

HEALTH STATUS AND PHYSICAL FITNESS OF SEDENTARY, LABOURER AND EX- ATHLETE WOMEN OF THREE DIFFERENT COMMUNITIES OF NORTH BENGAL

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INTRODUCTION

Development of modern science and technology has profoundly changed the life-style of women. Today, there is a growing emphasis on looking good, feeling good and living longer. According to many health experts, the way each human being lives will be a major determining factor for the health and fitness of that individual. For years everyone has known that health status is the level of health of the individual, group or population as subjectively assessed by the individual or by more objective measures (Medical Dictionary, 1998). Bouchard and Shepherd (1994) observed the fitness influences health but health status also influence both physical activity and fitness. Fitness is important for everyone. Without physical fitness the health cannot move alone. Powers and Hawley (1994) deals with the health status and physical fitness i.e. health related fitness can be defined by the wellness model, in which fitness is more than the absence of disease, it includes the elements of proper nutrition, exercise, stress control and self-responsibility. Sato et al. (2005) suggest that there is a relatively strong relationship between health status and the level of physical fitness in both males and females.

Personal health is a dynamic state of being. It is influenced by four multiple factors, such as – heredity, environment, personal behavior and access to professional health care practitioners and other health services. Blair et al. (1981) stated that the amount of percentage of fat of an individual is closely related to physical activity of the individual concern; less amount of physical activity deposit greater amount of body fat in the subcutaneous layer. Chaine et al. (1989) indicate that BMI is a fitness determinant which is valid, convenient and easy to use in the detection of unfavorable health indices. Dolan et al. (2007) analyzed that mortality was lowest among women in the middle of the distribution of each body size measure.

Physiological health is the study of body or bodily functions. Since haematological variables can be used to assess the health status (Selveira et al. 2004) and therefore considered in this study. Normal haemoglobin values help to some extent to determine the health condition, feeding habit and strength of individuals. Variations among sex also indicate the weak or strongest sex (Umeh et al. 2008). Schmidt et al. (1988), Robinson et al. (2003) and Bassett et al. (2006) have reported an increase in the haemoglobin concentration with physical activity. Tatsukawa et al. (2008) stated that high WBC count is a risk factor for hypertension. Blood bio-chemical balance at desired level is necessary for quality of living.

Physical fitness is an important part of life. This level changes with respect to an individual's age, sex, activity level and socio-economic status. Generally, it is achieved through exercise, correct nutrition and enough rest (Wikipedia, 2011).

These findings support daily physical activities and exercises to maintain or improve physical fitness could be useful for health status of middle – aged and elderly people. The present study

helps to determine the physical fitness of different communities along with their personal (anthropometrical) and selected physiological health status.

METHODOLOGY

This is a descriptive study to compare health status and physical fitness in the sedentary, labourer and ex-athlete women of the three different communities.

In the present study, stratified random sampling technique (Using Pseudo Number Method) is followed. 225 sedentary women, 225 labourer women and 25 ex-athlete women (Mean only calculated) within the range between 35-44 years were selected from three districts namely Cooch Behar, Jalpaiguri and Darjeeling of North Bengal, India. According to the design of the study there were four sub-groups namely General (GN), Scheduled Caste (SC), Scheduled Tribe (ST) and Ex-athlete (EA). For first three groups (GN, SC and ST) there were two sub-groups i.e. Sedentary and Labourer. The present study is related to the health status and its relation with two factors such as personal (B.M.I. & B.F. %) health and physiological (haematological variables) health. For evaluating the haematological variables haemoglobin concentration and W.B.C. were considered. The haemoglobin concentration of the sample of subject's blood was recorded by Sahli's haemometer. For estimation of W.B.C. the blood film was drawn by an expert and slides has shown to recognized pathological laboratory at the different districts. In respect of physical fitness for estimation of muscular strength endurance by sit-up and cardio respiratory endurance by 1-mile run-walk have been considered. The standard test procedures were applied for collecting the data with the help of recognized pathological laboratory in each district. After collecting it's, for statistical analysis arranged the all data according to parameter-wise.

