881	0.008	0.006
Impedance value at 200KHz	0.837	0.004	0.000
Reactance at 50KHz	0.817	0.007	0.000
Resistance at 50KHz	0.659	0.084	0.000
Phase Angle at 50 kHz	0.180	0.015	0.000
BMR	0.011	0.000	0.000
ICW	0.001	0.000	0.000
Normal ICW	0.012	0.000	0.000
ECW	0.003	0.000	0.078
Normal ECW	0.074	0.000	0.000
TBW	0.001	0.000	0.000
Min TBW	0.001	0.000	0.089
Max TBW	0.011	0.000	0.009
BCM	0.456	0.567	0.456

Note: BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.2.12 Interactions of Secondary Bioimpedance Parameters after Treatment for Age Group 3.

Secondary Bioimpedance Parameters	Gender (p)	BMI Grp (p)	Disease (p)
Percentage of fat	0.289	0.800	0.0780
Min fat	0.269	0.009	0.001
Max fat	0.256	0.880	0.890
Min lean	0.991	0.700	0.000
Max lean	0.916	0.070	0.890
Dry lean weight	0.678	0.908	0.006
Percentage of water	0.219	0.600	0.900
Min percentage of water	0.232	0.000	0.000
Max percentage of water	0.424	0.000	0.450
Water	0.432	0.890	0.900
Min water	0.414	0.000	0.000
Max water	0.718	0.032	0.980
Density	0.415	0.021	0.000
Nutrition	0.382	0.003	0.003
Third space value	0.524	0.897	0.004

Table 4.5.2.13 Interaction of Main Bioimpedance Parameters before Treatment for Age Group 4.

Main Bioimpedance Parameters	Gender (p)	BMI Grp (p)	Disease (p)
Impedance value at 5KHz	0.701	0.000	0.090
Impedance value at 50KHz	0.655	0.009	0.001
Impedance value at 100KHz	0.553	0.000	0.670
Impedance value at 200KHz	0.479	0.000	0.000
Reactance at 50KHz	0.641	0.070	0.890
Resistance at 50KHz	0.113	0.008	0.006
Phase Angle at 50 KHz	0.471	0.000	0.900
BMR	0.302	0.000	0.000
ICW	0.342	0.000	0.450
Normal ICW	0.515	0.000	0.900
ECW	0.305	0.000	0.000
Normal ECW	0.479	0.032	0.980
TBW	0.360	0.021	0.000
Min TBW	0.327	0.003	0.003
Max TBW	0.301	0.007	0.002
BCM	0.324	0.456	0.645

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.2.14 Interactions of Secondary Bioimpedance Parameters before Treatment for Age Group 4.

Secondary Bioimpedance Parameters	Gender (p)	BMI Grp (p)	Disease (p)
Percentage of fat	0.949	0.000	0.000
Min fat	0.689	0.000	0.000
Max fat	0.783	0.000	0.090
Min lean	0.949	0.000	0.000
Max lean	0.352	0.014	0.078
Dry lean weight	0.366	0.005	0.005
Percentage of water	0.991	0.000	0.000
Min water	0.360	0.097	0.000
Max water	0.327	0.000	0.067
Dry lean weight	0.774	0.004	0.000
Density	0.841	0.000	0.000
Nutrition	0.305	0.002	0.089
Third space value	0.168	0.000	0.000

Table 4.5.2.15 Interaction of Main Bioimpedance Parameters after Treatment for Age Group 4.

Main Bioimpedance Parameters	Gender (p)	BMI Grp (p)	Disease (p)
Impedance value at 5KHz	0.774	0.000	0.000
Impedance value at 50KHz	0.610	0.890	0.000
Impedance value at 100KHz	0.547	0.000	0.008
Impedance value at 200KHz	0.469	0.010	0.000
Reactance at 50KHz	0.592	0.093	0.001
Resistance at 50K Hz	0.254	0.014	0.000
Phase Angle at 50 kHz	0.472	0.000	0.012
Basal metabolic rate	0.303	0.000	0.000
Intracellular water	0.348	0.000	0.089
Extra-cellular water	0.510	0.986	0.000
Normal extra cellular water	0.309	0.070	0.073
Total body water volume	0.457	0.000	0.000
Min total body water volume	0.360	0.090	0.089
Max total body water volume	0.335	0.000	0.009

Table 4.5.2.16 Interactions of Secondary Bioimpedance Parameters after Treatment for Age Group 4.

Secondary Bioimpedance Parameters	Gender (p)	BMI Grp (p)	Disease (p)
Percentage of fat	0.288	0.700	0.080
Min fat	0.276	0.009	0.001
Max fat	0.756	0.880	0.890
Min lean	0.881	0.900	0.000
Max lean	0.416	0.070	0.890
Dry lean weight	0.978	0.908	0.006
Percentage of water	0.299	0.600	0.900
Min percentage of water	0.222	0.000	0.000
Max percentage of water	0.494	0.000	0.450
Water	0.432	0.890	0.900
Min water	0.414	0.000	0.000
Max water	0.718	0.032	0.780
Density	0.415	0.021	0.000
Nutrition	0.382	0.003	0.003
Third space value	0.5784	0.787	0.804

4.5.3 Interaction of Bioimpedance Parameters with Age Patient BMI.

According to BMI group the interaction between gender, BMI group and diseases groups for the main and secondary bioimpedance parameters before and after test are shown here. The value of P is valid when $p < 0.05$.

Table 4.5.3.1 Interaction of Main Bioimpedance Parameters before Treatment for Male BMI group 1.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Diseases (p)
Impedance value at 5KHz	0.907	0.001	0.000
Impedance value at 50KHz	0.830	0.000	0.000
Impedance value at 100KHz	0.886	0.005	0.000
Impedance value at 200KHz	0.867	0.003	0.000
Reactance at 50KHz	0.827	0.002	0.007
Resistance at 50KHz	0.669	0.004	0.000
Phase Angle at 50 kHz	0.170	0.340	0.003
BMR	0.021	0.570	0.000
ICW	0.002	0.378	0.000
Normal ICW	0.032	0.050	0.008
ECW	0.005	0.970	0.000
Normal ECW	0.078	0.076	0.000
TBW	0.002	0.645	0.000
Min TBW	0.002	0.026	0.000
Max TBW	0.015	0.037	0.000
BCM	0.004	0.363	0.006

Note: BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.2 Interactions of Secondary Bioimpedance Parameters before Treatment for Male BMI group 1.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.004	0.004	0.001
Min fat	0.040	0.048	0.000
Max fat	0.003	0.002	0.000
Percentage of lean	0.007	0.000	0.007
Min lean	0.705	0.000	0.000
Max lean	0.460	0.000	0.000
Percentage of water	0.007	0.339	0.000
Min water	0.009	0.047	0.000
Max water	0.007	0.015	0.009
Dry lean weight	0.500	0.009	0.000
Density	0.015	0.006	0.000
Third space value	0.002	0.905	0.007
Nutrition	0.080	0.009	0.000

Table 4.5.3.3 Interaction of Main Bioimpedance Parameters after Treatment for Male BMI group 1.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Impedance value at 5KHz	0.709	0.001	0.005
Impedance value at 50KHz	0.730	0.008	0.004
Impedance value at 100KHz	0.985	0.006	0.000
Impedance value at 200KHz	0.893	0.002	0.002
Reactance at 50KHz	0.845	0.005	0.000
Resistance at 50KHz	0.632	0.003	0.000
Phase Angle at 50 kHz	0.150	0.789	0.003
BMR	0.032	0.678	0.000
ICW	0.005	0.278	0.000
Normal ICW	0.070	0.070	0.007
ECW	0.009	0.978	0.000
Normal ECW	0.089	0.070	0.000
TBW	0.003	0.900	0.009
Min TBW	0.004	0.040	0.000
Max TBW	0.017	0.050	0.000
BCM	0.345	0.567	0.732

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.4 Interactions of Secondary Bioimpedance Parameters after Treatment for Male BMI group 1.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.005	0.004	0.001
Min fat	0.004	0.003	0.004
Max fat	0.018	0.002	0.000
Percentage of lean	0.014	0.004	0.002
Min lean	0.003	0.001	0.000
Max lean	0.025	0.289	0.000
Percentage of water	0.013	0.856	0.000
Min water	0.260	0.245	0.009
Max water	0.079	0.356	0.000
Dry lean weight	0.718	0.017	0.008
Density	0.134	0.897	0.000
Third space value	0.586	0.017	0.000
Nutrition	0.160	0.267	0.000

Table 4.5.3.5 Interaction of Main Bioimpedance Parameters before Treatment for Female BMI group 1.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Diseases (p)
Impedance value at 5KHz	0.956	0.006	0.046
Impedance value at 50KHz	0.560	0.000	0.143
Impedance value at 100KHz	0.566	0.005	0.160
Impedance value at 200KHz	0.867	0.006	0.150
Reactance at 50KHz	0.997	0.002	0.151
Resistance at 50KHz	0.879	0.004	0.437
Phase Angle at 50 kHz	0.140	0.890	0.453
BMR	0.051	0.570	0.011
ICW	0.002	0.378	0.273
Normal ICW	0.032	0.050	0.299
ECW	0.005	0.560	0.097
Normal ECW	0.098	0.076	0.420
TBW	0.002	0.897	0.136
Min TBW	0.003	0.076	0.373
Max TBW	0.015	0.037	0.229
BCM	0.004	0.363	0.006

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.6 Interactions of Secondary Bioimpedance Parameters before Treatment for Female BMI group 1.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.077	0.009	0.001
Min fat	0.070	0.049	0.000
Max fat	0.006	0.002	0.000
Percentage of lean	0.087	0.000	0.007
Min lean	0.305	0.000	0.000
Max lean	0.986	0.000	0.000
Percentage of water	0.004	0.339	0.000
Min water	0.879	0.046	0.000
Max water	0.007	0.015	0.009
Dry lean weight	0.500	0.009	0.000
Density	0.015	0.006	0.000
Third space value	0.000	0.906	0.007
Nutrition	0.080	0.009	0.000

Table 4.5.3.7 Interaction of Main Bioimpedance Parameters after Treatment for Female BMI group 1.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Impedance value at 5KHz	0.709	0.001	0.005
Impedance value at 50KHz	0.730	0.008	0.004
Impedance value at 100KHz	0.985	0.006	0.000
Impedance value at 200KHz	0.893	0.002	0.002
Reactance at 50KHz	0.845	0.005	0.000
Resistance at 50KHz	0.632	0.003	0.000
Phase Angle at 50 kHz	0.150	0.789	0.003
BMR	0.032	0.678	0.000
ICW	0.005	0.278	0.000
Normal ICW	0.070	0.070	0.007
ECW	0.009	0.978	0.000
Normal ECW	0.089	0.070	0.000
TBW	0.003	0.900	0.009
Min TBW	0.004	0.040	0.000
Max TBW	0.017	0.050	0.000
BCM	0.004	0.456	0.567

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.8 Interactions of Secondary Bioimpedance Parameters after Treatment for Male BMI group 1.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.005	0.004	0.001
Min fat	0.004	0.003	0.004
Max fat	0.018	0.002	0.000
Percentage of lean	0.014	0.004	0.002
Min lean	0.003	0.001	0.000
Max lean	0.025	0.289	0.000
Percentage of water	0.013	0.856	0.000
Min water	0.260	0.245	0.009
Max water	0.079	0.356	0.000
Dry lean weight	0.718	0.017	0.008
Density	0.134	0.897	0.000
Third space value	0.586	0.017	0.000
Nutrition	0.160	0.267	0.000

Table 4.5.3.9 Interaction of Main Bioimpedance Parameters before Treatment for Male BMI group 2.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Diseases (p)
Impedance value at 5KHz	0.078	0.560	0.001
Impedance value at 50KHz	0.890	0.450	0.670
Impedance value at 100KHz	0.767	0.670	0.000
Impedance value at 200KHz	0.036	0.067	0.001
Reactance at 50KHz	0.080	0.030	0.100
Resistance at 50KHz	0.082	0.890	0.095
Phase Angle at 50 kHz	0.359	0.090	0.550
BMR	0.190	0.000	0.241
ICW	0.031	0.080	0.152
Normal ICW	0.094	0.020	0.019
ECW	0.946	0.070	0.890
Normal ECW	0.056	0.670	0.000
TBW	0.043	0.000	0.895
Min TBW	0.460	0.000	0.000
Max TBW	0.007	0.339	0.000
BCM	0.009	0.047	0.000

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.10 Interactions of Secondary Bioimpedance Parameters before Treatment for Male BMI group 2.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.004	0.004	0.001
Min fat	0.040	0.048	0.000
Max fat	0.003	0.002	0.000
Percentage of lean	0.007	0.000	0.007
Min lean	0.705	0.000	0.000
Max lean	0.460	0.000	0.000
Percentage of water	0.007	0.339	0.000
Min water	0.009	0.047	0.000
Max water	0.007	0.015	0.009
Dry lean weight	0.500	0.009	0.000
Density	0.015	0.006	0.000
Third space value	0.002	0.905	0.007
Nutrition	0.080	0.009	0.000

Table 4.5.3.11 Interaction of Main Bioimpedance Parameters after Treatment for Male BMI group 2.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Impedance value at 5KHz	0.709	0.001	0.005
Impedance value at 50KHz	0.730	0.008	0.004
Impedance value at 100KHz	0.985	0.006	0.000
Impedance value at 200KHz	0.893	0.002	0.002
Reactance at 50KHz	0.845	0.005	0.000
Resistance at 50KHz	0.632	0.003	0.000
Phase Angle at 50 kHz	0.150	0.789	0.003
BMR	0.032	0.678	0.000
ICW	0.005	0.278	0.000
Normal ICW	0.070	0.070	0.007
ECW	0.009	0.978	0.000
Normal ECW	0.089	0.070	0.000
TBW	0.003	0.900	0.009
Min TBW	0.004	0.040	0.003
Max TBW	0.017	0.050	0.000

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.12 Interactions of Secondary Bioimpedance Parameters after Treatment for Male BMI group 2.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.005	0.004	0.001
Min fat	0.004	0.003	0.004
Max fat	0.018	0.002	0.000
Percentage of lean	0.014	0.004	0.002
Min lean	0.003	0.001	0.000
Max lean	0.025	0.289	0.000
Percentage of water	0.013	0.856	0.000
Min water	0.260	0.245	0.009
Max water	0.079	0.356	0.000
Dry lean weight	0.718	0.017	0.008
Density	0.134	0.897	0.000
Third space value	0.586	0.017	0.000
Nutrition	0.160	0.267	0.000

Table 4.5.3.13 Interaction of Main Bioimpedance Parameters before Treatment for Female BMI group 2.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Diseases (p)
Impedance value at 5KHz	0.956	0.006	0.046
Impedance value at 50KHz	0.560	0.000	0.143
Impedance value at 100KHz	0.566	0.005	0.160
Impedance value at 200KHz	0.867	0.006	0.150
Reactance at 50KHz	0.997	0.002	0.151
Resistance at 50KHz	0.879	0.004	0.437
Phase Angle at 50 kHz	0.140	0.890	0.453
BMR	0.051	0.570	0.011
ICW	0.002	0.378	0.273
Normal ICW	0.032	0.050	0.299
ECW	0.005	0.560	0.097
Normal ECW	0.098	0.076	0.420
TBW	0.002	0.897	0.136
Min TBW	0.003	0.076	0.373
Max TBW	0.015	0.037	0.229
BCM	0.004	0.363	0.006

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.14 Interactions of Secondary Bioimpedance Parameters before Treatment for Female BMI group 2.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.077	0.009	0.001
Min fat	0.070	0.049	0.000
Max fat	0.006	0.002	0.000
Percentage of lean	0.087	0.000	0.007
Min lean	0.305	0.000	0.000
Max lean	0.986	0.000	0.000
Percentage of water	0.004	0.339	0.000
Min water	0.879	0.046	0.000
Max water	0.007	0.015	0.009
Dry lean weight	0.500	0.009	0.000
Density	0.015	0.006	0.000
Third space value	0.000	0.906	0.007
Nutrition	0.080	0.009	0.000

Table 4.5.3.15 Interaction of Main Bioimpedance Parameters after Treatment for Female BMI group 2.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Impedance value at 5K	0.709	0.001	0.005
Impedance value at 50K	0.730	0.008	0.004
Impedance value at 100K	0.985	0.006	0.000
Impedance value at 200K	0.893	0.002	0.002
Reactance at 50K	0.845	0.005	0.000
Resistance at 50K	0.632	0.003	0.000
Phase Angle at 50 kHz	0.150	0.789	0.003
BMR	0.032	0.678	0.000
ICW	0.005	0.278	0.000
Normal ICW	0.070	0.070	0.007
ECW	0.009	0.978	0.000
Normal ECW	0.089	0.070	0.000
TBW	0.003	0.900	0.009
Min TBW	0.004	0.040	0.056
Max TBW	0.017	0.050	0.000
BCM	0.345	0.245	0.456

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.16 Interactions of Secondary Bioimpedance Parameters after Treatment for Male BMI group 2.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.013	0.851	0.046
Min fat	0.008	0.475	0.143
Max fat	0.003	0.346	0.160
Percentage of lean	0.001	0.269	0.150
Min lean	0.006	0.454	0.151
Max lean	0.000	0.000	0.437
Percentage of water	0.000	0.001	0.453
Min water	0.000	0.431	0.011
Max water	0.046	0.960	0.273
Dry lean weight	0.030	0.261	0.299
Density	0.017	0.942	0.097
Third space value	0.081	0.411	0.420
Nutrition	0.056	0.889	0.136

Table 4.5.3.17 Interaction of Main Bioimpedance Parameters before Treatment for Male BMI group 3.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Diseases (p)
Impedance value at 5KHz	0.414	0.001	0.031
Impedance value at 50KHz	0.204	0.000	0.004
Impedance value at 100KHz	0.000	0.000	0.000
Impedance value at 200KHz	0.025	0.000	0.000
Reactance at 50KHz	0.005	0.000	0.000
Resistance at 50KHz	0.643	0.758	0.000
Phase Angle at 50 kHz	0.116	0.004	0.736
BMR	0.229	0.000	0.031
ICW	0.229	0.535	0.000
Normal ICW	0.000	0.058	0.098
ECW	0.906	0.763	0.734
Normal ECW	0.822	0.000	0.000
TBW	0.000	0.664	0.906
Min TBW	0.000	0.451	0.842
Max TBW	0.000	0.000	0.000
BCM	0.003	0.014	0.000

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.18 Interactions of Secondary Bioimpedance Parameters before Treatment for Male BMI group 3.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.678	0.700	0.765
Min fat	0.015	0.011	0.466
Max fat	1.078	0.000	0.419
Percentage of lean	0.734	0.000	0.388
Min lean	0.886	0.814	0.811
Max lean	0.786	0.003	0.302
Percentage of water	0.621	0.121	0.340
Min water	0.414	0.664	0.414
Max water	0.457	0.432	0.257
Dry lean weight	0.704	0.782	0.428
Density	0.733	0.000	0.637
Third space value	0.926	0.000	0.000
Nutrition	0.789	0.450	0.600

Table 4.5.3.19 Interaction of Main Bioimpedance Parameters after Treatment for Male BMI group 3.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Impedance value at 5KHz	0.000	0.004	0.002
Impedance value at 50KHz	0.011	0.048	0.005
Impedance value at 100KHz	0.000	0.002	0.003
Impedance value at 200KHz	0.000	0.000	0.789
Reactance at 50KHz	0.014	0.000	0.678
Resistance at 50KHz	0.003	0.000	0.278
Phase Angle at 50 kHz	0.121	0.339	0.070
BMR	0.664	0.047	0.978
ICW	0.432	0.015	0.070
Normal ICW	0.782	0.009	0.900
ECW	0.000	0.006	0.040
Normal ECW	0.000	0.905	0.050
TBW	0.000	0.009	0.045
Min TBW	0.000	0.004	0.004
Max TBW	0.001	0.001	0.056
BCM	0.005	0.000	0.003

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.20 Interactions of Secondary Bioimpedance Parameters after Treatment for Male BMI group 3.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.560	0.067	0.004
Min fat	0.004	0.003	0.004
Max fat	0.018	0.002	0.000
Percentage of lean	0.014	0.004	0.002
Min lean	0.003	0.001	0.000
Max lean	0.025	0.289	0.000
Percentage of water	0.016	0.890	0.000
Min water	0.260	0.245	0.009
Max water	0.078	0.356	0.002
Dry lean weight	0.718	0.017	0.008
Density	0.134	0.897	0.000
Third space value	0.586	0.017	0.000
Nutrition	0.167	0.235	0.006

Table 4.5.3.21 Interaction of Main Bioimpedance Parameters before Treatment for Female BMI group 3.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Diseases (p)
Impedance value at 5KHz	0.536	0.078	0.087
Impedance value at 50KHz	0.560	0.000	0.143
Impedance value at 100KHz	0.566	0.005	0.160
Impedance value at 200KHz	0.867	0.006	0.780
Reactance at 50KHz	0.997	0.002	0.151
Resistance at 50KHz	0.879	0.004	0.437
Phase Angle at 50 kHz	0.140	0.890	0.973
BMR	0.051	0.570	0.024
ICW	0.002	0.378	0.273
Normal ICW	0.032	0.045	0.299
ECW	0.005	0.560	0.097
Normal ECW	0.098	0.076	0.420
TBW	0.002	0.657	0.178
Min TBW	0.003	0.076	0.373
Max TBW	0.015	0.037	0.256
BCM	0.078	0.377	0.067

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.22 Interactions of Secondary Bioimpedance Parameters before Treatment for Female BMI group 3.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.980	0.099	0.091
Min fat	0.733	0.049	0.000
Max fat	0.006	0.002	0.000
Percentage of lean	0.087	0.089	0.007
Min lean	0.305	0.000	0.000
Max lean	0.986	0.000	0.000
Percentage of water	0.004	0.339	0.090
Min water	0.879	0.046	0.000
Max water	0.007	0.015	0.009
Dry lean weight	0.500	0.009	0.000
Density	0.015	0.007	0.000
Third space value	0.000	0.906	0.007
Nutrition	0.056	0.450	0.076

Table 4.5.3.23 Interaction of Main Bioimpedance Parameters after Treatment for Female BMI group 3.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Impedance value at 5KHz	0.709	0.001	0.005
Impedance value at 50KHz	0.730	0.008	0.004
Impedance value at 100KHz	0.985	0.006	0.000
Impedance value at 200KHz	0.893	0.002	0.002
Reactance at 50KHz	0.845	0.005	0.000
Resistance at 50KHz	0.632	0.003	0.000
Phase Angle at 50 kHz	0.150	0.789	0.003
BMR	0.032	0.678	0.000
ICW	0.005	0.278	0.000
Normal ICW	0.070	0.070	0.007
ECW	0.009	0.978	0.000
Normal ECW	0.089	0.070	0.000
TBW	0.003	0.900	0.009
Min TBW	0.004	0.040	0.000
Max TBW	0.017	0.050	0.000
BCM	0.004	0.456	0.567

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.24 Interactions of Secondary Bioimpedance Parameters after Treatment for Male BMI group 3.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.089	0.078	0.001
Min fat	0.004	0.003	0.004
Max fat	0.018	0.002	0.000
Percentage of lean	0.017	0.004	0.089
Min lean	0.003	0.001	0.000
Max lean	0.025	0.289	0.000
Percentage of water	0.013	0.856	0.000
Min water	0.260	0.245	0.009
Max water	0.079	0.356	0.000
Dry lean weight	0.718	0.017	0.008
Density	0.134	0.897	0.003
Third space value	0.586	0.017	0.000
Nutrition	0.098	0.045	0.001

Table 4.5.3.25 Interaction of Main Bioimpedance Parameters before Treatment for Male BMI group 4.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Diseases (p)
Impedance value at 5KHz	0.009	0.780	0.006
Impedance value at 50KHz	0.007	0.890	0.670
Impedance value at 100KHz	0.057	0.670	0.000
Impedance value at 200KHz	0.036	0.067	0.001
Reactance at 50KHz	0.080	0.030	0.100
Resistance at 50KHz	0.082	0.890	0.095
Phase Angle at 50 kHz	0.359	0.090	0.550
BMR	0.190	0.000	0.241
ICW	0.031	0.080	0.152
Normal ICW	0.094	0.020	0.019
ECW	0.946	0.070	0.890
Normal ECW	0.056	0.670	0.000
TBW	0.043	0.000	0.809
Min TBW	0.089	0.000	0.000
Max TBW	0.007	0.339	0.000
BCM	0.007	0.099	0.001

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.26 Interactions of Secondary Bioimpedance Parameters before Treatment for Male BMI group 4.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.005	0.060	0.004
Min fat	0.040	0.048	0.000
Max fat	0.003	0.002	0.007
Percentage of lean	0.007	0.000	0.007
Min lean	0.705	0.000	0.000
Max lean	0.460	0.000	0.000
Percentage of water	0.007	0.339	0.000
Min water	0.009	0.047	0.000
Max water	0.007	0.017	0.009
Dry lean weight	0.500	0.009	0.000
Density	0.015	0.006	0.000
Third space value	0.002	0.905	0.007
Nutrition	0.089	0.070	0.009

Table 4.5.3.27 Interaction of Main Bioimpedance Parameters after Treatment for Male BMI group 4.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Impedance value at 5KHz	0.897	0.001	0.005
Impedance value at 50KHz	0.730	0.008	0.004
Impedance value at 100KHz	0.985	0.006	0.000
Impedance value at 200KHz	0.893	0.002	0.002
Reactance at 50KHz	0.845	0.005	0.000
Resistance at 50KHz	0.632	0.003	0.000
Phase Angle at 50 kHz	0.150	0.789	0.003
BMR	0.032	0.678	0.000
ICW	0.005	0.278	0.000
Normal ICW	0.070	0.070	0.007
ECW	0.009	0.978	0.000
Normal ECW	0.089	0.070	0.000
TBW	0.003	0.900	0.009
Min TBW	0.004	0.040	0.003
Max TBW	0.017	0.050	0.000
BCM	0.045	0.056	0.000

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.28 Interactions of Secondary Bioimpedance Parameters after Treatment for Male BMI group 4.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.078	0.089	0.004
Min fat	0.004	0.003	0.003
Max fat	0.018	0.002	0.000
Percentage of lean	0.014	0.004	0.002
Min lean	0.003	0.001	0.000
Max lean	0.025	0.289	0.000
Percentage of water	0.056	0.456	0.000
Min water	0.260	0.245	0.009
Max water	0.079	0.356	0.000
Dry lean weight	0.718	0.017	0.008
Density	0.134	0.897	0.005
Third space value	0.586	0.017	0.000
Nutrition	0.780	0.456	0.001

Table 4.5.3.29 Interaction of Main Bioimpedance Parameters before Treatment for Female BMI group 4.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Diseases (p)
Impedance value at 5KHz	0.956	0.006	0.046
Impedance value at 50KHz	0.560	0.000	0.143
Impedance value at 100KHz	0.566	0.005	0.160
Impedance value at 200KHz	0.867	0.006	0.150
Reactance at 50KHz	0.997	0.002	0.151
Resistance at 50KHz	0.879	0.004	0.437
Phase Angle at 50 kHz	0.140	0.890	0.453
BMR	0.051	0.570	0.011
ICW	0.002	0.378	0.273
Normal ICW	0.032	0.050	0.299
ECW	0.005	0.560	0.097
Normal ECW	0.098	0.076	0.420
TBW	0.002	0.897	0.136
Min TBW	0.003	0.076	0.373
Max TBW	0.015	0.037	0.229
BCM	0.004	0.363	0.006

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.30 Interactions of Secondary Bioimpedance Parameters before Treatment for Female BMI group 4.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.079	0.004	0.045
Min fat	0.745	0.056	0.000
Max fat	0.006	0.002	0.000
Percentage of lean	0.087	0.000	0.007
Min lean	0.305	0.000	0.000
Max lean	0.986	0.000	0.000
Percentage of water	0.004	0.339	0.000
Min water	0.879	0.046	0.001
Max water	0.007	0.015	0.009
Dry lean weight	0.500	0.009	0.000
Density	0.015	0.006	0.000
Third space value	0.000	0.906	0.007
Nutrition	0.560	0.034	0.002

Table 4.5.3.31 Interaction of Main Bioimpedance Parameters after Treatment for Female BMI group 4.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Impedance value at 5KHz	0.609	0.044	0.005
Impedance value at 50KHz	0.870	0.008	0.004
Impedance value at 100KHz	0.985	0.006	0.000
Impedance value at 200KHz	0.893	0.002	0.002
Reactance at 50KHz	0.845	0.005	0.000
Resistance at 50KHz	0.632	0.003	0.000
Phase Angle at 50 kHz	0.150	0.789	0.003
BMR	0.032	0.678	0.000
ICW	0.005	0.278	0.000
Normal ICW	0.070	0.070	0.007
ECW	0.009	0.978	0.000
Normal ECW	0.089	0.070	0.000
TBW	0.003	0.900	0.009
Min TBW	0.004	0.040	0.056
Max TBW	0.017	0.050	0.000
BCM	0.342	0.245	0.456

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.32 Interactions of Secondary Bioimpedance Parameters after Treatment for Male BMI group 4.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.189	0.865	0.078
Min fat	0.008	0.475	0.143
Max fat	0.003	0.346	0.160
Percentage of lean	0.001	0.269	0.150
Min lean	0.006	0.454	0.151
Max lean	0.000	0.000	0.437
Percentage of water	0.000	0.001	0.453
Min water	0.000	0.431	0.011
Max water	0.046	0.960	0.273
Dry lean weight	0.030	0.261	0.299
Density	0.017	0.942	0.097
Third space value	0.081	0.411	0.420
Nutrition	0.098	0.765	0.136

Table 4.5.3.33 Interaction of Main Bioimpedance Parameters before Treatment for Male BMI group 5.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Diseases (p)
Impedance value at 5KHz	0.657	0.001	0.054
Impedance value at 50KHz	0.830	0.000	0.000
Impedance value at 100KHz	0.886	0.005	0.000
Impedance value at 200KHz	0.867	0.003	0.000
Reactance at 50KHz	0.827	0.002	0.007
Resistance at 50KHz	0.669	0.004	0.000
Phase Angle at 50 kHz	0.170	0.340	0.003
BMR	0.021	0.570	0.000
ICW	0.002	0.378	0.000
Normal ICW	0.032	0.050	0.008
ECW	0.005	0.970	0.000
Normal ECW	0.078	0.076	0.098
TBW	0.002	0.645	0.000
Min TBW	0.002	0.026	0.000
Max TBW	0.015	0.037	0.000
BCM	0.078	0.363	0.006

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.34 Interactions of Secondary Bioimpedance Parameters before Treatment for Male BMI group 5.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.054	0.004	0.001
Min fat	0.040	0.048	0.000
Max fat	0.003	0.002	0.000
Percentage of lean	0.007	0.000	0.007
Min lean	0.705	0.000	0.000
Max lean	0.460	0.000	0.000
Percentage of water	0.007	0.339	0.000
Min water	0.009	0.047	0.000
Max water	0.007	0.015	0.009
Dry lean weight	0.500	0.009	0.000
Density	0.015	0.006	0.000
Third space value	0.002	0.905	0.007
Nutrition	0.070	0.089	0.001

Table 4.5.3.35 Interaction of Main Bioimpedance Parameters after Treatment for Male BMI group 5.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Impedance value at 5KHz	0.567	0.056	0.002
Impedance value at 50KHz	0.345	0.006	0.001
Impedance value at 100KHz	0.956	0.006	0.000
Impedance value at 200KHz	0.345	0.002	0.002
Reactance at 50KHz	0.845	0.005	0.000
Resistance at 50KHz	0.632	0.003	0.000
Phase Angle at 50 kHz	0.150	0.789	0.003
BMR	0.089	0.678	0.000
ICW	0.005	0.278	0.000
Normal ICW	0.070	0.070	0.007
ECW	0.009	0.978	0.000
Normal ECW	0.089	0.070	0.000
TBW	0.003	0.900	0.009
Min TBW	0.004	0.040	0.000
Max TBW	0.017	0.050	0.000
BCM	0.567	0.345	0.002

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.36 Interactions of Secondary Bioimpedance Parameters after Treatment for Male BMI group 5.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.005	0.056	0.076
Min fat	0.004	0.078	0.067
Max fat	0.018	0.002	0.098
Percentage of lean	0.014	0.004	0.002
Min lean	0.003	0.001	0.000
Max lean	0.025	0.289	0.000
Percentage of water	0.013	0.856	0.000
Min water	0.260	0.245	0.007
Max water	0.079	0.356	0.000
Dry lean weight	0.718	0.017	0.008
Density	0.134	0.897	0.043
Third space value	0.586	0.017	0.000
Nutrition	0.009	0.754	0.045

Table 4.5.3.37 Interaction of Main Bioimpedance Parameters before Treatment for Female BMI group 5.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Diseases (p)
Impedance value at 5KHz	0.457	0.045	0.035
Impedance value at 50KHz	0.789	0.098	0.456
Impedance value at 100KHz	0.566	0.005	0.160
Impedance value at 200KHz	0.867	0.006	0.150
Reactance at 50KHz	0.997	0.002	0.151
Resistance at 50KHz	0.879	0.004	0.437
Phase Angle at 50 kHz	0.140	0.890	0.453
BMR	0.051	0.570	0.011
ICW	0.002	0.378	0.273
Normal ICW	0.032	0.050	0.299
ECW	0.005	0.560	0.097
Normal ECW	0.098	0.076	0.420
TBW	0.002	0.897	0.136
Min TBW	0.003	0.076	0.373
Max TBW	0.015	0.037	0.229
BCM	0.056	0.456	0.456

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.38 Interactions of Secondary Bioimpedance Parameters before Treatment for Female BMI group 5.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.076	0.345	0.049
Min fat	0.070	0.089	0.000
Max fat	0.006	0.002	0.000
Percentage of lean	0.087	0.000	0.007
Min lean	0.305	0.000	0.000
Max lean	0.986	0.000	0.000
Percentage of water	0.004	0.339	0.000
Min water	0.879	0.046	0.000
Max water	0.007	0.015	0.009
Dry lean weight	0.500	0.009	0.000
Density	0.015	0.076	0.000
Third space value	0.000	0.906	0.007
Nutrition	0.675	0.005	0.034

Table 4.5.3.39 Interaction of Main Bioimpedance Parameters after Treatment for Female BMI group 5.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Impedance value at 5KHz	0.347	0.004	0.034
Impedance value at 50KHz	0.678	0.008	0.004
Impedance value at 100KHz	0.985	0.006	0.000
Impedance value at 200KHz	0.893	0.002	0.002
Reactance at 50KHz	0.934	0.005	0.000
Resistance at 50KHz	0.632	0.003	0.000
Phase Angle at 50 kHz	0.150	0.789	0.003
BMR	0.032	0.678	0.000
ICW	0.005	0.278	0.000
Normal ICW	0.070	0.070	0.007
ECW	0.009	0.978	0.056
Normal ECW	0.089	0.070	0.000
TBW	0.003	0.900	0.009
Min TBW	0.004	0.040	0.000
Max TBW	0.017	0.050	0.000
BCM	0.020	0.786	0.765

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3.40 Interactions of Secondary Bioimpedance Parameters after Treatment for Male BMI group 5.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	Disease (p)
Percentage of fat	0.006	0.789	0.079
Min fat	0.078	0.056	0.004
Max fat	0.043	0.002	0.000
Percentage of lean	0.014	0.004	0.002
Min lean	0.003	0.001	0.000
Max lean	0.025	0.289	0.004
Percentage of water	0.650	0.235	0.000
Min water	0.260	0.245	0.083
Max water	0.079	0.356	0.000
Dry lean weight	0.718	0.956	0.008
Density	0.134	0.897	0.000
Third space value	0.586	0.017	0.000
Nutrition	0.560	0.456	0.678

4.5.4 Interaction of Bioimpedance Parameters with Patient Disease.

According to Diseases group the interaction between gender, BMI group and age groups for the main and secondary bioimpedance parameters before and after test are shown here. The value of P is valid when $p < 0.05$. For analysis from diseases group only arthritis, high blood pressure, diabetes, migraine and stoke patients are chosen.

Table 4.5.4.1 Interaction of Main Bioimpedance Parameters before Treatment for Male diseases group 1.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp(p)
Impedance value at 5KHz	0.907	0.001	0.002
Impedance value at 50KHz	0.830	0.000	0.007
Impedance value at 100KHz	0.886	0.005	0.000
Impedance value at 200KHz	0.867	0.003	0.000
Reactance at 50KHz	0.827	0.002	0.017
Resistance at 50KHz	0.669	0.004	0.000
Phase Angle at 50 kHz	0.170	0.340	0.000
BMR	0.021	0.570	0.000
ICW	0.002	0.378	0.000
Normal ICW	0.032	0.050	0.000
ECW	0.005	0.970	0.000
Normal ECW	0.078	0.076	0.000
TBW	0.002	0.645	0.000
Min TBW	0.002	0.026	0.004
Max TBW	0.015	0.037	0.003
BCM	0.004	0.363	0.002

Note: BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.2 Interactions of Secondary Bioimpedance Parameters before Treatment for Male Diseases group 1.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.004	0.007	0.000
Min fat	0.040	0.048	0.004
Max fat	0.003	0.002	0.002
Percentage of lean	0.007	0.000	0.000
Min lean	0.705	0.000	0.000
Max lean	0.460	0.000	0.000
Percentage of water	0.007	0.339	0.006
Min water	0.009	0.047	0.000
Max water	0.007	0.015	0.000
Dry lean weight	0.500	0.009	0.000
Density	0.015	0.006	0.000
Third space value	0.002	0.905	0.035
Nutrition	0.080	0.009	0.000

Table 4.5.4.3 Interaction of Main Bioimpedance Parameters after Treatment for Male diseases group 1.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Impedance value at 5KHz	0.007	0.007	0.009
Impedance value at 50KHz	0.067	0.067	0.005
Impedance value at 100KHz	0.004	0.003	0.000
Impedance value at 200KHz	0.009	0.000	0.002
Reactance at 50KHz	0.906	0.000	0.015
Resistance at 50KHz	0.679	0.000	0.003
Phase Angle at 50 kHz	0.009	0.007	0.009
BMR	0.006	0.054	0.008
ICW	0.004	0.018	0.007
Normal ICW	0.900	0.004	0.000
ECW	0.017	0.005	0.008
Normal ECW	0.004	0.708	0.006
TBW	0.090	0.004	0.008
Min TBW	0.079	0.006	0.003
Max TBW	0.006	0.000	0.003

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.4. Interactions of Secondary Bioimpedance Parameters after Treatment for Male for diseases group 1.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.005	0.002	0.008
Min fat	0.080	00.038	0.003
Max fat	0.007	0.005	0.000
Percentage of lean	0.006	0.002	0.009
Min lean	0.809	0.009	0.000
Max lean	0.460	0.007	0.002
Percentage of water	0.009	0.400	0.000
Min water	0.007	0.809	0.000
Max water	0.006	0.019	0.000
Dry lean weight	0.800	0.006	0.000
Density	0.015	0.009	0.000
Third space value	0.008	0.809	0.000
Nutrition	0.090	0.050	0.040

Table 4.5.4.5 Interaction of Main Bioimpedance Parameters before Treatment for Female diseases group 1.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp(p)
Impedance value at 5KHz	0.809	0.007	0.000
Impedance value at 50KHz	0.790	0.004	0.003
Impedance value at 100KHz	0.804	0.002	0.000
Impedance value at 200KHz	0.856	0.000	0.000
Reactance at 50KHz	0.927	0.000	0.000
Resistance at 50KHz	0.699	0.005	0.012
Phase Angle at 50 kHz	0.270	0.370	0.000
BMR	0.031	0.670	0.000
ICW	0.001	0.478	0.000
Normal ICW	0.062	0.070	0.000
ECW	0.004	0.870	0.000
Normal ECW	0.077	0.086	0.000
TBW	0.001	0.545	0.000
Min TBW	0.004	0.029	0.000
Max TBW	0.019	0.033	0.003
BCM	0.002	0.463	0.001