RESULTS AND DISCUSSION

Table No.1
Mean and SD of selected parameters of the personal health

| Parameters | | GN-Sed | SC-Sed | ST-Sed | GN-Lab | SC-Lab | ST-Lab | EA |
|------------|------|--------|--------|--------|--------|--------|--------|-------|
| B.M.I. | Mean | 26.83 | 25.47 | 25.43 | 19.51 | 19.72 | 19.02 | 24.00 |
| | S.D. | ±2.85 | ±2.35 | ±2.62 | ±2.00 | ±1.45 | ±1.61 | ±3.03 |
| B.F.% | Mean | 31.88 | 29.62 | 29.50 | 22.00 | 21.97 | 21.24 | 30.78 |
| | S.D. | ±3.97 | ±3.61 | ±4.06 | ±2.61 | ±1.89 | ±2.01 | ±3.89 |

Table No.1 represents the mean B.M.I. and B.F. % of all labourer sub-groups is almost same and also lower than the all other groups. The position of Ex-athletic group was in between Sedentary and Labourer sub-groups in case of body mass index. But in percentage of body fat the GN-Sed group was higher followed by E.A. and SC-Sed groups. It appears from the mean scores of

B.M.I. and B.F. % of all Sed and Lab groups that they are not equal. Therefore, statistical treatment of the data was essential to ascertain the degree of difference among the means.

Table No-2
ANOVA of selected parameters of the personal health

| Parameters | F-value | | P-value | |
|------------|-----------|-----------|-----------|-----------|
| | Sed-Group | Lab-Group | Sed-Group | Lab-Group |
| B.M.I. | 6.49 | 3.35 | 0.002 | 0.04 |
| B.F.% | 8.92 | 2.89 | 0.0002 | 0.06 |

F-value= 3.04 is significant at 0.05 level

Table No.2 represents the B.M.I. score among the three Sed- groups are not equal as obtained P-value and F- value were 0.0018 and 6.49 respectively. Similarly, the B.M.I. score among the three Lab- groups are not same. Since, F-ratio was high enough to be significant at 5% level. The B.F. % score among the three Sed-groups was significant. On the other hand, difference among the three Lab-groups was not statistically significant.

Table No.3
t-test of all the groups together for B.M.I. and B.F. %

| Para- meters | Statistics | GN-Sed Vs. SC-Sed | GN-Sed Vs. ST-Sed | SC- Sed Vs. ST-Sed | GN- Sed Vs. GN- Lab | SC- Sed Vs. Sc-Lab | ST-Sed Vs. ST- Lab | GN- Lab Vs. SC- Lab | GN- Lab Vs. ST-Lab | SC- Lab Vs. ST- Lab |
|-----------------|---------------------|-------------------------|-------------------------|-----------------------------|---------------------------------|-----------------------------|-----------------------------|---------------------------------|-----------------------------|---------------------------|
| B.M.I. | t- stat | 3.09 | 2.9 | 0.16 | 16.7 | 17.17 | 18.28 | -0.74 | 1.87 | -2.72 |
| | P(T>=t) one tail | 0.001* | 0.002* | 0.44 | 4.11* | 8.09* | 1.87* | 0.23 | 0.03 | 0.004* |
| B.F.% | t- stat | 3.54 | 3.45 | -0.18 | 17.16 | 16.61 | 16.57 | 0.07 | 2.02 | -2.31 |
| | P(T>=t) one tail | 0.0003* | 0.0004* | 0.43 | 8.34* | 5.58* | 6.57* | 0.47 | 0.02* | 0.01* |

Statistics: t-stat=1.98 is significant at 0.05 level

Table No.3 represents the B.M.I. score of GN-Sed group was significantly higher than SC-Sed grouped and the different was statistically significance. In the same way, B.M.I. score of GN-Sed group was higher at 5% level than the ST-Sed group. However, there was almost no difference between SC-Sed and ST-Sed groups. The B.M.I. of all sedentary groups was higher than B.M.I. of all labourer groups and it was significant. In paired t- test between GN- Lab and SC- Lab, the difference was statistically not significant. The GN- Lab group's B.M.I. was significantly different from that the ST- Lab group. The B.M.I. of ST-Lab group was statistically lower than the B.M.I. of SC- Lab at 5% level of significance. The t-test scores clearly revealed that the fat percentage of GN-Sed group was significantly higher than both SC-Sed and ST-Sed groups. The difference between SC and ST- Sed groups was negligible and not significant. When all Sed- groups were matched against their corresponding Lab-groups, it was observed that the

GN-Sed group was significantly higher than GN-Lab group. Similarly, both SC and ST-Sed groups were significantly higher than SC and ST-Lab groups respectively.