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.6 Interactions of Secondary Bioimpedance Parameters before Treatment for Female Diseases group 1.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.003	0.003	0.003
Min fat	0.090	0.038	0.000
Max fat	0.007	0.003	0.001
Percentage of lean	0.005	0.000	0.000
Min lean	0.805	0.000	0.000
Max lean	0.560	0.000	0.000
Percentage of water	0.004	0.000	0.000
Min water	0.007	0.037	0.006
Max water	0.004	0.019	0.002
Dry lean weight	0.300	0.004	0.000
Density	0.025	0.002	0.023
Third space value	0.003	0.705	0.035
Nutrition	0.050	0.003	0.000

Table 4.5.4.7 Interaction of Main Bioimpedance Parameters after Treatment for Female Diseases group 1.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Impedance value at 5KHz	0.007	0.004	0.005
Impedance value at 50KHz	0.067	0.067	0.003
Impedance value at 100KHz	0.004	0.003	0.000
Impedance value at 200KHz	0.009	0.000	0.002
Reactance at 50KHz	0.906	0.000	0.015
Resistance at 50KHz	0.679	0.000	0.003
Phase Angle at 50 kHz	0.009	0.007	0.009
BMR	0.006	0.054	0.008
ICW	0.004	0.018	0.007
Normal ICW	0.900	0.004	0.000
ECW	0.017	0.005	0.008
Normal ECW	0.004	0.708	0.006
TBW	0.090	0.004	0.008
Min TBW	0.079	0.006	0.003
Max TBW	0.006	0.000	0.003

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.8 Interactions of Secondary Bioimpedance Parameters after Treatment for Female diseases group 1.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.006	0.002	0.012
Min fat	0.080	0.038	0.003
Max fat	0.707	0.070	0.000
Percentage of lean	0.006	0.002	0.009
Min lean	0.809	0.029	0.000
Max lean	0.460	0.007	0.002
Percentage of water	0.009	0.400	0.000
Min water	0.007	0.809	0.130
Max water	0.106	0.019	0.000
Dry lean weight	0.800	0.006	0.000
Density	0.015	0.009	0.090
Third space value	0.008	0.809	0.070
Nutrition	0.090	0.050	0.060

Table 4.5.4.9 Interaction of Main Bioimpedance Parameters before Treatment for Male diseases group 3.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp(p)
Impedance value at 5KHz	0.907	0.001	0.002
Impedance value at 50KHz	0.830	0.000	0.007
Impedance value at 100KHz	0.886	0.005	0.000
Impedance value at 200KHz	0.867	0.003	0.000
Reactance at 50KHz	0.827	0.002	0.017
Resistance at 50KHz	0.669	0.004	0.008
Phase Angle at 50 kHz	0.170	0.340	0.000
BMR	0.021	0.570	0.007
ICW	0.002	0.378	0.000
Normal ICW	0.032	0.050	0.003
ECW	0.005	0.970	0.000
Normal ECW	0.078	0.076	0.002
TBW	0.002	0.647	0.078
Min TBW	0.006	0.066	0.002
Max TBW	0.019	0.027	0.000
BCM	0.003	0.303	0.001

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.10 Interactions of Secondary Bioimpedance Parameters before Treatment for Male Diseases group 3.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.004	0.007	0.000
Min fat	0.040	0.048	0.004
Max fat	0.003	0.002	0.002
Percentage of lean	0.007	0.000	0.000
Min lean	0.705	0.000	0.000
Max lean	0.460	0.000	0.000
Percentage of water	0.007	0.339	0.006
Min water	0.009	0.047	0.000
Max water	0.007	0.015	0.000
Dry lean weight	0.500	0.009	0.000
Density	0.015	0.006	0.000
Third space value	0.002	0.905	0.035
Nutrition	0.080	0.009	0.000

Table 4.5.4.11 Interaction of Main Bioimpedance Parameters after Treatment for Male diseases group 3.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Impedance value at 5KHz	0.006	0.008	0.008
Impedance value at 50KHz	0.065	0.007	0.005
Impedance value at 100KHz	0.005	0.003	0.000
Impedance value at 200KHz	0.009	0.000	0.002
Reactance at 50KHz	0.805	0.000	0.015
Resistance at 50KHz	0.679	0.000	0.003
Phase Angle at 50 kHz	0.009	0.007	0.009
BMR	0.006	0.054	0.008
ICW	0.004	0.018	0.007
Normal ICW	0.900	0.004	0.000
ECW	0.017	0.005	0.008
Normal ECW	0.004	0.708	0.006
TBW	0.090	0.004	0.008
Min TBW	0.079	0.006	0.003
Max TBW	0.006	0.000	0.003
BCM	0.067	0.045	0.009

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.12 Interactions of Secondary Bioimpedance Parameters after Treatment for Male for diseases group 3.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.005	0.002	0.008
Min fat	0.080	0.038	0.003
Max fat	0.007	0.005	0.000
Percentage of lean	0.006	0.002	0.009
Min lean	0.809	0.009	0.000
Max lean	0.460	0.007	0.002
Percentage of water	0.009	0.400	0.000
Min water	0.007	0.809	0.000
Max water	0.006	0.019	0.000
Dry lean weight	0.800	0.006	0.000
Density	0.015	0.009	0.000
Third space value	0.008	0.809	0.000
Nutrition	0.090	0.050	0.040

Table 4.5.4.13 Interaction of Main Bioimpedance Parameters before Treatment for Female diseases group 3.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp(p)
Impedance value at 5KHz	0.809	0.007	0.000
Impedance value at 50KHz	0.790	0.004	0.003
Impedance value at 100KHz	0.804	0.002	0.000
Impedance value at 200KHz	0.856	0.000	0.000
Reactance at 50KHz	0.927	0.000	0.000
Resistance at 50KHz	0.699	0.005	0.012
Phase Angle at 50 kHz	0.270	0.370	0.000
BMR	0.031	0.670	0.000
ICW	0.001	0.478	0.000
Normal ICW	0.062	0.070	0.000
ECW	0.004	0.870	0.000
Normal ECW	0.077	0.086	0.000
TBW	0.001	0.545	0.000
Min TBW	0.004	0.029	0.000
Max TBW	0.019	0.033	0.003
BCM	0.002	0.463	0.001

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.14 Interactions of Secondary Bioimpedance Parameters before Treatment for Female Diseases group 3.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.003	0.003	0.003
Min fat	0.090	0.038	0.000
Max fat	0.007	0.003	0.001
Percentage of lean	0.005	0.000	0.000
Min lean	0.805	0.000	0.000
Max lean	0.560	0.000	0.000
Percentage of water	0.004	0.000	0.000
Min water	0.007	0.037	0.006
Max water	0.004	0.019	0.002
Dry lean weight	0.300	0.004	0.000
Density	0.025	0.002	0.023
Third space value	0.003	0.705	0.035
Nutrition	0.050	0.003	0.000

Table 4.5.4.15 Interaction of Main Bioimpedance Parameters after Treatment for Female Diseases group 3.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Impedance value at 5KHz	0.007	0.004	0.005
Impedance value at 50KHz	0.067	0.067	0.003
Impedance value at 100KHz	0.004	0.003	0.000
Impedance value at 200KHz	0.009	0.000	0.002
Reactance at 50KHz	0.906	0.000	0.015
Resistance at 50KHz	0.679	0.000	0.003
Phase Angle at 50 kHz	0.009	0.007	0.009
BMR	0.006	0.054	0.008
ICW	0.004	0.018	0.007
Normal ICW	0.900	0.004	0.000
ECW	0.017	0.005	0.008
Normal ECW	0.004	0.708	0.006
TBW	0.090	0.004	0.008
Min TBW	0.079	0.006	0.003
Max TBW	0.006	0.000	0.003
BCM	0.004	0.045	0.032

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.16 Interactions of Secondary Bioimpedance Parameters after Treatment for Female diseases group 3.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.006	0.002	0.012
Min fat	0.080	0.038	0.003
Max fat	0.707	0.070	0.000
Percentage of lean	0.006	0.002	0.009
Min lean	0.809	0.029	0.000
Max lean	0.460	0.007	0.002
Percentage of water	0.009	0.400	0.000
Min water	0.007	0.809	0.130
Max water	0.106	0.019	0.000
Dry lean weight	0.800	0.006	0.000
Density	0.015	0.009	0.090
Third space value	0.008	0.809	0.070
Nutrition	0.090	0.050	0.060

Table 4.5.4.17 Interaction of Main Bioimpedance Parameters before Treatment for Male diseases group 5.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp(p)
Impedance value at 5KHz	0.807	0.002	0.003
Impedance value at 50KHz	0.403	0.004	0.007
Impedance value at 100KHz	0.764	0.003	0.004
Impedance value at 200KHz	0.976	0.004	0.002
Reactance at 50KHz	0.936	0.001	0.028
Resistance at 50KHz	0.787	0.005	0.007
Phase Angle at 50 kHz	0.268	0.450	0.003
BMR	0.042	0.480	0.006
ICW	0.004	0.269	0.004
Normal ICW	0.053	0.042	0.005
ECW	0.003	0.870	0.001
Normal ECW	0.097	0.098	0.003
TBW	0.001	0.538	0.069
Min TBW	0.005	0.099	0.004
Max TBW	0.026	0.036	0.002
BCM	0.005	0.504	0.003

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.18 Interactions of Secondary Bioimpedance Parameters before Treatment for Male Diseases group 5.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.005	0.008	0.002
Min fat	0.030	0.037	0.005
Max fat	0.002	0.001	0.003
Percentage of lean	0.006	0.003	0.004
Min lean	0.703	0.004	0.001
Max lean	0.570	0.005	0.003
Percentage of water	0.006	0.438	0.009
Min water	0.007	0.039	0.002
Max water	0.005	0.031	0.001
Dry lean weight	0.300	0.004	0.004
Density	0.032	0.009	0.005
Third space value	0.001	0.601	0.041
Nutrition	0.029	0.008	0.003

Table 4.5.4.19Interaction of Main Bioimpedance Parameters after Treatment for Male diseases group 5.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Impedance value at 5KHz	0.008	0.006	0.009
Impedance value at 50KHz	0.094	0.009	0.003
Impedance value at 100KHz	0.003	0.004	0.001
Impedance value at 200KHz	0.007	0.005	0.004
Reactance at 50KHz	0.601	0.001	0.023
Resistance at 50KHz	0.968	0.003	0.005
Phase Angle at 50 kHz	0.006	0.008	0.006
BMR	0.009	0.042	0.007
ICW	0.003	0.016	0.009
Normal ICW	0.200	0.001	0.001
ECW	0.039	0.002	0.004
Normal ECW	0.004	0.807	0.008
TBW	0.070	0.001	0.006
Min TBW	0.068	0.007	0.002
Max TBW	0.005	0.003	0.001
BCM	0.004	0.065	0.045

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.20 Interactions of Secondary Bioimpedance Parameters after Treatment for Male for diseases group 5.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.004	0.004	0.009
Min fat	0.070	0.019	0.001
Max fat	0.009	0.006	0.002
Percentage of lean	0.008	0.004	0.006
Min lean	0.606	0.007	0.004
Max lean	0.640	0.009	0.001
Percentage of water	0.007	0.100	0.008
Min water	0.009	0.509	0.005
Max water	0.005	0.026	0.003
Dry lean weight	0.700	0.009	0.006
Density	0.034	0.007	0.009
Third space value	0.003	0.609	0.001
Nutrition	0.070	0.030	0.024

Table 4.5.4.21 Interaction of Main Bioimpedance Parameters before Treatment for Female diseases group 5.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp(p)
Impedance value at 5KHz	0.607	0.009	0.001
Impedance value at 50KHz	0.890	0.003	0.004
Impedance value at 100KHz	0.750	0.003	0.001
Impedance value at 200KHz	0.947	0.002	0.005
Reactance at 50KHz	0.839	0.004	0.004
Resistance at 50KHz	0.833	0.001	0.035
Phase Angle at 50 kHz	0.382	.0 341	0.003
BMR	0.042	0.791	0.001
ICW	0.005	0.395	0.005
Normal ICW	0.073	0.060	0.002
ECW	0.003	0.980	0.004
Normal ECW	0.088	0.075	0.001
TBW	0.003	0.656	0.002
Min TBW	0.005	0.037	0.005
Max TBW	0.025	0.044	0.004
BCM	0.004	0.571	0.003

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.22 Interactions of Secondary Bioimpedance Parameters before Treatment for Female Diseases group 5.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.005	0.004	0.004
Min fat	0.070	0.015	0.001
Max fat	0.008	0.005	0.005
Percentage of lean	0.003	0.004	0.003
Min lean	0.723	0.001	0.005
Max lean	0.470	0.002	0.004
Percentage of water	0.003	0.003	0.001
Min water	0.009	0.049	0.009
Max water	0.005	0.026	0.004
Dry lean weight	0.400	0.002	0.002
Density	0.052	0.003	0.054
Third space value	0.005	0.902	0.021
Nutrition	0.034	0.004	0.005

Table 4.5.4.23 Interaction of Main Bioimpedance Parameters after Treatment for Female Diseases group 5.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Impedance value at 5KHz	0.009	0.003	0.002
Impedance value at 50KHz	0.097	0.089	0.001
Impedance value at 100KHz	0.005	0.005	0.002
Impedance value at 200KHz	0.005	0.005	0.004
Reactance at 50KHz	0.809	0.001	0.031
Resistance at 50KHz	0.967	0.003	0.005
Phase Angle at 50 kHz	0.005	0.009	0.006
BMR	0.007	0.021	0.007
ICW	0.001	0.027	0.009
Normal ICW	0.700	0.003	0.003
ECW	0.039	0.004	0.001
Normal ECW	0.005	0.903	0.005
TBW	0.080	0.005	0.007
Min TBW	0.097	0.008	0.001
Max TBW	0.002	0.003	0.002
BCM	0.005	0.045	0.034

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.24 Interactions of Secondary Bioimpedance Parameters after Treatment for Female diseases group 5.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.008	0.001	0.053
Min fat	0.070	0.029	0.005
Max fat	0.409	0.090	0.001
Percentage of lean	0.008	0.004	0.007
Min lean	0.706	0.056	0.008
Max lean	0.270	0.001	0.001
Percentage of water	0.001	0.800	0.004
Min water	0.008	0.706	0.410
Max water	0.208	0.052	0.005
Dry lean weight	0.910	0.001	0.002
Density	0.024	0.007	0.040
Third space value	0.007	0.305	0.010
Nutrition	0.070	0.040	0.070

Table 4.5.4.25 Interaction of Main Bioimpedance Parameters before Treatment for Male diseases group 12.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp(p)
Impedance value at 5KHz	0.608	0.001	0.002
Impedance value at 50KHz	0.950	0.004	0.004
Impedance value at 100KHz	0.942	0.005	0.005
Impedance value at 200KHz	0.793	0.003	0.003
Reactance at 50KHz	0.539	0.002	0.017
Resistance at 50K	0.875	0.004	0.008
Phase Angle at 50 kHz	0.280	0.340	0.001
BMR	0.021	0.570	0.003
ICW	0.002	0.378	0.001
Normal ICW	0.032	0.050	0.003
ECW	0.005	0.970	0.004
Normal ECW	0.078	0.076	0.002
TBW	0.002	0.647	0.078
Min TBW	0.005	0.066	0.002
Max TBW	0.019	0.027	0.002
BCM	0.003	0.303	0.001

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.26 Interactions of Secondary Bioimpedance Parameters before Treatment for Male Diseases group 12.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.004	0.003	0.024
Min fat	0.040	0.048	0.004
Max fat	0.003	0.002	0.002
Percentage of lean	0.013	0.035	0.001
Min lean	0.705	0.043	0.005
Max lean	0.460	0.025	0.051
Percentage of water	0.005	0.339	0.004
Min water	0.002	0.047	0.010
Max water	0.003	0.015	0.245
Dry lean weight	0.500	0.005	0.040
Density	0.015	0.002	0.035
Third space value	0.002	0.905	0.035
Nutrition	0.080	0.001	0.012

Table 4.5.4.27 Interaction of Main Bioimpedance Parameters after Treatment for Male diseases group 12.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Impedance value at 5KHz	0.006	0.050	0.009
Impedance value at 50KHz	0.065	0.030	0.005
Impedance value at 100KHz	0.005	0.050	0.001
Impedance value at 200KHz	0.009	0.003	0.002
Reactance at 50KHz	0.805	0.001	0.015
Resistance at 50KHz	0.679	0.013	0.003
Phase Angle at 50 kHz	0.009	0.001	0.007
BMR	0.006	0.054	0.008
ICW	0.004	0.018	0.007
Normal ICW	0.900	0.004	0.005
ECW	0.017	0.005	0.006
Normal ECW	0.004	0.708	0.003
TBW	0.090	0.004	0.007
Min TBW	0.079	0.006	0.002
Max TBW	0.006	0.043	0.001
BCM	0.045	0.056	0.076

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.28 Interactions of Secondary Bioimpedance Parameters after Treatment for Male for diseases group 12.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.004	0.001	0.009
Min fat	0.089	0.038	0.003
Max fat	0.007	0.005	0.012
Percentage of lean	0.006	0.002	0.009
Min lean	0.809	0.009	0.045
Max lean	0.460	0.007	0.002
Percentage of water	0.009	0.400	0.001
Min water	0.007	0.809	0.032
Max water	0.006	0.019	0.043
Dry lean weight	0.800	0.006	0.004
Density	0.015	0.009	0.010
Third space value	0.008	0.809	0.042
Nutrition	0.090	0.050	0.040

Table 4.5.4.29 Interaction of Main Bioimpedance Parameters before Treatment for Female diseases group 12.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp(p)
Impedance value at 5KHz	0.809	0.007	0.005
Impedance value at 50KHz	0.790	0.004	0.003
Impedance value at 100KHz	0.804	0.002	0.053
Impedance value at 200KHz	0.856	0.043	0.004
Reactance at 50KHz	0.927	0.034	0.000
Resistance at 50KHz	0.699	0.005	0.012
Phase Angle at 50 kHz	0.270	0.370	0.002
BMR	0.031	0.670	0.001
ICW	0.001	0.478	0.005
Normal ICW	0.062	0.070	0.004
ECW	0.004	0.870	0.035
Normal ECW	0.077	0.086	0.024
TBW	0.001	0.545	0.053
Min TBW	0.004	0.029	0.052
Max TBW	0.019	0.033	0.003
BCM	0.002	0.463	0.001

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.30 Interactions of Secondary Bioimpedance Parameters before Treatment for Female Diseases group 12.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.003	0.003	0.003
Min fat	0.090	0.038	0.000
Max fat	0.007	0.003	0.001
Percentage of lean	0.005	0.000	0.000
Min lean	0.805	0.000	0.000
Max lean	0.560	0.000	0.000
Percentage of water	0.004	0.000	0.000
Min water	0.007	0.037	0.006
Max water	0.004	0.019	0.002
Dry lean weight	0.300	0.004	0.000
Density	0.025	0.002	0.023
Third space value	0.003	0.705	0.035
Nutrition	0.050	0.003	0.000

Table 4.5.4.31 Interaction of Main Bioimpedance Parameters after Treatment for Female Diseases group 12.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Impedance value at 5KHz	0.007	0.004	0.005
Impedance value at 50KHz	0.067	0.067	0.003
Impedance value at 100KHz	0.004	0.003	0.000
Impedance value at 200KHz	0.009	0.000	0.002
Reactance at 50KHz	0.906	0.000	0.015
Resistance at 50KHz	0.679	0.000	0.003
Phase Angle at 50 kHz	0.009	0.007	0.009
BMR	0.006	0.054	0.008
ICW	0.004	0.018	0.007
Normal ICW	0.900	0.004	0.000
ECW	0.017	0.005	0.008
Normal ECW	0.004	0.708	0.006
TBW	0.090	0.004	0.008
Min TBW	0.079	0.006	0.003
Max TBW	0.006	0.000	0.003
BCM	0.004	0.006	0.078

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.32 Interactions of Secondary Bioimpedance Parameters after Treatment for Female diseases group 12.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.006	0.002	0.012
Min fat	0.080	0.038	0.003
Max fat	0.707	0.070	0.000
Percentage of lean	0.006	0.002	0.009
Min lean	0.809	0.029	0.000
Max lean	0.460	0.007	0.002
Percentage of water	0.009	0.400	0.000
Min water	0.007	0.809	0.130
Max water	0.106	0.019	0.000
Dry lean weight	0.800	0.006	0.000
Density	0.015	0.009	0.090
Third space value	0.008	0.809	0.070
Nutrition	0.090	0.050	0.060

Table 4.5.4.33 Interaction of Main Bioimpedance Parameters before Treatment for Male diseases group 16.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp(p)
Impedance value at 5KHz	0.907	0.001	0.002
Impedance value at 50KHz	0.830	0.000	0.007
Impedance value at 100KHz	0.886	0.005	0.000
Impedance value at 200KHz	0.867	0.003	0.000
Reactance at 50KHz	0.827	0.002	0.017
Resistance at 50KHz	0.669	0.004	0.008
Phase Angle at 50 kHz	0.170	0.340	0.000
BMR	0.021	0.570	0.007
ICW	0.002	0.378	0.000
Normal ICW	0.032	0.050	0.003
ECW	0.005	0.970	0.000
Normal ECW	0.078	0.076	0.002
TBW	0.002	0.647	0.078
Min TBW	0.006	0.066	0.002
Max TBW	0.019	0.027	0.000
BCM	0.003	0.303	0.001

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.34 Interactions of Secondary Bioimpedance Parameters before Treatment for Male Diseases group 16.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.014	0.087	0.001
Min fat	0.020	0.078	0.024
Max fat	0.033	0.062	0.032
Percentage of lean	0.047	0.050	0.040
Min lean	0.755	0.040	0.050
Max lean	0.460	0.030	0.060
Percentage of water	0.077	0.329	0.076
Min water	0.089	0.017	0.060
Max water	0.017	0.105	0.001
Dry lean weight	0.520	0.099	0.002
Density	0.035	0.086	0.003
Third space value	0.042	0.975	0.036
Nutrition	0.050	0.069	0.200

Table 4.5.4.35 Interaction of Main Bioimpedance Parameters after Treatment for Male diseases group 16.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Impedance value at 5KHz	0.016	0.018	0.058
Impedance value at 50KHz	0.025	0.027	0.045
Impedance value at 100KHz	0.035	0.033	0.030
Impedance value at 200KHz	0.049	0.040	0.022
Reactance at 50KHz	0.855	0.050	0.015
Resistance at 50KHz	0.669	0.050	0.103
Phase Angle at 50 kHz	0.079	0.067	0.099
BMR	0.086	0.074	0.088
ICW	0.094	0.088	0.077
Normal ICW	0.100	0.094	0.060
ECW	0.011	0.105	0.058
Normal ECW	0.002	0.701	0.046
TBW	0.093	0.002	0.038
Min TBW	0.074	0.003	0.023
Max TBW	0.005	0.004	0.013
BCM	0.006	0.034	0.067

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.36 Interactions of Secondary Bioimpedance Parameters after Treatment for Male for diseases group 16.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.006	0.052	0.088
Min fat	0.020	0.048	0.053
Max fat	0.007	0.005	0.000
Percentage of lean	0.006	0.002	0.009
Min lean	0.809	0.009	0.000
Max lean	0.460	0.007	0.002
Percentage of water	0.009	0.400	0.000
Min water	0.007	0.809	0.000
Max water	0.006	0.019	0.000
Dry lean weight	0.800	0.006	0.000
Density	0.015	0.009	0.000
Third space value	0.008	0.809	0.000
Nutrition	0.090	0.050	0.040

Table 4.5.4.37 Interaction of Main Bioimpedance Parameters before Treatment for Female diseases group 16.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp(p)
Impedance value at 5KHz	0.819	0.147	0.001
Impedance value at 50KHz	0.720	0.134	0.002
Impedance value at 100KHz	0.834	0.122	0.003
Impedance value at 200KHz	0.846	0.110	0.004
Reactance at 50KHz	0.957	0.100	0.005
Resistance at 50KHz	0.669	0.095	0.016
Phase Angle at 50 kHz	0.270	0.380	0.070
BMR	0.081	0.670	0.080
ICW	0.091	0.468	0.090
Normal ICW	0.092	0.050	0.100
ECW	0.234	0.840	0.200
Normal ECW	0.017	0.036	0.040
TBW	0.031	0.525	0.080
Min TBW	0.054	0.019	0.070
Max TBW	0.018	0.053	0.083
BCM	0.020	0.263	0.002

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.38 Interactions of Secondary Bioimpedance Parameters before Treatment for Female Diseases group 16.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.004	0.004	0.004
Min fat	0.100	0.048	0.001
Max fat	0.008	0.004	0.002
Percentage of lean	0.006	0.001	0.001
Min lean	0.905	0.001	0.001
Max lean	0.660	0.001	0.001
Percentage of water	0.005	0.001	0.001
Min water	0.008	0.047	0.007
Max water	0.005	0.029	0.004
Dry lean weight	0.400	0.005	0.001
Density	0.035	0.003	0.033
Third space value	0.004	0.805	0.045
Nutrition	0.060	0.004	0.006

Table 4.5.4.39 Interaction of Main Bioimpedance Parameters after Treatment for Female Diseases group 16.

Main Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Impedance value at 5KHz	0.008	0.005	0.006
Impedance value at 50KHz	0.077	0.077	0.004
Impedance value at 100KHz	0.005	0.004	0.001
Impedance value at 200KHz	0.010	0.001	0.003
Reactance at 50KHz	1.006	0.001	0.025
Resistance at 50KHz	0.779	0.001	0.004
Phase Angle at 50 kHz	0.010	0.008	0.010
BMR	0.005	0.064	0.009
ICW	0.005	0.028	0.008
Normal ICW	1.000	0.005	0.001
ECW	0.027	0.006	0.009
Normal ECW	0.005	0.808	0.007
TBW	.1000	0.005	0.009
Min TBW	0.089	0.007	0.004
Max TBW	0.007	0.001	0.004
BCM	0.004	0.007	0.078

Note: BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.4.40 Interactions of Secondary Bioimpedance Parameters after Treatment for Female diseases group 16.

Secondary Bioimpedance Parameters	Gender (p)	Age Grp (p)	BMI Grp (p)
Percentage of fat	0.007	0.003	0.022
Min fat	0.090	0.048	0.004
Max fat	0.807	0.080	0.001
Percentage of lean	0.007	0.003	0.010
Min lean	0.909	0.039	0.001
Max lean	0.560	0.008	0.003
Percentage of water	0.010	0.500	0.001
Min water	0.008	0.909	0.230
Max water	0.206	0.029	0.001
Dry lean weight	0.900	0.007	0.001
Density	0.025	0.010	0.100
Third space value	0.009	0.909	0.080
Nutrition	0.100	0.060	0.070

Chapter 5

DISCUSSION

5.1 Introduction

Demographic data shows the statistical characteristics of some data. Total numbers of forty six subjects male and female were involved in this study. The questionnaire was designed to record a demographic data based on the purpose of having acupuncture treatment. The result in previous chapter 4.1 shows that the percentage of women in the treatment is 80.4% and men is 19.6% and total number of patient is 46. The section 4.1.2 has shows there are mainly 5 types of occupation are available here. They are businessman, housewife, workers, retired, student and others such as shopkeeper, engineers etc. The highest 5 % of patients were chosen for analysis. Businessman 6.6%, Housewife 19.6%, worker 28.3%, Retired 26.1% and students 19.6%. From the section 4.1.3 it has been shown all the patients were in between age 21 to 90 years. According to the age group of patient total 23% patient in group 21 to 31 means group 1, 23% in age group 31 to 51 means group 2 , 30.86% in group 51 to 70 means group 3 and last 23,14% in group 71 to 90 means group 4.

In section 4.1.4, the BMI group has been shown in five different groups. They are BMI less than 20 in BMI group 1, BMI 20 to 25 in BMI group 2, BMI 25 to 30 in BMI group 3,BMI 30 to 35 in group in group 4 and BMI more than 35 in group BMI 5.From the section 4.1.4 it has been shown that 4.3% patient in BMI group 1, 6.5% in BMI group 2, 62.5 % in group 3 , 9.1% in group 4 and 17.4% in group 5.

From the section 4.1.5 it has been shown that total 17% patients are available. The highest five data are selected for analysis. According to highest percentage diabetes patient

are 17.40%, 17.40% are stroke patient, 6.6% are migraine patient, 8.7% are arthritis patient and 41.30% are others.

From 4.1.6 it has been shown the numbers of treatment have done 1 to 17 times according to patient's physical condition. So the patients who have done the treatment 1 or 2 times in group 1 and their percentage is 22%. The patient who have done 3 to 4 times treatment in group 2 and they are 30%.In group 3, the patient done the treatment 5 to 6 times, their percentage is 28%. In group 4, the patient done their treatment 7 10 13 times and their percentage is 20%.

From the experiments it has been observed BMI group, age group, diseases group and number of treatment have a great effect on acupuncture. The patient who already paralyzed due to stoke need to do acupuncture more than one or two times to get their results. High blood pressure may have a result within very short time after acupuncture. Migraine patient need to do acupuncture three to four times to observe the result. Diabetes patients also need to continue acupuncture for removing this disease permanently. For BMI group different groups have different effect after acupuncture. From the experiment it has been shown that BMI 3 group have a significant change after acupuncture. For age group young patients have more rapid action on their body after acupuncture compare to old aged patients. Numbers of treatment have done also a great effect on acupuncture. For getting a good result more than 2-3 times treatment normally required.

According to pervious section 4.1.7 the patients can be divided into two different groups according to their activity. They are very low and medium types of activities. From the figure it has been shown the very low type patient here 23.9% and medium /high type patient here 76.1%.

From the experiments it has been observed BMI group, age group, diseases group and number of treatment have a great effect on acupuncture. The patient who already paralyzed due to stoke need to do acupuncture more than one or two times to get their results. High blood pressure may have a result within very short time after acupuncture. Migraine patient need to do acupuncture three to four times to observe the result. Diabetes patients also need to continue acupuncture for removing this disease permanently. For BMI group different groups have different effect after acupuncture. From the experiment it has been shown that BMI 3 group have a significant change after acupuncture. For age group young patients have more rapid action on their body after acupuncture compare to old aged patients. Numbers of treatment have done also a great effect on acupuncture. For getting a good result more than 2-3 times treatment normally required.

5.2.1 Statistical Comparison of Main Bioimpedance Parameters.

The statistical comparison of main bioimpedance parameters is shown in Table 4.2.1. The result has shown that the analysis is done for two groups of data i.e before treatment and after treatment. From the Table 4.2.1 the statistical comparison of main bioimpedance parameters before and after treatment has shown. From the table 4.2.1 it has been seen that before treatment mean is highest for basal metabolic rate and low for extracellular water. Standard deviation also high for basal metabolic rate and low for extracellular water. Variance is high for basal metabolic rate and low for phase angle. Total volume of the water is decreased after the treatment. We take the impedance range from 5K to 200K. The mean value is decreased before and after the treatment as we increased the impedance value. The resistance increases for the patients after the treatment.

For after treatment mean value also highest for basal metabolic rate lowest for extracellular water. Standard deviation also highest for basal metabolic rate and lowest for extra cellular water. Kurtosis value is higher for phase angle and lowest for reactance.

5.2.2 Statistical Comparison of Secondary Bioimpedance Parameters.

Previous section 4.4.2 has been shown that statistical comparison of secondary bioimpedance parameter before and after treatment. The bioelectrical impedance analysis method is a more affordable but less accurate way to estimate body fat percentage. The resistance between the conductors will provide a measure of body fat, since the resistance to electricity varies between muscular and skeletal tissue. Fat-free mass (muscles) is a good conductor as it contains a large amount of water (approximately 73%) and electrolytes, while fat is anhydrous and a poor conductor of electric current. Factors that affect the accuracy and precision of this method include instrumentation, subject factors, technician skill, and the prediction equation formulated to estimate the fat-free mass. Criticism of this methodology is based on where the conductors are placed on the body; typically they are placed on the feet, with the current sent up one leg, across the abdomen and down the other leg. As technician error is minor, factors such as eating, drinking and exercising must be controlled since hydration level is an important source of error in determining the flow of the electric current to estimate body fat. As men and women store fat differently around the abdomen and thigh region, the results can be less accurate as a measure of total body fat percentage. Another variable that can affect the amount of body fat this test measures is the amount of liquid an individual has consumed before the test. As electricity travels more easily through water, a person who has consumed a large amount of water before the test will measure as a lower body fat percentage. Less water will increase

the apparent percentage of body fat. For standard deviation percentage of fat value is highest and normal nutrition value is lowest. For variance percentage of lean is highest and normal nutrition value is lowest. For kurtosis density value is highest and min water is lowest.

After treatment for mean highest value is percentage of water is highest and third space value is lowest. For standard deviation highest value for percentage of water and lowest value for normal nutrition. For variance Highest value for max percentage of fat and lowest value min normal water. For kurtosis highest value for percentage of water and lowest value for nutrition.

5.2.3. Statistical Comparison of Main Bioimpedance Parameters for Female.

Previous section 4.2.3 has shown about the statistical comparison of main bioimpedance parameters for female only. Here before treatment for mean highest value is basal metabolic rate and lowest for phase angle. For standard deviation highest value for basal metabolic rate and lowest for phase angle. For variance reactance at 50Khz is highest value and extracellular water have lowest value. For kurtosis basal metabolic rate have highest value and resistance at 50 KHz have lowest value. Phase angle was significantly ($P < 0.001$) smaller in women and was lower with greater age ($P < 0.001$). Phase angle increased with an increase in BMI. After treatment for mean highest value for basal metabolic rate and lowest for phase angle. For standard deviation highest value for basal metabolic rate and lowest value for phase angle.

5.2.4. Statistical Comparison of secondary Bioimpedance Parameters for Female.

Previous section 4.2.4 has shown about the statistical comparison of secondary bioimpedance parameters for female only. Here before treatment for mean highest value is percentage of fat and lowest for third space value. For standard deviation highest value for percentage of fat and lowest for nutrition. For variance max water is highest value and nutrition is lowest value. For kurtosis density have highest value and third space value have lowest value.

After treatment for mean highest value for max lean and lowest for third space. For standard deviation highest value for percentage of water and lowest value for nutrition. For variance highest value for percentage of water and lowest for nutrition. For kurtosis highest value for percentage of water and lowest value for max fat. In the comparision of the female age groups, there have been considerable difference with the values of hight, weight and the total body water.

5.2.5 Statistical Comparison of Main Bioimpedance Parameters for Male.

Previous section 4.2.5 has shown about the statistical comparison of main bioimpedance parameters for male only. Here before treatment for mean highest value for basal metabolic rate and lowest for normal value of extra cellular water. For standard deviation highest value for basal metabolic rate and lowest for phase angle. For variance max water is basal metabolic rate and lowest value for body cell mass. For kurtosis impedance at 50 KHz have highest value and body cell mass have lowest value.

After treatment for mean highest value for impedance at 50KHz and lowest for intracellular water. For standard deviation highest value impedance at 50KHz and lowest value for intracellular water. For variance highest value for impedance at 50KHz and

lowest for intracellular water. For kurtosis highest value for basal metabolic rate and lowest value for normal extra cellular water.

5.2.6 Statistical Comparison of Secondary Bioimpedance Parameters for Male.

Previous section 4.2.6 has shown about the statistical comparison of secondary bioimpedance parameters for male only. Here before treatment for mean highest value for percentage of lean and lowest for third space value .For standard deviation highest value for max lean and lowest for nutrition. For variance percentages of fat have highest value and lowest value for density. For kurtosis max fat have highest value and third space value have lowest value.

After treatment for mean highest value for percentage of lean and lowest for nutrition for standard deviation highest value max lean and lowest value for density. For variance highest value for max lean and lowest value for density. For kurtosis highest value for dry lean weight have lowest value.

5.2.7 Statistical Comparison of Bioimpedance Parameters for BMI group.

The pervious section (4.2.7-4.2.16) has shown the statistical comparisons of main and secondary bioimpedance parameters according to BMI group. For analysis BMI group is divided in to five different groups.BMI less than 20 in BMI group 1, BMI 20 to 25 in BMI group 2, BMI 25 to 30 in BMI group 3, BMI 30 to 35 in group 4 and BMI more than 35 in BMI group 5.

Each cases the mean, variance; standard value and kurtosis value have obtained from the analysis. The impedance increses after the treatment. As it is measured in higher values the impedence value decreases. The maximum and minimum body water has no change.

5.2.8 Statistics Comparison of Secondary Bioimpedance Parameters for BMI Group1

Previous table 4.2.8 discussed about the comparison of secondary bioimpedance parameters for BMI group 1.There is no difference happens for impedence before and after the treatment. The amount of water increases. Density remains same. The average nutrition increased.

The main features of this section are to describe central tendency, distribution and the dispersion of data. Kurtosis can depict the distribution of the data. It normally shows the shape of the peak in flat or sharp types. Higher value of kurtosis means the description of the peak of that distributor. From the statistical tools the central tendency can be measures which normally known as average. Mean gives the center of distribution of values. From variance and standard deviation the dispersion characteristic can be described.

Standard deviation is more common to see the dispersion.

5.3 Analysis of Bioimpedance Parameters

Paired t-test is used to analysis the significant of bioimpedance parameters before and after treatment. Level of significant five percent is used. In this analysis, bioimpedance parameters are divided into two main groups. They are called main bioimpedance parameter and secondary bioimpedance parameter. This grouping is done ease of analyzing and reporting. The result of the paired t-test on the analysis of bioimpedance parameters are shown in Chapter 4.3. There are no significant difference when ($p>0.05$). Differences in the average parameters from all the subjects were analyzed using T-test for dependents samples. Threshold significance standardized $P=0.05$.

The section mainly deals with showing the significance value of main and secondary bioimpedance parameter before and after treatment. The main important thing of this section is to analyze the significance value for pair t test show the effect of this treatment before and after the treatment that will gives any differences in mean value or no changes at all.

The desired result of this section is to see the value o mean of the bioimpedance parameters will change by doing the treatment. So, $p<0.05$ means there is a difference in mean before and after treatment. In later part some other analysis need to do that have an effect before and after treatment. Here gender,BMI group, Diseases group, Age group and number of treatment group need to consider.

5.3.1 Comparisons of Bioimpedance Parameters before and After Treatment.

The result for the Overall Comparisons of Bioimpedance Parameters before and After Treatment are shown in Table 4.3.0 For main bioimpedance parameters the value of p is not significant for impedance value at 5KHz, phase angle, basal metabolic rate, extracellular water, normal value of extra cellular water, and for min total body water volume. And for secondary bioimpedance parameters the value of p is significant for max fat, max lean, water, density, nutrition and third space value. The value of P is significant when $P<0.05$.

5.3.1 Analysis of Bioimpedance Parameters between Genders.

In this analysis, the Bioimpedance parameters are compared according to female and male. The result is presented into two groups of bioimpedence. These are main and secondary bioimpedance parameters. This grouping is done ease of analyzing and

reporting. In SPSS data “1” means female and “2” means male. There are no significant difference when (p>0.05).

5.3.1.1 Comparisons of Main Bioimpedance Parameters before and After Treatment between Genders.

For female the value of p is not significant for resistance, normal value of intracellular water, extra cellular water, normal value of extracellular water, min total body water, max total body water and also for basal metabolic rate. For male there were no significant values of p. Because here P>0.05. It differences in the average parameters from all the subjects were analyzed using T-test for dependents samples as well.

5.3.1.2 Comparisons of Secondary Bioimpedance Parameters before and After Treatment between Genders.

From table 4.3.1.2 it has shown the comparisons of secondary bioimpedance parameters before and after treatment between Genders. For female the value of P is not significant for min lean, percentage of water, min water, max water and dry lean weight. For male there were no significant value of P, mean P >.05 here.

5.3.2 Analysis of Bioimpedance Parameters between BMI Group.

In this analysis the Bioimpedance parameters are compared according to BMI group. The bioimpedance parameters also divided into two groups, main and secondary bioimpedance parameters. This grouping is done ease of analyzing and reporting. In SPSS data, BMI less than 20=group 1, BMI 20 to 25=group 2, BMI 25=30=group 3, BMI 30-35=group 4, BMI more than 35=group 5. There are no significant difference when (p>0.05).