Table No.4
Mean and SD of selected parameters of the physiological health

| Parameters | | GN-Sed | SC-Sed | ST-Sed | GN-Lab | SC-Lab | ST-Lab | EA |
|------------|------|---------|---------|---------|---------|----------|---------|---------|
| Hb% | Mean | 10.83 | 10.52 | 10.61 | 8.90 | 8.95 | 9.15 | 10.93 |
| | S.D. | ±0.83 | ±0.84 | ±0.79 | ±0.85 | ±0.81 | ±0.87 | ±0.88 |
| W.B.C. | Mean | 9172.66 | 9328.66 | 9295.33 | 8557.93 | 8108.00 | 8153.33 | 9108.00 |
| | S.D. | ±878.55 | ±924.01 | ±992.48 | ±879.37 | ±1123.91 | ±998.29 | ±904.58 |

Table No.4 represents the Hb% of EA group was higher among all the other sub-groups. In W.B.C. score the highest and lowest groups were SC-Sed and SC-Lab respectively. It may be also observed that in the different sub-groups, means are not equal and variations are limited. However, it is necessary to proceed for further statistical analysis.

Table No-5: Anova of selected parameters of the physiological health

| Parameters | F-value | | P-value | |
|------------|-----------|-----------|-----------|-----------|
| | Sed-Group | Lab-Group | Sed-Group | Lab-Group |
| Hb% | 2.96 | 1.79 | 0.05 | 0.17 |
| W.B.C. | 0.58 | 4.54 | 0.56 | 0.02 |

Statistics: F-value= 3.04 is significant at 0.05 level

Table No.5 represents the Hb% is concerned GN, SC and ST-Sed sub-groups were not equal but differences are statistically not significant. Similarly in the labourer women groups, the mean values of three sub- groups are not equal but the differences are statistically significant as may be evident from lower F- value. The W.B.C score among the three Sed - groups and three Lab-groups separately are not equal as their obtained 'F' value was 0.58 and 4.54 respectively.

Table No.6
t-test of all the groups together for Hb%, W.B.C and B.G.

| Para-meters | Statistics | GN- Sed Vs. SC-Sed | GN- Sed Vs. ST-Sed | SC- Sed Vs. ST- Sed | GN- Sed Vs. GN-Lab | SC- Sed Vs. SC- Lab | ST- Sed Vs. ST- Lab | GN- Lab Vs. SC- Lab | GN- Lab Vs. ST- Lab | SC- Lab Vs. ST- Lab |
|-------------|------------------|--------------------|--------------------|---------------------|--------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | | Hb% | t- stat | -2.54 | 1.76 | 0.7 | 13.73 | 11.67 | 10.03 | -0.41 |
| | P(T>=t) one tail | 0.006* | 0.04 | 0.24 | 2.21* | 9.51* | 9.84* | 0.34 | 0.04 | 0.08 |
| W.B.C | t- stat | -1.09 | -0.87 | -0.21 | 4.58 | 8.37 | 8.00 | 3.36 | 3.14 | 0.29 |

| | | | | | | | | | |
|---------------------|------|------|------|-------|-------|-------|---------|--------|------|
| P(T>=t) one tail | 0.14 | 0.19 | 0.42 | 9.14* | 1.31* | 6.46* | 0.0006* | 0.001* | 0.39 |
|---------------------|------|------|------|-------|-------|-------|---------|--------|------|

Statistics: t-stat=1.98 is significant at 0.05 level

Table No. 6 represents the t-test result of different groups. It may be seen GN-Sed group's Hb% was significantly higher than both SC and ST-Sed groups. Further GN-Sed group's Hb% was significantly higher than GN-Lab group. Similarly, SC and ST- Sed groups had higher value than their respective labourer women groups. There were no significant differences among the labourer women sub-groups. From the analysis of the results, it may be seen that haemoglobin percentage is relatively higher in sedentary group than their labourer counterpart. It may be seen that W.B.C. score of GN-Sed group was not significant with SC and ST sedentary groups. But all the sedentary groups were significantly higher than the corresponding labourer groups. However, there was almost no difference between SC-Lab and ST-Lab groups. It was also observed that the W.B.C score GN- Lab was statistically higher than the SC-Lab and ST-Lab groups.