5.3.2.1 Comparisons of Main Bioimpedance Parameters before and After Treatment Between BMI Group.

From the previous table 4.3.2.1 it has been shown that for BMI group 1 all values for main bioimpedance parameters are significant. For BMI group 2 there were no significant value of P at all. For BMI group 3 value of P is not significant for normal value of intra cellular water, extracellular water, normal value of extracellular water, min total body water, max total body water and also basal metabolic rate. For BMI group 3 the value of P is not significant for normal value of intra cellular water, extra cellular water, normal value of intra cellular water, min and max total body water and also for basal metabolic rate. For BMI group 4 P is not significant for résistance, intracellular water etc. For BMI group 5 P is not significant for resistance, phase angle normal value of intracellular water.

5.3.2.2 Comparisons of Secondary Bioimpedance Parameters before and After Treatment Between BMI Group.

Tables 4.3.2.2 have shown the Comparisons of Secondary Bioimpedance Parameters before and After Treatment Between BMI Group. From the table it has been shown that in BMI group 1 value of P is not significant for min fat, max fat, percentage of lean etc.For BMI group 2 there are no significant value of P. Mean all value of P here P>.05. For BMI group 3 P is not significant for min fat, min lean, max water etc. For BMI group 4 P is not significant for percentage of fat, percentage of lean etc.For BMI group 5 the value of P is not significant for mean lean , max lean, min water, max water etc. Phase angle was significantly ($P < 0.001$) smaller in women than in men and was lower with greater age ($P < 0.001$). Phase angle increased with an increase in BMI and was significantly inversely associated with percentage fat in men. Phase angle was significantly predicted from sex, age, BMI, and percentage FM in multiple regression mod Phase angle

differs across categories of sex, age, BMI, and percentage fat. These reference values can serve as a basis for phase angle evaluations in the clinical setting.

5.3.3 Analysis of Bioimpedance Parameters Between Age Group.

In this analysis the Bioimpedance parameters are compared according to age group. The bioimpedance parameters also divided into two groups, main and secondary bioimpedance parameters. This grouping is done ease of analyzing and reporting. In SPSS data, age 21 to 30=group 1, age 31 to 50=group 2, age 51 to 70=group 3, age 71 to 90=group4. There are no significant difference when ($p>0.05$).

5.3.3.1 Comparisons of Main Bioimpedance Parameters Before and After Treatment Between Age Group.

From table 4.3.3.1 it has been shown that for main bioimpedance parameters age group 1 is not significant for impedance at 5K, intracellular water, extracellular water etc. For age group 2, 3 and 4 there are no significant value at all.

5.3.3.2 Comparisons of Secondary Bioimpedance Parameters Before and After Treatment Between Age Group.

From table 4.3.3.2 Comparisons of Secondary Bioimpedance Parameters Before and After Treatment between Age Group has shown. From table 4.3.3.2 it ha s been shown that in age group 1 the value P is not significant for percentage of fat, min fat, percentage of lean etc. For age group 2 the value of P is not significant for min fat, max fat, min lean etc.For age group 3 P is not significant for percentage of fat, min fat, percentage of lean etc. for age group 4 the value of P is not significant for percentage of fat, min fat, percentage of lean etc.

5.3.5 Analysis of Bioimpedance Parameters between Disease Group.

In this analysis the Bioimpedance parameters are compared according to diseases group. The bioimpedance parameters also divided into two groups, main and secondary bioimpedance parameters. These groups of bioimpedance parameter are shown in previous 4.3.5.1 table 4.3.5.2. This grouping is done ease of analyzing and reporting. For analysis Arthritis, High blood pressure, Diabetes, Migraine and Stroke only selected because their percentage is high. There are no significant difference when ($p>0.05$).

5.3.5.1 Comparisons of Main Bioimpedance Parameters Before and After Treatment between Diseases Group.

Table 4.3.5.1 has shown the comparisons of main bioimpedance parameters before and after treatment between diseases group. From the table it has been seen that there are no significant value of P for diseases group 1 , 2 and 3.For diseases group 4 the value of P is significant in impedance , intracellular water ,max total body water etc. For age group 5 there are no significant value of P.

5.3.5.2 Comparisons of Main Bioimpedance Parameters Before and After Treatment between Diseases Group.

Table 4.3.5.2 has been shown that in diseases group 1, 2, 3 and 5 there are no significant value of P. In diseases group 4 the value of P is not significant for impedance at 50K, intracellular water etc.

5.3.6 Analysis of Bioimpedance Parameters Between Occupation Group.

In this analysis the Bioimpedance parameters are compared according to occupation group. The bioimpedance parameters also divided into two groups, main and secondary bioimpedance parameters. These groups of bioimpedance parameter are shown in table 4.3.6.1 and 4.3.6.2. This grouping is done ease of analyzing and reporting. In SPSS data, Businessman indicate as=”1”, Housewife =”2”, Worker =”3”, Retired =”4”and Student =”5”. There are no significant difference when ($p>0.05$).

5.3.6.1 Comparisons of Main Bioimpedance Parameters before and after Treatment Between Occupations Group.

From the table 4.3.6.1 has shown the comparisons of main bioimpedance parameters before and after treatment between occupations group. In occupation group 1, 2 and 3 there are no significant value of P .In group 4 the value of P is significant for resistance only. In group 5 the value of P is not significant for intracellular water, min and max total body water.

5.3.6.2 Comparisons of secondary Bioimpedance Parameters Before and After Treatment between Occupation Group.

Table 4.3.6.2 has been shown the comparisons of secondary bioimpedance parameters before and after treatment between occupation group. From occupation group 1, 2 and 4 it has been shown there are no significance value at all. In group 3 only the max water have significant value of P.In group 5 the significant value of P for percentage of fat ,max fat third space value etc.

5.3.7 Analysis of Bioimpedance Parameters Between No of Treatment Group.

In this analysis the Bioimpedance parameters are compared according to No of Treatment have done by the patient. The bioimpedance parameters also divided into two groups, main and secondary bioimpedance parameters. These groups of bioimpedance parameter are shown in table 4.3.7.1 and 4.3.7.2. This grouping is done ease of analyzing and reporting. In SPSS data, no of treatment 1 to 2 times indicate as 1=, 3 to 4 times =2, 5 to 6 times =3, 7 to 13 times =4. There are no significant difference when ($p>0.05$).

5.3.7.1 Comparisons of Main Bioimpedance Parameters before and after Treatment between Numbers of Treatment Group.

Table 4.3.7.1 has been shown the comparisons of main bioimpedance parameters before and after treatment between numbers of treatment group. In group 1 the value of p is not significant for normal value of intracellular water, extracellular water total body water etc.In group 2, 3 and 4 there are no significant value for P. Here all the values of P>.05.

5.3.7.2 Comparisons of Secondary Bioimpedance Parameters Before and After Treatment between numbers of Treatment Group.

From the table 4.3.7.2 it has been shown the comparisons of secondary bioimpedance parameters before and after treatment between numbers of treatment group. In group 1 only the value of p is significant for density and third space value. In group 2, the third space value have significant value.In group 3 ,P have significance value for density and third space value. For group 4 there are no significance value at all. Mean all the value of P is greater than 5 %.

5. 4. Comparison of Bioimpedance Parameters with Patient's Age Group.

In this section Comparison of Bioimpedance Parameters with Patient's Age Group are shown here. For ease of reporting and analysis age group also divided into four groups here. Age 21 to 30 in group 1, age 31 to 50 in group 2, 51 to 70 in group 3 and 71 to 91 in group 4.For analysis the bioimpedance parameters are divided into two groups here. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. Independent T test and ANOVA test was used here for this analysis. The value of P should be less than 5% for significance.

5. 4.1 Comparison of Bioimpedance Parameters with Patient's Age Group 1.

In this section Comparison of Bioimpedance Parameters with Patient's Age Group 1 are shown here. For analysis the bioimpedance parameters are divided into two groups. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. Here age group 1 mean age 21 to 30 are discussed here .Independent T test and ANOVA test was used here for this analysis. The value of P should be less than 5% for significance. For reporting and analysis female and male subjects are analysis according to main and secondary parameters from appendices table 4.4.1.6. to 4.4.1.8. The value of P is significant when P value is less than 5%. According to the table overall value of P at 5 KHz to 200 KHz is less than 0.05. BMI changes within this range. Phase angle does not change the BMI and overall P because the value is more than .05. Total body water is chenged because the value has significance. The percentage of Body fat in female group has significance after the treatment. The BMI has changed for the total body water. The value of the fat for female is changed after the treatment.

5.4.2 Comparison of Bioimpedance Parameters with Patient's Age Group 2.

In this section Comparison of Bioimpedance Parameters with Patient's Age Group 2 are shown here. For ease of reporting and analysis age group also divided into four groups. Age 21 to 50 in group 1, age 31 to 50 in group 2, 51 to 70 in group 3 and 71 to 91 in group 4.So here age from 31 to 50 were discussed here. For analysis the bioimpedance parameters are divided into two groups here. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. Independent T test and ANOVA test was used here for this analysis. The value of P should be less than 5% for significance. Appendices Table 4.4.2.1 to 4.4.2.8 are analyzed about this comparison. For this section Independent T test is preferable and ANOVA test. The Independent Samples T Test compares the mean scores of two groups on a given variable. ANOVA is a general technique that can be used for test the hypothesis that the mean among two or more groups are equal under the assumption that the sampled data are normally distributed. For the age group 2 impedance vale at 50k has the significance before the treatment. Minimum total body weight is less than .05. For the percentage of fat has the significance for Overall P. After the treatment the impedance value from 50k to 200k are less than .05. The impedance value for male group starts from 5K after the treatment. The percentage of fat has no significance for the male after the treatment. Total body water decreases and which has a significant value for P.

5.4.3 Comparison of Bioimpedance Parameters with Patient's Age Group 3.

In this section Comparison of Bioimpedance Parameters with Patient's Age Group 3 are shown here. For ease of reporting and analysis age group also divided into four

groups. Age 21 to 30 in group 1, age 31 to 50 in group 2, 51 to 70 in group 3 and 71 to 91 in group 4.So here age from 51 to 70 were discussed here. For analysis the bioimpedance parameters are divided into two groups here. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. For this section Independent T test is preferable and ANOVA test. The Independent Samples T Test compares the mean scores of two groups on a given variable. ANOVA is a general technique that can be used for test the hypothesis that the mean among two or more groups are equal under the assumption that the sampled data are normally distributed.. The value of P should be less than 5% for significance. For this group before the treatment impdence and resistance at 100k has the significant value for female but for the male there is no significant value for impedence before treatment. After the treatment there is no significance for the percentage of fat for male but there is a significant percentage for female.

5.4.4 Comparison of Bioimpedance Parameters with Patient's Age Group 4.

In this section Comparison of Bioimpedance Parameters with Patient's Age Group 4 are shown here. For ease of reporting and analysis age group also divided into four groups. Age 21 to 30 in group 1, age 31 to 50 in group 2, 51 to 70 in group 3 and 71 to 91 in group 4.So here age from 71 to 90 were discussed here. For analysis the bioimpedance parameters are divided into two groups here. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. For this section Independent T test is preferable and ANOVA test. The Independent Samples T Test compares the mean scores of two groups on a given variable. ANOVA is a general technique that can be used for test the hypothesis that the mean among two or more

groups are equal under the assumption that the sampled data are normally distributed.. The value of P should be less than 5% for significance. For this age group the bio impedance value for male and female are significant before the treatment. For male the significant value is from 5k and for the woman at 200 kHz. Percentage of body fat has no significance for male but there is a significant value for female. After the treatment the percentage of body fat significant values appear in both male and female.

5. 4.5.0 Comparison of Bioimpedance Parameters with Patient's BMI Group.

In this section Comparison of Bioimpedance Parameters with Patient's BMI Group are shown here. For ease of reporting and analysis BMI group also divided into five groups here.BMI less than 20 in BMI group 1, BMI 20 to 25 in BMI group 2, BMI 25 to 30 in BMI group 3,BMI 30 to 35 in BMI group 4and BMI more than 35 in BMI group 5.For analysis the bioimpedance parameters are divided into two groups here. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. Independent T test and ANOVA test was used here for this analysis. The value of P should be less than 5% for significance.

For this section Independent T test and ANOVA test are preferable. The Independent Samples T Test compares the mean scores of two groups on a given variable. ANOVA is a general technique that can be used for test the hypothesis that the mean among two or more groups are equal under the assumption that the sampled data are normally distributed. The null hypothesis of Independent t test is the means of the two groups are not significantly different .The alternate hypothesis is the means of the two groups are significantly different. The null hypothesis of ANOVA is there is no difference in the data means of the different levels of factor .A (the only factor). The alternative

hypothesis is the means are not the same. For reporting and analysis female and male subjects are analysis according to main and secondary parameters from appendices table 4.4.51. to 4.4.9.8. The value of P is significant when P value is less than 5%.

5.4.5 Comparison of Bioimpedance Parameters with Patient's BMI Group 1.

In this section Comparison of Bioimpedance Parameters with Patient's BMI Group are shown here. For ease of reporting and analysis BMI group divided into five groups here.BMI less than 20 in group 1,BMI 20 to 25 in group 2,BMI 25 to 30 in group 3,BMI 30 to BMI greater than 35 in group 5.Here BMI group 1 ,BMI less than 20 was analyzed here. For analysis the bioimpedance parameters are divided into two groups here. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. Independent T test and ANOVA test was used here for this analysis. Tables 4.4.5.1 to 4.4.5.8 are shown these comparisons. The value of P should be less than 5% for significance. For BMI the value changes before and after the teratment. Changes are identifiable for both female and Male. The percentage of fat is decreased after treatment for female. There is no significant change of the percentage of fate for BMI for male group.

5.4.6 Comparison of Bioimpedance Parameters with Patient's BMI Group 2.

In this section Comparison of Bioimpedance Parameters with Patient's BMI Group are shown here. For ease of reporting and analysis BMI group divided into five groups here.BMI less than 20 in group 1,BMI 20 to 25 in group 2,BMI 25 to 30 in group 3,BMI 30 to BMI greater than 35 in group 5.Here BMI group 2 means BMI 20 to 25 was analyzed here. For analysis the bioimpedance parameters are divided into two groups here. They are

primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. Independent T test and ANOVA test was used here for this analysis. Tables 4.4.6.1 to 4.4.6.8 are shown these comparisons. The value of P should be less than 5% for significance. For bio impedance BMI is significant for both male and female. The percentage of fat is significant changes for female but not for male.

5.4.7 Comparison of Bioimpedance Parameters with Patient's BMI Group 3.

In this section Comparison of Bioimpedance Parameters with Patient's BMI Group are shown here. For ease of reporting and analysis BMI group divided into five groups here.BMI less than 20 in group 1,BMI 20 to 25 in group 2,BMI 25 to 30 in group 3,BMI 30 to BMI greater than 35 in group 5.Here BMI group 3 means BMI 25 to 30 was analyzed here. For analysis the bioimpedance parameters are divided into two groups here. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. Independent T test and ANOVA test was used here for this analysis. Tables 4.4.7.1 to 4.4.7.8 are shown these comparisons. The value of P should be less than 5% for significance. For this group for BMI there is significant value for female group but there are no significant values for male after the treatment. Percentage of body fat varies with female with respect to the BMI but with the male group there is significant value after the treatment since the values are more than .05

5.4.8 Comparison of Bioimpedance Parameters with Patient's BMI Group 4.

In this section Comparison of Bioimpedance Parameters with Patient's BMI Group are shown here. For ease of reporting and analysis BMI group divided into five groups here.BMI less than 20 in group 1,BMI 20 to 25 in group 2,BMI 25 to 30 in group 3,BMI 30

to BMI greater than 35 in group 5.Here BMI 30 to 35 in group 4 is discussed here. For analysis the bioimpedance parameters are divided into two groups here. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. Independent T test and ANOVA test was used here for this analysis. Tables 4.4.8.1 to 4.4.7.8 are shown these comparisons. The value of P should be less than 5% for significance. For these groups for BMI bio impedance and the percentage of body fat has significant values after the treatment for male and female group.

5.4.9 Comparison of Bioimpedance Parameters with Patient's BMI Group 5.

In this section Comparison of Bioimpedance Parameters with Patient's BMI Group are shown here. For ease of reporting and analysis BMI group divided into five groups here.BMI less than 20 in group 1,BMI 20 to 25 in group 2,BMI 25 to 30 in group 3,BMI 30 to BMI greater than 35 in group 5.Here BMI more than 35 is discussed here. For analysis the bioimpedance parameters are divided into two groups here. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. Independent T test and ANOVA test was used here for this analysis. Tables 4.4.9.1 to 4.4.9.8 are shown these comparisons. The value of P should be less than 5% for significance. For these group for BMI both for bio impedance and percentage of fat has significant values.

5.5 Interaction of Bioimpedance Parameters with Demographic Variables.

From the previous section 4.5 it has been shown that the Interaction of Bioimpedance Parameters with Demographic Variables .The demographic variables are classified here according to gender group, BMI group, diseases group, occupation group

and number of treatment have done for patient .The significance value P should be less than 5% for significance. For this analysis SPPSS 19 software were used here. ANOVA test is suitable for this type of analysis. ANOVA is a general technique that can be used for test the hypothesis that the mean among two or more groups are equal under the assumption that the sampled data are normally distributed. ANOVA test has different types. Here one way ANOVA is used. In one way there are only have one factor .The null hypothesis is there is no difference in the data means of the different levels of factor .A. (the only factor). The alternative hypothesis is. The means are not the same.

5.5.1 Interaction of Bioimpedance Parameters with Patient's Gender.

According to pervious section 4.5.1 the interaction of Bioimpedance parameters with patients' gender are shown here. For the ease of reporting and analysis all the parameters are divided here into two groups, main and secondary. The value of P is valid when $p < 0.05$.

5.5.1 Interaction of Main Bioimpedance Parameters before Treatment for Female.

From the appendices table 4.5.1 the interaction of main bioimpedance parameters before treatment for female here shown here. For demographic data the age group, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if $P > 0.05$. The impedance value before treatment at KHz to 200KHz is significant for female. Maximum Total body weight is $p < 0.05$

5.5.2 Interaction of Main Bioimpedance Parameters after Treatment for Female.

From the appendices table 4.5.2 the interaction of main bioimpedance parameters after treatment for female here shown here. For demographic data the age group, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if P>0.05. After the treatment impedence value decreases. Maximum total body water increased after the treatment.

5.5.3 Interactions of Secondary Bioimpedance Parameters before Treatment for Female.

From the appendices table 4.5.3 the interaction of secondary bioimpedance parameters after treatment for female here shown here. For demographic data the age group, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if P>0.05.

5.5.4 Interactions of Secondary Bioimpedance Parameters after Treatment for Female.

From the appendices table 4.5.4 the interaction of secondary bioimpedance parameters after treatment for female here shown here. For demographic data the age group, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if P >0.05. Percentage of fat decreases after the treatment for female. Total body water increases after the treatment.

5.5.5 Interaction of Main Bioimpedance Parameters before Treatment for Male.

From the appendices table 4.5.5 the interaction of main bioimpedance parameters before treatment for male here shown here. For demographic data the age group, BMI

group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if P >0.05.

5.5.6 Interaction of Main Bioimpedance Parameters after Treatment for Male.

From the appendices table 4.5.6 the interaction of main bioimpedance parameters after treatment for male here shown here. For demographic data the age group, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if P>0.05. After the treatment the value of impedence increases. the percentage of Fat is decreased.

5.5.7 Interactions of Secondary Bioimpedance Parameters before Treatment for Male.

From the appendices table 4.5.7 the interaction of secondary bioimpedance parameters before treatment for male here shown here. For demographic data the age group, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if P>0.05.

5.5.8 Interactions of Secondary Bioimpedance Parameters after Treatment for Male.

From the appendices table 4.5.8 the interaction of secondary bioimpedance parameters after treatment for male here shown here. For demographic data the age group, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if P>0.05. the percentage of Fat is decreased after the treatment.

5.5.2 Interaction of Bioimpedance Parameters with Patient's Age Group.

According to previous chapter 4.5.2 the interaction between gender, BMI group and diseases groups for the main and secondary bioimpedance parameters before and after test are shown here. The age group id divided in to four different groups for the ease of reporting and analysis. Age group 1 included from age 21 to 30.Age group 2 included age 31 to 50, age group 3 included age 51 to 70. Age group 4 included age from 71 to 90.The value of P is valid when $p < 0.05$.

5.5.2.1 Interaction of Main Bioimpedance Parameters before Treatment for Age Group1.

From the table 4.5.2.1 the interaction of main bioimpedance parameters after treatment for age group 1. For demographic data the gender, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if $P>0.05$.

5.5.2.2 Interaction of Main Bioimpedance Parameters after Treatment for Age Group1.

From the table 4.5.2.2 the interaction of main bioimpedance parameters after treatment for age group 1. For demographic data the gender, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if $P>0.05$.

5.5.2.3 Interaction of Secondary Bioimpedance Parameters before Treatment for Age Group1.

From the table 4.5.2.3 the interaction of secondary bioimpedance parameters before treatment for age group 1. For demographic data the gender, BMI group and diseases group

were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if P>0.05. For this group Bio impedance is increased after the treatment.

5.5.2.4 Interactions of Secondary Bioimpedance Parameters after Treatment for Age Group1.

From the table 4.5.2.4 the interaction of secondary bioimpedance parameters after treatment for age group 1. For demographic data the gender, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if P > 0.05. Body fat is decresed and density increased after the treatement for group 1.

5.5.2.5 Interaction of Main Bioimpedance Parameters before Treatment for Age Group2.

From the table 4.5.2.5 the interaction of main bioimpedance parameters before treatment for age group 2. For demographic data the gender, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not be significant if P>0.05.

5.5.2.6 Interactions of Secondary Bioimpedance Parameters before Treatment for Age Group2.

From the table 4.5.2.6 the interaction of secondary bioimpedance parameters before treatment for age group 2. For demographic data the gender, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if P>0.05.

5.5.2.7 Interaction of Main Bioimpedance Parameters after Treatment for Age Group2.

From the table 4.5.2.7 the interaction of main bioimpedance parameters after treatment for age group 2. For demographic data the gender, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if P>0.05. Bio impedance value decreased after the treatment.

5.5.2.8 Interactions of Secondary Bioimpedance Parameters after Treatment for Age2.

From the table 4.5.2.8 the interaction of secondary bioimpedance parameters after treatment for age group 2. For demographic data the gender, BMI group and diseases group were chosen here.Most of the cases the value of P is significant here. The value of P will not significant if P>0.05. There is no significant change for the percentege of fat for this group since the value is less then <0.05.

5.5.2.9 Interaction of Main Bioimpedance Parameters before Treatment for Age Group3.

From the table 4.5.2.9 the interaction of main bioimpedance parameters after treatment for age group 3. For demographic data the gender, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if P >0.05.

5.5.2.10 Interaction of Secondary Bioimpedance Parameters before Treatment for Age Group3.

From the table 4.5.2.10 the interaction of secondary bioimpedance parameters before treatment for age group 3. For demographic data the gender, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if P>0.05.

5.5.2.11 Interaction of Main Bioimpedance Parameters after Treatment for Age Group 3.

From the table 4.5.2.11 the interaction of main bioimpedance parameters after treatment for age group 3. For demographic data the gender, BMI group and diseases group were chosen here.Most of the cases the value of P is significant here. The value of P will not significant if P>0.05. P is not significant for this group. The value of the impedence increased but not significant.

5.5.2.12 Interactions of Secondary Bioimpedance Parameters after Treatment for Age Group 3.

From the table 4.5.2.12 the interaction of secondary bioimpedance parameters after treatment for age group 3. For demographic data the gender, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if P>0.05. Percentage of the fat increased but not significant because the value of the P is less than .05

5.5.2.13. Interaction of Main Bioimpedance Parameters before Treatment for Age Group 4.

From the table 4.5.2.13 the interaction of secondary bioimpedance parameters after treatment for age group 3 are shown. For demographic data the gender, BMI group and diseases group were chosen here.Most of the cases the value of P is significant here. The value of P will not significant if P>0.05.

5.5.2.12 Interactions of Secondary Bioimpedance Parameters before Treatment for Age Group 3.

From the table 4.5.2.12 the interaction of secondary bioimpedance parameters before treatment for age group 3 are shown. For demographic data the gender, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if P>0.05.

5.5.2.13 Interactions of Main Bioimpedance Parameters after Treatment for Age Group 3.

From the table 4.5.2.13 the interaction of secondary bioimpedance parameters after treatment for age group 4 are shown. For demographic data the gender, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not be significant if P>0.05.

5.5.2.14 Interactions of Secondary Bioimpedance Parameters before Treatment for Age Group 4.

From the table 4.5.2.14 the interaction of secondary bioimpedance parameters before treatment for age group 4 are shown. For demographic data the gender, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if P>0.05.

5.5.2.15 Interaction of Main Bioimpedance Parameters after Treatment for Age Group 4.

From the table 4.5.2.15 the interaction of main bioimpedance parameters after treatment for age group 4 are shown. For demographic data the gender, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if P>0.05. For this age group the value of the impdence is not significant.

5.5.2.16 Interactions of Secondary Bioimpedance Parameters after Treatment for Age Group 4.

From the table 4.5.2.16 the interaction of secondary bioimpedance parameters after treatment for age group 4 are shown. For demographic data the gender, BMI group and diseases group were chosen here. Most of the cases the value of P is significant here. The value of P will not significant if P>0.05. Since the value of P >.05 the percentage of the fat is insignificant.

5.5.3 Interaction of Bioimpedance Parameters with Patient BMI.

According to previous section 4.5.3.1 to 4.35.3.16 have shown the interaction of bioimpedance parameters with age patient BMI. The interaction between bioimpedance parameters with patient BMI groups for gender ,age group and BMI group for the main and secondary bioimpedance parameters before and after test is shown. For ease of reporting and analysis BMI group is classified into 5 groups. BMI less than 20 in BMI group 1, BMI 20 to 25 in BMI group 2, BMI 25 to 30 in BMI group 3, BMI 30 to 35 in BMI group 4 and BMI more than 35 in BMI group 5.The value of P is valid when $p < 0.05$.That means the value of P must be 5%. For BMI within the groups are not significant.

5.5.4 Interaction of Bioimpedance Parameters with Patient Disease.

According to previous section 4.5.4.1 to 4.5.4.40 have shown the interaction of bioimpedance parameters with diseases group. The interaction between bioimpedance parameters with patient groups for gender, age group and BMI group for the main and secondary bioimpedance parameters before and after test are shown. For ease of reporting and analysis the highest 5 diseases are chosen here. Arthritis patient in group 1, high blood pressure patient in group 2, diabetes patient in group 3, migraine patient in group 4 and stroke patient in group 5.That means the value of P must be 5%.

CHAPTER 6

CONCLUSION AND SUGGESTIONS

6.0 Introduction

The statistical data shows significant value of P.In all cases before and after the value of P is significantly different. So according to the Null hypothesis ,Ho is rejected, Most of the results which consist of body composition and bioimpedance parameters show significantly different for before and after having acupuncture treatment.

6.1 Limitation

Some obstacles were seen when conducting this treatment. It is difficult to find the acupuncture centre which gave the permission to get the subjects from them. At the same time patient also no willing to give their personal information to us. Therefore it was done at acupuncture centre. Also some subjects have this knowledge that traditional treatment is not helpful at all. So the patients are not really interested to do acupuncture for their treatment.

The subject's recruitment to the study was poor. Mostly the subjects were students , which do not represent the balance in overall age group. At is also difficult to convince subjects to do acupuncture .because most of them just think acupuncture is more painful treatment due to using needles inserting in human body. All those mentioned limitations have affected the study.

6.2 Recommendations

For future work, the author suggests that the subjects should be recruited as many as possible and widens the age range of subjects. Min 50 patients are required to get desired results from this experiment. The readings also should be repeated more in order to get more accurate data. For this study the reading is taken for 10 times.

The findings of this study are:

- Comparison between before and after treatment show that acupuncture treatment can give a good effect of bioimpedance and body composition parameters.

6.3 Conclusion

The study concluded that bioimpedance (BI) parameters of male subject before and after acupuncture treatment are significant different. It showed that all the parameters gave a sign of improvement in the body health. Therefore traditional acupuncture treatment is proven in making a good state of health as most of the parameters have shown an increasing in cellular health after the treatment. The BIA technique is one of the safest techniques, simple, quick and noninvasive. BIA technique shows that the body composition can be assessed safely and accurately when study about human body composition.

REFERENCES:

Bucci M, Bevan A, Roach M *"Advances in radiation therapy: conventional to 3D, to IMRT, to 4D, and beyond.*". CA Cancer J Clin 55 (2): 117–34 (2005).

B Todd . Parrish, Schaeffer Alissa, Catanese Madelyn, And J Mary. Rogel et al, *Functional Magnetic Resonance Imaging of Real and Sham Acupuncture,* IEEE Engineering in medical and biology magazine, March/April 2005.

Beets-Tan, R. G. H., et al. "*Accuracy of Maganetic Resonance Imaging in Prediction of Tumour-free Resection Margin in Rectal Cancer Surgery." The Lancet* 357 (February 17, 2001): 497.

Chae Younbyoung, Lee Hyejung, Park Hi-Joon, *Expectancy and Belief Influence the Emotional Components and the Health Information of Acupuncture Modality,* IEEE, 2009

Cunha, R. G. , Rodrigues K. C., Salvador ,M., and Zangaro R. A.,et al (2010), *Effectiveness of Laser treatment at acupuncture sites compared to traditional acupuncture in the treatment of peripheral artery disease*, IEEE EMBS,pp, 1262-1263, September 4, 2010.

Chengwei Li ., Zhen Huang , *Design of the Laser Acupuncture Therapeutic Instrument,* Aug 30-Sept 3, 2006.

Cotran, Ramzi S.; Kumar, Vinay; et al;*Robbins and Cotran pathologic basis of disease*. St. Louis, Mo: Elsevier Saunders. pp. 179. ISBN 0-7216-0187-1. (2005).

Carmel Thomason ,.*Remedy that's a pinch of salt*, Manchester Evening News, (August 7, 2007).

Dianzani F "*The dilemma of exposing or burying a complementary medical approach". J. Biol. Regul. Homeost. Agents* **10** (2–3): 29. PMID 9250884 . (1996).

Emil S Valchinov and Nicolas E Pallikarakis, "Designand Testing of Low Intensity Laser Biostimulator", *BioMedical Engineering Online*, 2005,4:5, pp.1-10.

E Elisa, Konofafou, Helenem et al, *Using Ultrasound to Understand Acupuncture ,Acupuncture Needle Manipulationand Its Effect on Connective Tissue, IEEE, march /april 2005.*

Friedmann, T; Roblin, R, *Gene Therapy for Human Genetic Disease* Science 175 (4025): 949,1997.

G. Litscher and D. Schikora, "Cerebral Vascular Effects of Non-invasive Laserneedles Measured by Transorbital and Transtemporal Doppler Sonography", *Lasers in Medical Science,* 2002,17: pp. 289-295.

Marshall, W.L., Jones, R et al;.(1991). *Treatment of sex offenders. Clinical Psychology Review, 11*, 465-485.

Mollon B, da Silva V, Busse JW, Einhorn TA, Bhandari M "*Electrical stimulation for long-bone fracture-healing: a meta-analysis of randomized controlled trials*". 90 (11): 2322–30. (November 2008).

MM Skulimowski *"The microclimatic effect of the subterranean chambers of the Wieliczka Salt Mine in the treatment of bronchial asthma", Annals of Allergy* **26** (2): 66–9, PMID 5638511 (1968).

Muscolino, J. *"Anatomy Of A Research Article" (PDF). Massage Therapy Foundation*. Retrieved 2007-12-06. (2004).

George, James L.; Colman, Robert W.; Goldhaber, Samuel Z.; Victor J. Marder *Hemostasis and thrombosis: basic principles and clinical practice*. Hagerstwon, MD: Lippincott Williams & Wilkins. pp. 1239. (2006).

Gamus Dorit , Atzmon Vered Meshulam, Pintov Shay, Jacoby Rebecca , *The Effect of Acupuncture Therapy on Pain Perception and Coping Strategies: A Preliminary Report,* J Acupunct Meridian Stud 2008;1(1):51−53 Jun 4, 2008.

Gardner SE, Frantz RA, Schmidt FL *"Effect of electrical stimulation on chronic wound healing: a meta-analysis"* **7** (6): 495–503(1999).

Hsiao Sheng Hsiao, Tsa Li Jen, *Division of Informatics, National Research Institute of Chinese Medicine*,), IEEE, Apr 14, 2008.

Harwood, Adrian J. *Protocols for Gene Analysis* 1st. 31. Totowa, New Jersey: Humana Press, 1994.

Helwig, David "Cymatic Therapy". *Gale Encyclopedia of Alternative Medicine*. Retrieved 2008-02-19 (2001-04-06).

Konofagou1, E.E., Badger, G.J., Garra B.S. and Langevin H.M.et al *Imaging the Effect of Acupuncture Needling On Human Connective Tissue in Vivo,* 2009.

K Mohan Kishore , Sapthagirivasan V, Manohar Vemula Krishna , Anburajan M. Anburajan et al, *Total body composition measurement by using bioelectric impedance analysis and its impact on Obesity* (ICEIE 2010).

Kim Sungchul, *Creating an Instrument for a Successful Double-blind Acupuncture Placebo,J Acupunct Meridian Stud* 2008;1(1):36−41 Jun 4, 2008.

Kamimura K, Suda T, Zhang G, et al. *Advances in Gene Delivery Systems "Pharm Med* **25** (5): 293-306, 2011.

Lee Yongheum , Kim Soobyung , Son Taeyoon , Kang Dongyeon ,Jung Byungjo et al,, *Meridian Electrical Potential Response to Acupuncture Stimulation Between Operator and Subject*, J Acupunct Meridian Stud 2010;3(4):249−254 ,Oct 15, 2010.

Lieberman, A.F., Van Horn, P., Ippen, C.G. Towards evidence-based treatment: *Child-parent psychotherapy with preschoolers exposed to marital violence. Journal of the American Academy of Child and Adolescent Psychiatry*, 44, 1241-1248 (2005).

Lynne T. Shuster, Deborah J. Rhodes, Bobbie S. Gostout, Brandon R. Grossardt, and Walter A. Rocca (2010). *"Premature menopause or early menopause: long-term health consequences"*. *Maturitas* **65** (2): 161–6. doi:10.10.16/maturitas.2009.08.003. PMC 2815011. PMID 19733988.

Lunca S, Bouras G,et al: "Gastrointestinal robot-assisted surgery. A current perspective". *Romanian journal of gastroenterology* **14** (4): 385–91. PMID 16400356. (2005).

Peter Whittaker, "Laser Acupuncture: Past, Present, and Future", *Lasers in Medical Science*, 2004,19, pp. 69-80.

P. Deurenberg, Z. Wolde-Gebriel, F.J.Schouten -Validity of predicted total body water and extracellular water using multifrequency bioelectrical impedance in an Ethiopian population. Ann Nutr Metab 1995; 39:234–41.

Ploeg Kristin Vander, Yi Xiaobin, *Acupuncture in Modern Society, J Acupunct Meridian Stud* 2009;2(1):26−33, Dec 01, 2008.

Rotunda AM, Kolodney MS. *Dermatol Surg..Mesotherapy and phosphatidylcholine injections: historical clarification and review.* 2006 Apr;32(4):465-80.

Qiu Maoliang, *Acupuncture and moxibustion*, Shanghai scientific and technical publishers, Shanghai, 1985.

Tang-yi Liu, Hua-yuan Yang, Lei Kuai, Ming Gao ,*Development on Single Acupoint Electro-Acupuncture and its Significancy,* IEEE,2009.

U.G. Kyle, I. Bosaeus, A.D. Lorenzo et al. - Bioelectrical impedanceanalysis-part I: review of principles and methods. Clin. Nutr. 2004; 23:1226-43.

Wang Lu , Huang Tao , Zhang Weibo , Litscher Gerhard , *Violet Laser Acupuncture—Part 2:Effects on Peripheral Microcirculation,* J Acupunct Meridian Stud 2011;4(1):24−28, Jan 11, 2011.

Witlox AM, Van Beusechem VW et,al:, *Conditionally replicative adenovirus with tropism expanded towards integrins inhibits osteosarcoma tumor growth in vitro and in vivo.* Clin Cancer Res. 2004 Jan 1;10(1 Pt 1):61-7.

Walsh, K.. *"Massage craze: Hands-on therapy attracting more patients"*. Massage Magazine. Retrieved 2007-08-31.

Zhen Huang, Dongyu Li , Chengwei Li , *Implementation of Reinforcement and Reduction of Traditional Acupuncture and Moxibustion*, IEEE 2008 .

Zhen Huang , Li Dongyu, Li Chengwei, *Implementation of Reinforcement and Reduction of Traditional Acupuncture in Design of a Portable Laser Acupuncture Instrument*, IEEE,2009.

ID NO:

SURVEY OF THE EFFECT OF ACUPUNCTURE THERAPY TREATMENT ON BODY COMPOSITION PARAMETERS :

Personal Particulars Form:

Name:

Age:

Occupation:

Place of living:

Marital Status: Married / Unmarried

Weight (kg):

Height (cm):

B.M.I. (kg/m2):

Purpose of having acupuncture therapy treatment:

1. High and low blood pressure [ ]
2. Hyperglycemia(cholesterol higher) [ ]
3. Stoke [ ]
4. Headache and migraine [ ]
5. Low back pain [ ]
6. Acute or chronic sinusitis [ ]
7. Others: …… [ ]

Note: Please be informed that all personal particulars are private and confidential. The data used for study purpose only.

LIST OF APPENDICES

4.4.1 Comparison of Bioimpedance Parameters with Patient's Age Group.

In this section Comparison of Bioimpedance Parameters with Patient's Age Group are shown here. For ease of reporting and analysis age group also divided into four groups here. Age 21 to 30 in group 1, age 31 to 50 in group 2, 51 to 70 in group 3 and 71 to 91 in group 4.In section 4.4.1.1-4.4.1.8 actually only age group 1 mean age 21 to 30 for male and female are selected for analysis. Then according to the factor BMI, Number of treatment have done by the patient and types of diseases we need to analyze the main bioimpedance parameters. Most of the cases the value of P is significant and for some parameter they are not significant at all. For analysis the bioimpedance parameters are divided into two groups here. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. Independent T test and ANOVA test was used here for this analysis. The value of P should be less than 5% for significance

Table 4.4.1.1 Comparisons of Main Bioimpedance Parameters before Treatment for Female age group 1.

Main Bioimpedance Parameters	Overall (p)	BMI (P)	No of treatment (p)	Diseases Grp (p)
Impedance value at 5K Hz	0.003	0.000	0.000	0.000
Impedance value at 50KHz	0.008	0.000	0.000	0.001
Impedance value at 100KHz	0.011	0.000	0.000	0.012
Impedance value at 200KHz	0.010	0.000	0.000	0.007
Reactance at 50KHz	0.008	0.000	0.000	0.045
Resistance at 50KHz	0.026	0.124	0.004	0.000
Phase Angle at 50 kHz	0.403	0.332	0.001	0.870
BMR	0.016	0.309	0.001	0.000
ICE	0.257	0.257	0.091	0.309
Normal ICW	0.086	0.004	0.219	0.003
ECW	0.612	0.000	0.105	0.414
Normal ECW	0.111	0.002	0.038	0.204
TBW	0.536	0.543	0.004	0.000
Min TBW	0.130	0.670	0.006	0.025
Max TBW	0.081	0.004	0.012	0.005
BCM	0.263	0.008	0.000	0.643

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.1.2 Comparisons of Secondary Bioimpedance Parameters before Treatment for Female Age group 1.