Table No.7
Mean and SD of selected activities on physical fitness

| Parameters | | GN-Sed | SC-Sed | ST-Sed | GN-Lab | SC-Lab | ST-Lab | EA |
|---------------------------------|------|---------|---------|---------|---------|---------|---------|---------|
| Sit-up (No.) | Mean | 3.43 | 4.29 | 4.27 | 8.64 | 10.35 | 10.07 | 14.44 |
| | S.D. | ±5.27 | ±5.47 | ±5.15 | ±5.05 | ±5.56 | ±5.14 | ±10.99 |
| 1-mile run/walk Run(Sec.) | Mean | 1157.27 | 1116.49 | 1166.96 | 903.43 | 880.66 | 887.36 | 655.83 |
| | S.D. | ±163.27 | ±153.13 | ±192.43 | ±115.37 | ±103.97 | ±111.39 | ±161.63 |

Table No.7 represents the physical fitness of ex-athlete on selected activities was superior to all other groups. However, the labourer group was better than the sedentary group. In the mean sit-up score the GN-Sed and GN-Lab groups were lower among the all sedentary and labourer groups respectively. Beside these, the SC-Sed and SC-Lab groups were taken the less time among the other Sed and Lab groups in 1-mile walk/run.

Table No-8
ANOVA of selected activities on physical fitness

| Parameters | F-value | | P-value | |
|--------------------|-----------|-----------|-----------|-----------|
| | Sed-Group | Lab-Group | Sed-Group | Lab-Group |
| Sit-up (No.) | 2.09 | 2.28 | 0.13 | 0.10 |
| 1-mile run/walk | 1.85 | 0.85 | 0.16 | 0.43 |

| | | | | |
|------------------|--|--|--|--|
| Run(Sec.) | | | | |
|------------------|--|--|--|--|

Statistics: F-value= 3.04 is significant at 0.05 level

Table No.8 represents the mean sit-up scores of three Sed-groups and three Lab-groups were statistically not different and obtained F-value was 2.09 and 2.28 respectively. In Sed and Lab group's Anova result the F-value was not significant. It means variation among the each group is negligible. Same results have been seen in 1-mile walk/run scores.

Table No.9
T-test of all the groups together for selected activities on physical fitness.

| Para-meters | Statistics | GN-Sed Vs. SC-Sed | GN-Sed Vs. ST-Sed | SC-Sed Vs. ST-Sed | GN-Sed Vs. GN-Lab | SC-Sed Vs. Sc-Lab | ST-Sed Vs. ST-Lab | GN-Lab Vs. SC-Lab | GN-Lab Vs. ST-Lab | SC-Lab Vs. ST-Lab |
|----------------------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Sit-up (No.) | t- stat | -1.92 | -0.94 | -1.16 | -5.86 | -5.68 | -7.16 | -1.82 | -1.63 | -0.37 |
| | P(T>=t) one tail | 0.03 | 0.18 | 0.13 | 6.10* | 1.27* | 2.49* | 0.04 | 0.05 | 0.36 |
| 1-mile run/walk Run (Sec.) | t- stat | 1.54 | -0.40 | 1.75 | 1.19E+01 | 11.32 | 11.22 | 1.21 | 0.87 | 0.35 |
| | P(T>=t) one tail | 0.06 | 0.35 | 0.04 | 3.72* | 4.17* | 6.36* | 0.12 | 0.20 | 0.36 |

Statistics: t-stat=1.98 is significant at 0.05 level

Table No.9 represents the result for sit-up of paired t-test revealed that in the sedentary and labourer groups separately none of the matched pair was significant. Whereas intra-group difference the Sed-group was compared with matched Lab-group i.e. Sed-GN Vs Lab-GN and similar, three pairs were found significantly different. For 1-mile walk /run in the Sed-groups out of three pairs (t-test) only SC-Sed and ST-Sed was significantly different. In Lab groups' intra-group variation was negligible. However, when three Sed-groups were matched with corresponding Lab-group all the three matched pairs appeared significantly different. Further it appears that Lab-group took less time in covering 1-mile distance than Sed sub-group subjects.