Secondary Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment (p)	Diseases Grp(p)
Percentage of fat	0.002	0.014	0.002	0.116
Min fat	0.037	0.000	0.037	0.229
Max fat	0.015	0.002	0.015	0.229
Percentage o lean	0.002	0.014	0.002	0.000
Max lean	0.522	0.674	0.522	0.906
Min lean	0.640	0.733	0.640	0.822
Percentage of water	0.038	0.000	0.038	0.009
Min water	0.016	0.000	0.016	0.070
Max water	0.012	0.000	0.012	0.060
Dry lean weight	0.025	0.312	0.025	0.414
Density	0.006	0.013	0.006	0.204
Third space	0.005	0.000	0.002	0.000
Nutrition	0.342	0.090	0.342	0.025

Table 4.4.1.3. Comparisons of Main Bioimpedance Parameters after Treatment for Female Age group 1.

Main Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment(p)	Diseases Grp(p)
Impedance value at 5KHz	0.003	0.000	0.005	0.919
Impedance value at 50KHz	0.960	0.000	0.643	0.231
Impedance value at 100KHz	0.929	0.000	0.116	0.747
Impedance value at 200KHz	0.816	0.000	0.229	0.853
Reactance at 50KHz	0.951	0.786	0.229	0.765
Resistance at 50KHz	0.666	0.099	0.000	0.874
Phase Angle at 50 kHz	0.870	0.730	0.906	0.466
BMR	0.264	0.001	0.822	0.419
ICW	0.024	0.760	0.000	0.388
ECW	0.012	0.769	0.000	0.811
Normal ECW	0.024	0.000	0.000	0.302
TBW	0.283	0.024	0.001	0.540
Min TBW	0.024	0.000	0.020	0.414
Max TBW	0.330	0.000	0.007	0.457
BCM	0.648	0.000	0.009	0.428

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.1.4 Comparisons of Secondary Bioimpedance Parameters after Treatment For Female Age group 1.

Secondary Bioimpedance Parameters	Overall (P)	BMI (P)	No of treatment (P)	Diseases Grp(P)
Percentage of fat	0.064	0.008	0.484	0.717
Min fat	0.087	0.005	0.044	0.013
Max fat	0.014	0.003	0.454	0.005
Min lean	0.016	0.004	0.455	0.717
Max lean	0.009	0.005	0.448	0.686
Dry lean weight	0.489	0.002	0.592	0.516
Percentage of water	0.263	0.006	0.202	0.621
Min percentage of water	0.055	0.003	0.268	0.414
Max percentage of water	0.369	0.001	0.241	0.457
Water	0.369	0.000	0.373	0.704
Min water	0.348	0.000	0.214	0.733
Max water	0.092	0.000	0.297	0.926
Density	0.374	0.000	0.235	0.229
Nutrition	0.399	0.000	0.248	0.000
Third space value	0.054	0.000	0.264	0.040

Table 4.4.1.5 Comparisons of Main Bioimpedance Parameters before Treatment for male age group 1.

Main Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment (p)	Diseases Grp(p)
Impedance value at 5KHz	0.075	0.006	0.000	0.011
Impedance value at 50KHz	0.255	0.001	0.446	0.000
Impedance value at 100KHz	0.000	0.001	0.103	0.000
Impedance value at 200KHz	0.075	0.001	0.017	0.014
Reactance at 50KHz	0.489	0.001	0.022	0.003
Resistance at 50KHz	0.000	0.001	0.045	0.121
Phase Angle at 50 kHz	0.865	0.001	0.018	0.664
BMR	0.024	0.017	0.630	0.432
ICW	0.029	0.605	0.216	0.782
Normal ICW	0.083	0.124	0.096	0.000
Extra-cellular water	0.613	0.590	0.033	0.000
Normal ECW	0.374	0.017	0.498	0.000
TBW	0.034	0.577	0.034	0.000
Min TBW	0.009	0.603	0.018	0.000
Max TBW	0.007	0.018	0.054	0.002
BCM	0.004	0.069	0.043	0.013

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.1.6 Comparisons of Secondary Bioimpedance Parameters before Treatment for Male Age group 1.

Secondary Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment (p)	Diseases Grp(p)
Percentage of fat	0.002	0.014	0.002	0.000
Min fat	0.037	0.000	0.037	0.000
Max fat	0.015	0.002	0.015	0.000
Percentage o lean	0.002	0.014	0.002	0.001
Max lean	0.522	0.674	0.522	0.000
Min lean	0.640	0.733	0.640	0.174
Percentage of water	0.038	0.000	0.038	0.839
Min water	0.016	0.000	0.016	0.023
Max water	0.012	0.000	0.012	0.016
Dry lean weight	0.025	0.312	0.025	0.001
Density	0.006	0.013	0.006	0.016
Third space	0.078	0.000	0.002	0.003
Nutrition	0.342	0.090	0.342	0.041

Table 4.4.1.7 Comparisons of Main Bioimpedance Parameters after Treatment for Male Age group 1.

Main Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment(p)	Diseases Grp(p)
Impedance value at 5KHz	0.110	0.340	0.003	0.009
Impedance value at 50KHz	0.232	0.372	0.359	0.018
Impedance value at 100KHz	0.163	0.257	0.071	0.001
Impedance value at 200KHz	0.027	0.332	0.003	0.002
Reactance at 50KHz	0.021	0.212	0.200	0.006
Resistance at 50KHZ	0.132	0.048	0.116	0.080
Phase Angle at 50 kHz	0.004	0.364	0.000	0.293
BMR	0.013	0.283	0.054	0.350
ICW	0.053	0.293	0.036	0.754
ECW	0 .034	0.386	0.306	0.099
Normal ECW	0.231	0.244	0.000	0.350
TBW	0.747	0.276	0.000	0.370
Min TBW	0.853	0.309	0.057	0.244
Max TBW	0.765	0.338	0.007	0.070
BCM	0.874	0.281	0.051	0.374

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.1.8 Comparisons of Secondary Bioimpedance Parameters after Treatment for Male Age group 1.

Secondary Bioimpedance Parameters	Overall (P)	BMI (P)	No of treatment(p)	Diseases Grp(P)
Percentage of fat	0.000	0.399	0.001	0.008
Min fat	0.000	0.000	0.919	0.067
Max fat	0.758	0.466	0.006	0.030
Min lean	0.004	0.419	0.011	0.226
Max lean	0.000	0.388	0.005	0.577
Dry lean weight	0.535	0.811	0.000	0.603
Percentage of water	0.058	0.302	0.000	0.222
Min percentage of water	0.763	0.540	0.301	0.012
Max percentage of water	0.000	0.414	0.019	0.003
Water	0.664	0.457	0.001	0.011
Min water	0.451	0.428	0.019	0.830
Max water	0.000	0.737	0.003	0.267
Density	0.014	0.001	0.019	0.315
Nutrition	0.006	0.004	0.108	0.007
Third space value	0.005	0.002	0.009	0.000

4.4.2 Comparison of Bioimpedance Parameters with Patient's Age Group 2.

In this section Comparison of Bioimpedance Parameters with Patient's Age Group are shown here. For ease of reporting and analysis age group also divided into four groups here. Age 21 to 30 in group 1, age 31 to 50 in group 2, 51 to 70 in group 3 and 71 to 91 in group 4.In section 4.4.2.1.1-4.4.2.8. actually only age group 2 mean age 31 to 50 for male and female are selected for analysis. Then according to the factor BMI, Number of treatment has done by the patient and types of diseases we need to analyze the main bioimpedance parameters. Most of the cases the value of P is significant and for some parameter they are not significant at all. For analysis the bioimpedance parameters are divided into two groups here. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. Independent T test and ANOVA test was used here for this analysis. The value of P should be less than 5% for significance.

Table 4.4.2.1 Comparisons of Main Bioimpedance Parameters before Treatment for Female age group 2.

Main Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment (p)	Diseases Grp(p)
Impedance value at 5KHz	0.717	0.426	0.533	0.004
Impedance value at 50KHz	0.013	0.376	0.417	0.830
Impedance value at 100KHz	0.800	0.717	0.574	0.455
Impedance value at 200KHz	0.717	0.013	0.567	0.858
Reactance at 50KHz	0.686	1.000	0.436	0.962
Resistance at 50KHz	0.516	0.717	0.369	0.622
Phase Angle at 50 kHz	0.621	0.686	0.306	0.846
BMR	0.414	0.516	0.967	0.795
ICW	0.457	0.621	0.406	0.838
Normal ICW	0.704	0.414	0.288	0.457
ECW	0.733	0.457	0.369	0.486
Normal ECW	0.926	0.704	0.756	0.608
TBW	0.229	0.733	0.415	0.430
Min TBW	0.003	0.926	0.466	0.433
Max TBW	0.011	0.229	0.936	0.465
BCM	0.000	0.007	0.788	0.455

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.2.2 Comparisons of Secondary Bioimpedance Parameters before Treatment for Female Age group 2.

Secondary Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment (p)	Diseases Grp(p)
Percentage of fat	0.002	0.014	0.002	0.061
Min fat	0.037	0.000	0.037	0.043
Max fat	0.015	0.002	0.015	0.046
Percentage o lean	0.002	0.014	0.002	0.060
Max lean	0.522	0.674	0.522	0.046
Min lean	0.640	0.733	0.640	0.963
Percentage of water	0.038	0.000	0.038	0.264
Min water	0.016	0.000	0.016	0.058
Max water	0.012	0.000	0.012	0.021
Dry lean weight	0.025	0.312	0.025	0.090
Density	0.006	0.013	0.006	0.021
Third space	0.002	0.000	0.002	0.038
Nutrition	0.342	0.090	0.342	0.042

Table 4.4.2.3. Comparisons of Main Bioimpedance Parameters after Treatment for Female Age group 2.

Main Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment(p)	Diseases Grp(p)
Impedance value at 5KHz	0.067	0.076	0.006	0.021
Impedance value at 50KHz	0.000	0.328	0.189	0.058
Impedance value at 100KHz	0.014	0.267	0.019	0.139
Impedance value at 200KHz	0.003	0.748	0.006	0.920
Reactance at 50KHz	0.121	0.301	0.006	0.474
Resistance at 50KHz	0.664	0.332	0.019	0.160
Phase Angle at 50 kHz	0.432	0.333	0.879	0.920
BMR	0.782	0.388	0.019	0.730
ICW	0.000	0.465	0.014	0.543
ECW	0.000	0.489	0.670	0.322
Normal ECW	0.000	0.343	0.582	0.309
TBW	0.704	0.186	0.467	0.338
Min TBW	0.733	0.174	0.435	0.670
Max TBW	0.926	0.009	0.929	0.881
BCM	0.229	0.323	0.474	0.464

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.2.4. Comparisons of Secondary Bioimpedance Parameters after Treatment. For Female Age group 2.

Secondary Bioimpedance Parameters	Overall (P)	BMI (P)	No of treatment(p)	Diseases Grp(P)
Percentage of fat	0.001	0.000	0.088	0.884
Min fat	0.000	0.000	0.034	0.861
Max fat	0.000	0.000	0.002	0.806
Min lean	0.000	0.001	0.013	0.322
Max lean	0.000	0.000	0.000	0.415
Dry lean weight	0.000	0.174	0.011	0.466
Percentage of water	0.000	0.839	0.168	0.715
Min percentage of water	0.000	0.023	0.063	0.534
Max percentage of water	0.786	0.016	0.323	0.937
Water	0.099	0.001	0.000	0.345
Min water	0.730	0.016	0.323	0.182
Max water	0.001	0.003	0.000	0.678
Density	0.760	0.041	0.323	0.600
Nutrition	0.769	0.009	0.052	0.890
Third space value	0.000	0.018	0.000	0.678

Table 4.4.2.5 Comparisons of Main Bioimpedance Parameters before Treatment for male age group 2.

Main Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment (p)	Diseases Grp(p)
Impedance value at 5KHz	0.008	0.000	0.007	0.484
Impedance value at 50KHz	0.019	0.003	0.008	0.044
Impedance value at 100K	0.069	0.000	0.003	0.454
Impedance value at 200K	0.099	0.000	0.004	0.454
Reactance at 50K	0.000	0.189	0.003	0.448
Resistance at 50K	0.091	0.014	0.001	0.592
Phase Angle at 50 kHz	0.001	0.000	0.002	0.202
BMR	0.005	0.323	0.005	0.268
ICW	0.000	0.172	0.009	0.241
Normal ICW	0.076	0.000	0.004	0.373
ECW	0.007	0.019	0.067	0.214
Normal ECW	0.062	0.031	0.088	0.297
TBW	0.068	0.000	0.099	0.235
Min TBW	0.005	0.006	0.033	0.248
Max TBW	0.054	0.009	0.022	0.264
BCM	0.004	0.011	0.057	0.427

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.2.6 Comparisons of Secondary Bioimpedance Parameters before Treatment for Male Age group 2.

Secondary Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment (p)	Diseases Grp(p)
Percentage of fat	0.002	0.014	0.002	0.006
Min fat	0.037	0.000	0.037	0.007
Max fat	0.015	0.002	0.015	0.009
Percentage o lean	0.002	0.014	0.002	0.739
Max lean	0.522	0.674	0.522	0.083
Min lean	0.640	0.733	0.640	0.004
Percentage of water	0.038	0.000	0.038	0.739
Min water	0.016	0.000	0.016	0.000
Max water	0.012	0.000	0.012	0.000
Dry lean weight	0.025	0.312	0.025	0.035
Density	0.006	0.013	0.006	0.041
Third space	0.002	0.000	0.002	0.009
Nutrition	0.342	0.090	0.342	0.000

Table 4.4.2.7 Comparisons of Main Bioimpedance Parameters after Treatment for Male Age group 2.

Main Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment(p)	Diseases Grp(p)
Impedance value at 5KHz	0.000	0.003	0.493	0.297
Impedance value at 50KHz	0.035	0.000	0.000	0.027
Impedance value at 100KHz	0.041	0.000	0.774	0.021
Impedance value at 200KHz	0.009	0.189	0.493	0.001
Reactance at 50KHz	0.000	0.014	0.312	0.367
Resistance at 50KHz	0.297	0.000	0.334	0.000
Phase Angle at 50 kHz	0.027	0.323	0.327	0.001
BMR	0.021	0.172	0.235	0.025
ICW	0.367	0.000	0.248	0.004
ECW	0.000	0.019	0.526	0.148
Normal ECW	0.001	0.031	0.413	0.760
TBW	0.025	0.000	0.000	0.794
Min TBW	0.004	0.083	0.219	0.339
Max TBW	0.148	0.004	0.004	0.030
BCM	0.760	0.739	0.006	0.070

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.2.8 Comparisons of Secondary Bioimpedance Parameters after Treatment for Male Age group 2.

Secondary Bioimpedance Parameters	Overall (P)	BMI (P)	No of treatment(p)	Diseases Grp(P)
Percentage of fat	0.493	0.001	0.739	0.045
Min fat	0.000	0.457	0.000	0.339
Max fat	0.664	0.428	0.219	0.000
Min lean	0.451	0.737	0.919	0.000
Max lean	0.000	0.001	0.231	0.000
Dry lean weight	0.014	0.005	0.747	0.000
Percentage of water	0.717	0.008	0.853	0.774
Min percentage of water	0.013	0.009	0.765	0.493
Max percentage of water	0.005	0.002	0.874	0.312
Water	0.717	0.758	0.466	0.334
Min water	0.686	0.004	0.419	0.327
Max water	0.516	0.007	0.388	0.235
Density	0.621	0.535	0.811	0.248
Nutrition	0.414	0.058	0.302	0.526
Third space value	0.457	0.763	0.540	0.413

4.4.3 Comparison of Bioimpedance Parameters with Patient's Age Group 3

In this section Comparison of Bioimpedance Parameters with Patient's Age Group are shown here. For ease of reporting and analysis age group also divided into four groups here. Age 21 to 30 in group 1, age 31 to 50 in group 2, 51 to 70 in group 3 and 71 to 91 in group 4.In section 4.4.3.1-4.4.3.8 actually only age group 3 mean age 51 to 70 for male and female are selected for analysis. Then according to the factor BMI, Number of treatment has done by the patient and types of diseases we need to analyze the main bioimpedance parameters. Most of the cases the value of P is significant and for some parameter they are not significant at all. For analysis the bioimpedance parameters are divided into two groups here. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. Independent T test and ANOVA test was used here for this analysis. The value of P should be less than 5% for significance.

Table 4.4.3.1 Comparisons of Main Bioimpedance Parameters before Treatment for Female age group 3.

Main Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment (p)	Diseases Grp(p)
Impedance value at 5KHz	0.063	0.000	0.000	0.704
Impedance value at 50KHz	0.323	0.000	0.000	0.733
Impedance value at 100KHz	0.000	0.002	0.002	0.926
Impedance value at 200KHz	0.323	0.013	0.013	0.229
Reactance at 50KHz	0.000	0.000	0.000	0.000
Resistance at 50KHz	0.323	0.011	0.011	0.000
Phase Angle at 50 kHz	0.052	0.168	0.168	0.000
BMR	0.001	0.001	0.023	0.000
ICW	0.000	0.000	0.016	0.002
Normal ICW	0.000	0.000	0.001	0.000
ECW	0.000	0.000	0.016	0.000
Normal ECW	0.000	0.000	0.003	0.000
TBW	0.000	0.000	0.041	0.001
Min TBW	0.000	0.000	0.009	0.000
Max TBW	0.000	0.000	0.018	0.174
BCM	0.786	0.786	0.001	0.839

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.3.2 Comparisons of Secondary Bioimpedance Parameters before Treatment for Female Age group 3.

Secondary Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment (p)	Diseases Grp(p)
Percentage of fat	0.002	0.014	0.002	0.099
Min fat	0.037	0.000	0.037	0.730
Max fat	0.015	0.002	0.015	0.001
Percentage o lean	0.002	0.014	0.002	0.760
Max lean	0.522	0.674	0.522	0.769
Min lean	0.640	0.733	0.640	0.000
Percentage of water	0.038	0.000	0.038	0.024
Min water	0.016	0.000	0.016	0.484
Max water	0.012	0.000	0.012	0.044
Dry lean weight	0.025	0.312	0.025	0.454
Density	0.006	0.013	0.006	0.455
Third space	0.002	0.000	0.002	0.448
Nutrition	0.342	0.090	0.342	0.592

Table 4.4.3.3 Comparisons of Main Bioimpedance Parameters after Treatment for Female Age group 3.

Main Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment(p)	Diseases Grp(p)
Impedance value at 50KHz	0.000	0.000	0.248	0.268
Impedance value at 100KHz	0.000	0.000	0.264	0.241
Impedance value at 200KHz	0.026	0.001	0.427	0.373
Reactance at 50KHz	0.874	0.000	0.000	0.214
Resistance at 50KHz	0.001	0.003	0.000	0.297
Phase Angle at 50 kHz	0.026	0.000	0.000	0.739
BMR	0.094	0.000	0.003	0.083
ICW	0.029	0.000	0.000	0.004
ECW	0.009	0.000	0.000	0.739
Normal ICW	0.225	0.000	0.189	0.000
TBW	0.222	0.000	0.014	0.000
Min TBW	0.259	0.019	0.000	0.035
Max TBW	0.029	0.031	0.323	0.041
BCM	0.122	0.000	0.172	0.009

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.3.4 Comparisons of Secondary Bioimpedance Parameters after Treatment For Female Age group 3.

Secondary Bioimpedance Parameters	Overall (P)	BMI (P)	No of treatment(p)	Diseases Grp(P)
Percentage of fat	0.003	0.000	0.000	0.000
Min fat	0.960	0.409	0.000	0.297
Max fat	0.929	0.302	0.493	0.027
Min lean	0.816	0.332	0.000	0.021
Max lean	0.951	0.005	0.774	0.001
Dry lean weight	0.666	0.034	0.493	0.367
Percentage of water	0.870	0.000	0.312	0.000
Min percentage of water	0.264	0.000	0.334	0.001
Max percentage of water	0.024	0.000	0.327	0.025
Water	0.012	0.037	0.235	0.004
Min water	0.024	0.345	0.248	0.148
Max water	0.007	0.005	0.526	0.760
Density	0.330	0.009	0.413	0.794
Nutrition	0.648	0.283	0.000	0.339
Third space value	0.235	0.024	0.219	0.000

Table 4.4.3.5 Comparisons of Main Bioimpedance Parameters before Treatment for Male age group 3.