In the present study, an attempt has been made to compare health status and physical fitness in the sedentary, labourer and ex-athlete women of the three different communities. The mean B.M.I. and B.F. % score of all the sedentary women groups were higher than their corresponding labourer groups. Misra et al. (2005) reported that average B.M.I. score was 26.1 ± 3.7 of (29-59) yrs. sedentary women. Koley et al. (2009) assessed the mean B.M.I. score of sedentary and labourer females were 24.82 Kg/m^2 and 19.58 Kg/m^2 respectively. Wimberley et al. (2001) reported that B.F. % of sedentary and active middle- aged (30-50s) women are 28.8 ± 6.8 and 18.9 ± 4.9 respectively. Stan forth et al. (2004) observed that the B.F. % of black and white adult (17 to 65 years) women is 36.1 and 29.9 respectively. In the study the sedentary women were selected from the urban area and their socio- economic status and life style were better than the labourer groups. Perhaps the difference was due to this reason. However, data of the present study were in close proximity with that of other leading researchers.

In this study all Lab- groups had lower haemoglobin concentration may be attributed to their socio-economic condition and this is not uncommon in our country. Garg and Kashyap (2006) reported the haemoglobin levels of the middle gestation women group was $8.84 \pm 1.2 \text{ gm/dl}$.

Bandyopadhyay (2007) found that the haemoglobin concentration of sedentary middle aged (35-44 years) women in West Bengal was 10.05 gm/dl. Kalur and Kochar (2009) mentioned that the mean blood haemoglobin concentration of urban middle-aged (40-45 years) women was 10.6 ± 1.42 gm/dl and rural middle-aged woman was 10.4 ± 1.36 gm/dl. Vazarova et al. (2002) found that the W.B.C was 8107 ± 2.02 cells/ mm^3 in 27 ± 6 years old non- diabetic Pima Indian Women. Otsuka et al. (2008) reported the mean W.B.C of the healthy and physically active middle aged (50.5 ± 5.45) women should be able to do sit-ups 11.3 ± 3.1 (Mean with SD). Wiroth et al., (2005) reported that the strength performance was significantly lower count was 4.890 (1194) cells/ μL in 48.6 ± 6.6 years old women. Regarding total count of W.B.C of the all groups were given in normal range i.e. (8108 to 9328.66) cells/ mm^3 .

In the present study, the physical performance of ex-athlete women were higher than all others groups. Liu et al., (2003) observed in Cohen's disease subjects compared with controls for sit-up test (-25.1%; $p < 0.001$). Osawa et al., (2011) reported the student and staff (21-29yrs.) of Keio University, Helsinki performed the number of sit-ups to the thereof 18.1 ± 4.5 . Jurimae et al., (1998) and Kamyabnia et al., (2011) found the dynamic sit-up was higher in control subjects than the obese women. Huang et al. (1998) stated physically fit and active participants reported less functional limitation than unfit or sedentary participants. A statistically significant interaction was found between the treatment and group factors ($[F, \text{sub. } 1.38] = 7.08; P < 0.05$) for cardiovascular endurance. Moreover, mean comparison indicated that the mean time needed to run the 1- mile was significantly reduced only in the experimental group (Derri et al., 2004). AL- Shamli (2010) found the rural students secured better in cardiovascular endurance than urban students ($7.63 \pm 1.30, 8.03 \pm 1.77$ respectively). The findings of the present study are closely similar to the findings of the leading researchers.

CONCLUSION

Body mass index of sedentary general group was significantly higher than all other groups and for this the position of Ex+ athletic group in between Sedentary and Labourer sub- groups. Regarding percentage of body fat GN- Sed group was higher followed by E.A. and SC- Sed groups. The lowest mean body fat percentage group was GN- Lab.

The blood hemoglobin concentration was relatively lower among all the groups and in case of labourer groups, it is less than 10gm%. Similarly, three labourer groups were statistically identical. However, all the sedentary groups' haemoglobin concentration was significantly higher than their corresponding labourer groups

The W.B.C. count of the three sedentary groups and EA-group were almost identical. There was no significant difference among the three Sed- groups. However, within the labourer group significant difference observed among the three groups. W.B.C. count of GN- Lab group was significantly higher than both SC and ST- Lab groups.

Under the muscular strength endurance the sit -up score of three Sed- groups were statistically not significant. Similarly three Lab- groups difference are not significant. Three Lab- groups were significantly higher than their matched Sed- group.

In Sed -groups the cardio respiratory endurance score was not significant, but the difference between SC and ST Sed- groups was significant. In Lab- group intra- group's variation was negligible. However, three Lab- groups were significantly higher than their matched Sed- groups respectively.

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