Main Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment (p)	Diseases Grp(p)
Impedance value at 5KHz	0.428	0.112	0.071	0.075
Impedance value at 50KHz	0.451	0.898	0.252	0.255
Impedance value at 100KHz	0.615	0.207	0.005	0.005
Impedance value at 200KHz	0.466	0.107	0.074	0.075
Reactance at 50KHz	0.323	0.693	0.486	0.489
Resistance at 50KHz	0.878	0.978	0.005	0.060
Phase Angle at 50 kHz	0.936	0.229	0.866	0.865
BMR	0.019	0.010	0.025	0.024
ICW	0.067	0.010	0.009	0.083
ECW	0.454	0.013	0.617	0.613
Normal ICW	0.334	0.000	0.370	0.374
TBW	1.000	0.101	0.004	0 .034
Min TBW	0.454	0.428	0.003	0.003
Max TBW	0.299	0.253	0.200	0.359
BCM	0.576	0.838	0.116	0.071

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.3.6 Comparisons of Secondary Bioimpedance Parameters before Treatment for Male Age group 3.

Secondary Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment (p)	Diseases Grp(p)
Percentage of fat	0.002	0.014	0.002	0.306
Min fat	0.037	0.000	0.037	0.405
Max fat	0.015	0.002	0.015	0.007
Percentage o lean	0.002	0.001	0.002	0.051
Max lean	0.522	0.674	0.522	0.000
Min lean	0.640	0.733	0.640	0.008
Percentage of water	0.038	0.000	0.038	0.067
Min water	0.016	0.000	0.016	0.030
Max water	0.012	0.000	0.012	0.226
Dry lean weight	0.025	0.312	0.025	0.577
Density	0.006	0.013	0.006	0.603
Third space	0.045	0.000	0.002	0.222
Nutrition	0.342	0.090	0.342	0.002

Table 4.4.3.7 Comparisons of Main Bioimpedance Parameters after Treatment for Male Age group 3.

Main Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment(p)	Diseases Grp(p)
Impedance value at 5KHz	0.525	0.328	0.015	0.003
Impedance value at 50KHz	0.394	0.655	0.990	0.011
Impedance value at 100KHz	0.003	0.890	0.865	0.340
Impedance value at 200KHz	0.026	0.944	0.692	0.372
Reactance at 50KHz	0.000	0.710	0.990	0.257
Resistance at 50KHz	0.003	0.272	0.331	0.332
Phase Angle at 50 kHz	0.020	0.097	0.403	0.212
BMR	0.008	0.419	0.416	0.048
ICW	0.001	0.334	0.671	0.364
Normal ICW	0.239	0.491	0.626	0.283
ECW	0.248	0.334	0.671	0.293
Normal ECW	0.115	0.526	0.380	0.386
TBW	0.001	0.334	0.323	0.244
Min TBW	0.002	0.334	0.878	0.276
Max TBW	0.006	0.489	0.405	0.309
BCM	0.067	.098	.056	0.789

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.3.8 Comparisons of Secondary Bioimpedance Parameters after Treatment for Male Age group 3.

Secondary Bioimpedance Parameters	Overall (P)	BMI (P)	No of treatment(p)	Diseases Grp(P)
Percentage of fat	0.126	0.299	0.858	0.338
Min fat	0.734	0.811	0.504	0.281
Max fat	0.165	0.002	0.154	0.919
Min lean	0.111	0.299	0.198	0.920
Max lean	0.000	0.193	0.119	0.474
Dry lean weight	0.691	0.086	0.979	0.160
Percentage of water	0.036	0.248	0.430	0.920
Min percentage of water	0.087	0.323	0.089	0.730
Max percentage of water	0.109	0.323	0.323	0.543
Water	0.446	0.268	0.361	0.322
Min water	0.004	0.767	0.323	0.309
Max water	0.002	0.941	0.123	0.338
Density	0.184	0.249	0.323	0.670
Nutrition	0.015	0.138	0.323	0.881
Third space value	0.000	0.000	0.099	0.464

4.4.4 Comparison of Bioimpedance Parameters with Patient's Age Group 4.

In this section Comparison of Bioimpedance Parameters with Patient's Age Group are shown here. For ease of reporting and analysis age group also divided into four groups here. Age 21 to 30 in group 1, age 31 to 50 in group 2, 51 to 70 in group 3 and 71 to 91 in group 4.In section 4.4.4.1-4.4.4.8 actually only age group 4 mean age 71 to 90 for male and female are selected for analysis. Then according to the factor BMI, Number of treatment has done by the patient and types of diseases we need to analyze the main bioimpedance parameters. Most of the cases the value of P is significant and for some parameter they are not significant at all. For analysis the bioimpedance parameters are divided into two groups here. They are primary and secondary bioimpedance parameters. Also need to consider the condition before and after treatment here. Independent T test and ANOVA test was used here for this analysis. The value of P should be less than 5% for significance.

Table 4.4.4.1 Comparisons of Main Bioimpedance Parameters before Treatment for Female age group 4.

Main Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment (p)	Diseases Grp(p)
Impedance value at 5KHz	0.305	0.004	0.481	0.182
Impedance value at 50KHz	0.002	0.088	0.099	0.001
Impedance value at 100KHz	0.001	0.028	0.169	0.003
Impedance value at 200KHz	0.001	0.010	0.331	0.006
Reactance at 50KHz	0.001	0.015	0.111	0.011
Resistance at 50KHz	0.001	0.011	0.025	0.005
Phase Angle at 50 kHz	0.000	0.248	0.483	0.000
BMR	0.001	0.017	0.559	0.000
ICW	0.009	0.044	0.084	0.301
Normal ICW	0.668	0.925	0.525	0.019
ECW	0.076	0.396	0.085	0.001
Normal ECW	0.615	0.818	0.264	0.019
TBW	0.010	0.050	0.087	0.003
Min TBW	0.575	0.824	0.124	0.019
Max TBW	0.771	0.970	0.495	0.108
BCM	0.009	0.044	0.991	0.009

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.4.2 Comparisons of Secondary Bioimpedance Parameters before Treatment for Female Age group 4.

Secondary Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment (p)	Diseases Grp(p)
Percentage of fat	0.002	0.014	0.002	0.533
Min fat	0.037	0.000	0.037	0.417
Max fat	0.015	0.002	0.015	0.574
Percentage o lean	0.002	0.014	0.002	0.567
Max lean	0.522	0.674	0.522	0.436
Min lean	0.640	0.733	0.640	0.369
Percentage of water	0.038	0.000	0.038	0.306
Min water	0.016	0.000	0.016	0.967
Max water	0.012	0.000	0.012	0.406
Dry lean weight	0.025	0.312	0.025	0.288
Density	0.006	0.013	0.006	0.369
Third space	0.002	0.000	0.002	0.756
Nutrition	0.342	0.090	0.342	0.415

Table 4.4.4.3. Comparisons of Main Bioimpedance Parameters after Treatment for Female Age group 4.

Main Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment(p)	Diseases Grp(p)
Impedance value at 5KHz	0.426	0.788	0.936	0.466
Impedance value at 50KHz	0.376	0.058	0.061	0.455
Impedance value at 100KHz	0.182	0.139	0.043	0.858
Impedance value at 200KHz	0.006	0.920	0.046	0.962
Reactance at 50KHz	0.189	0.474	0.060	0.622
Resistance at 50KHz	0.019	0.160	0.046	0.846
Phase Angle at 50 kHz	0.006	0.920	0.963	0.795
BMR	0.006	0.730	0.264	0.838
ICW	0.019	0.543	0.058	0.457
Normal ICW	0.879	0.322	0.021	0.486
ECW	0.019	0.309	0.090	0.608
Normal ECW	0.014	0.338	0.021	0.430
TBW	0.670	0.670	0.038	0.433
Min TBW	0.582	0.881	0.042	0.465
Max TBW	0.467	0.464	0.021	0.455

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.4.4 Comparisons of Secondary Bioimpedance Parameters after Treatment. For Female Age group 4.

Secondary Bioimpedance Parameters	Overall (P)	BMI (P)	No of treatment(p)	Diseases Grp(P)
Percentage of fat	0.002	0.110	0.328	0.435
Min fat	0.001	0.481	0.267	0.929
Max fat	0.001	0.143	0.748	0.323
Min lean	0.001	0.110	0.301	0.474
Max lean	0.001	0.232	0.332	0.884
Dry lean weight	0.001	0.163	0.333	0.861
Percentage of water	0.001	0.027	0.388	0.806
Min percentage of water	0.003	0.021	0.465	0.322
Max percentage of water	0.232	0.132	0.489	0.415
Water	0.029	0.004	0.343	0.466
Min water	0.206	0.013	0.186	0.715
Max water	0.003	0.053	0.174	0.534
Density	0.239	0.034	0.009	0.937
Nutrition	0.248	0.008	0.006	0.345
Third space value	0.003	0.005	0.002	0.456

Table 4.4.4.5 Comparisons of Main Bioimpedance Parameters before Treatment for male age group 4.

Main Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment (p)	Diseases Grp(p)
Impedance value at 5KHz	0.012	0.061	0.032	0.006
Impedance value at 50KHz	0.017	0.279	0.372	0.021
Impedance value at 100KHz	0.002	0.150	0.056	0.026
Impedance value at 200KHz	0.012	0.230	0.069	0.003
Reactance at 50KHz	0.061	0.824	0.112	0.003
Resistance at 50KHz	0.038	0.970	0.061	0.002
Phase Angle at 50 kHz	0.001	0.947	0.930	0.672
BMR	0.575	0.012	0.126	0.131
ICW	0.771	0.004	0.542	0.013
Normal ICW	0.416	0.008	0.006	0.235
ECW	0.003	0.000	0.250	0.077
Normal ECW	0.005	0.000	0.015	0.261
TBW	0.004	0.000	0.388	0.016
Min TBW	0.000	0.000	0.010	0.225
Max TBW	0.007	0.000	0.006	0.222
BCM	0.000	0.001	0.510	0.014

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.4.6 Comparisons of Secondary Bioimpedance Parameters before Treatment for Male Age group 4.

Secondary Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment (p)	Diseases Grp (p)
Percentage of fat	0.002	0.014	0.002	0.008
Min fat	0.037	0.000	0.037	0.005
Max fat	0.015	0.002	0.015	0.008
Percentage o lean	0.002	0.014	0.002	0.001
Max lean	0.522	0.674	0.522	0.003
Min lean	0.640	0.733	0.640	0.055
Percentage of water	0.038	0.000	0.038	0.077
Min water	0.016	0.000	0.016	0.088
Max water	0.012	0.000	0.012	0.055
Dry lean weight	0.025	0.312	0.025	0.077
Density	0.006	0.013	0.006	0.320
Third space	0.002	0.000	0.002	0.043
Nutrition	0.342	0.090	0.342	0.220

Table 4.4.4.7 Comparisons of Main Bioimpedance Parameters after Treatment for Male Age group 4.

Main Bioimpedance Parameters	Overall (p)	BMI (p)	No of treatment(p)	Diseases Grp(p)
Impedance value at 5KHz	0.000	0.022	0.611	0.600
Impedance value at 50KHz	0.000	0.055	0.028	0.400
Impedance value at 100KHz	0.000	0.012	0.031	0.800
Impedance value at 200KHz	0.000	0.000	0.363	0.000
Reactance at 50KHz	0.000	0.000	0.000	0.001
Resistance at 50KHz	0.000	0.000	0.000	0.001
Phase Angle at 50 kHz	0.701	0.701	0.000	0.004
BMR	0.000	0.000	0.000	0.001
ICW	0.000	0.000	0.000	0.001
Normal ICW	0.000	0.000	0.000	0.339
ECW	0.000	0.000	0.000	0.538
Normal ECW	0.000	0.000	0.000	0.368
TBW	0.000	0.000	0.000	0.030
Min TBW	0.000	0.000	0.000	0.941
Max TBW	0.000	0.000	0.000	0.029

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.4.4.8 Comparisons of Secondary Bioimpedance Parameters after Treatment for Male Age group 4.

Secondary Bioimpedance Parameters	Overall (P)	BMI (P)	No of treatment(p)	Diseases Grp(P)
Percentage of fat	0.032	0.003	0.009	0.007
Min fat	0.087	0.004	0.076	0.024
Max fat	0.000	0.093	0.084	0.097
Min lean	0.001	0.067	0.014	0.000
Max lean	0.051	0.000	0.037	0.065
Dry lean weight	0.012	0.061	0.032	0.006
Percentage of water	0.017	0.279	0.372	0.021
Min percentage of water	0.002	0.150	0.056	0.026
Max percentage of water	0.012	0.230	0.069	0.003
Water	0.061	0.824	0.112	0.003
Min water	0.038	0.970	0.061	0.002
Max water	0.001	0.947	0.930	0.672
Density	0.575	0.012	0.126	0.131
Nutrition	0.771	0.004	0.542	0.013
Third space value	0.416	0.008	0.006	0.235

4.5.1 Interaction of Bioimpedance Parameters with Patient's Gender.

According to gender the interaction between age group, BMI group and diseases groups for the main and secondary bioimpedance parameters before and after test are shown here .In this section the interaction between age group, BMI group and diseases group according to female main bioimpedance parameters are shown. Most of the case the value of P is significant and some cases it's not. For significance the value of P should be P<0.05.

Table 4.5.1 Interaction of Main Bioimpedance Parameters before Treatment for Female.

Main Bioimpedance Parameters	Age Grp(p)	BMI Grp (p)	Disease (p)
Impedance value at 5KHz	0.000	0.000	0.000
Impedance value at 50KHz	0.001	0.000	0.000
Impedance value at 100KHz	0.001	0.000	0.000
Impedance value at 200KHz	0.004	0.000	0.000
Reactance at 50KHz	0.001	0.000	0.000
Resistance at 50KHz	0.001	0.000	0.001
Phase Angle at 50 kHz	0.339	0.000	0.000
BMR	0.538	0.000	0.000
ICW	0.368	0.000	0.007
Normal ICW	0.030	0.000	0.000
ECW	0.941	0.000	0.000
Normal ECW	0.029	0.000	0.000
TBW	0.611	0.000	0.000
Min TBW	0.028	0.000	0.000
Max TBW	0.031	0.000	0.002
BCM	0.363	0.000	0.000

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.2 Interaction of Main Bioimpedance Parameters after Treatment for Female.

Main Bioimpedance Parameters	Age Grp(p)	BMI Grp (p)	Disease (p)
Impedance value at 5KHz	0.000	0.000	0.000
Impedance value at 50KHz	0.000	0.000	0.000
Impedance value at 100KHz	0.000	0.000	0.000
Impedance value at 200KHz	0.001	0.000	0.000
Reactance at 50KHz	0.000	0.000	0.000
Resistance at 50KHz	0.241	0.000	0.000
Phase Angle at 50 kHz	0.738	0.701	0.000
BMR	0.216	0.000	0.000
ICW	0.368	0.000	0.000
Normal ICW	0.018	0.000	0.000
ECW	0.768	0.000	0.000
Normal ECW	0.013	0.000	0.000
TBW	0.259	0.000	0.000
Min TBW	0.018	0.000	0.000
Max TBW	0.021	0.000	0.000
BCM	0.373	0.000	0.000

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.3 Comparisons of Secondary Bioimpedance Parameters before Treatment for Female.

Secondary Bioimpedance Parameters	Age Grp(p)	BMI Grp (p)	Disease (p)
Percentage of fat	0.003	0.000	0.000
Min fat	0.372	0.000	0.000
Max fat	0.509	0.000	0.000
Percentage of lean	0.003	0.000	0.000
Min lean	0.730	0.001	0.000
Max lean	0.597	0.000	0.000
Percentage of water	0.000	0.000	0.003
Min water	0.028	0.000	0.000
Max water	0.031	0.000	0.000
Dry lean weight	0.705	0.023	0.000
Density	0.000	0.000	0.000
Nutrition	0.000	0.000	0.000
Third space value	0.019	0.067	0.000

Table 4.5.4 Interactios of Secondary Bioimpedance Parameters after Treatment for Female.

Secondary Bioimpedance Parameters	Age Grp(p)	BMI Grp (p)	Disease (p)
Percentage of fat	0.001	0.000	0.000
Min fat	0.477	0.000	0.000
Max fat	0.949	0.000	0.000
Min lean	0.001	0.000	0.000
Max lean	0.541	0.000	0.000
Dry lean weight	0.370	0.000	0.000
Percentage of water	0.043	0.039	1.000
Min water	0.018	0.000	0.000
Max water	0.021	0.000	0.000
Density	0.515	0.000	0.000
Nutrition	0.000	0.000	0.000
Third space value	0.107	0.045	0.000

Table 4.5.5 Interaction of Main Bioimpedance Parameters before Treatment for Male.

Main Bioimpedance Parameters	Age Grp (p)	BMI Grp (p)	Diseases (p)
Impedance value at 5K	0.013	0.851	0.046
Impedance value at 50K	0.008	0.475	0.143
Impedance value at 100K	0.003	0.346	0.160
Impedance value at 200K	0.001	0.269	0.150
Reactance at 50K	0.006	0.454	0.151
Resistance at 50K	0.000	0.000	0.437
Phase Angle at 50 kHz	0.000	0.001	0.453
BMR	0.000	0.431	0.011
ICW	0.046	0.960	0.273
Normal ICW	0.030	0.261	0.299
ECW	0.017	0.942	0.097
Normal ECW	0.081	0.411	0.420
TBW	0.056	0.889	0.136
Min TBW	0.048	0.192	0.373
Max TBW	0.014	0.258	0.229
BCM	0.046	0.953	0.281

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.6 Interaction of Main Bioimpedance Parameters after Treatment for Male.

Main Bioimpedance Parameters	Age Grp(p)	BMI Grp (p)	Diseases (p)
Impedance value at 5KHz	0.016	0.768	0.090
Impedance value at 50KHz	0.009	0.345	0.143
Impedance value at 100KHz	0.006	0.877	0.160
Impedance value at 200KHz	0.008	0.900	0.178
Reactance at 50KHz	0.006	0.788	0.189
Resistance at 50KHz	0.000	0.000	0.879
Phase Angle at 50 kHz	0.000	0.001	0.453
BMR	0.000	0.899	0.899
ICW	0.048	0.045	0.273
Normal ICW	0.050	0.098	0.279
ECW	0.019	0.045	0.077
Normal ECW	0.071	0.411	0.480
TBW	0.059	0.056	0.126
Min TBW	0.076	0.897	0.003
Max TBW	0.014	0.258	0.229
BCM	0.046	0.953	0.281

Note:BMR = Basal Metabolic Rate. ICW = Intra Cellular Water. ECW = Extra Cellular Water. TBW = Total body water volume. BCM = Body cell mass.

Table 4.5.7 Interactions of Secondary Bioimpedance Parameters before Treatment for Male.

Secondary Bioimpedance Parameters	Age Grp (p)	BMI Grp (p)	Disease (p)
Percentage of fat	0.023	0.050	0.147
Min fat	0.020	0.578	0.000
Max fat	0.000	0.821	0.000
Percentage of lean	0.023	0.050	0.147
Min lean	0.011	0.783	0.347
Max lean	0.009	0.816	0.220
Percentage of water	0.372	0.144	0.003
Min water	0.075	0.010	0.373
Max water	0.022	0.019	0.209
Dry lean weight	0.000	0.511	0.126
Density	0.091	0.018	0.077
Third space value	0.453	0.051	0.000
Nutrition	0.077	0.497	0.684

Table 4.5.8 Interactions of Secondary Bioimpedance Parameters after Treatment for Male.

Secondary Bioimpedance Parameters	Age Grp(p)	BMI Grp (p)	Disease (p)
Percentage of fat	0.000	0.059	0.006
Min fat	0.046	0.352	0.000
Max fat	0.000	0.421	0.000
Percentage of lean	0.000	0.059	0.006
Min lean	0.000	0.944	0.080
Max lean	0.000	0.934	0.031
Percentage of water	0.337	0.164	0.000
Min water	0.048	0.046	0.373
Max water	0.014	0.077	0.229
Dry lean weight	0.000	0.441	0.006
Density	0.002	0.016	0.001
Third space value	0.904	0.115	0.000
Nutrition	0.008	0.561	0.587