CHAPTER 3

RESULTS

The purpose of the present study was to determine the extent to which Self-Efficacy, Health Belief, and Health Locus of Control in women were predictive of compliance with Health Behaviours over a period of three months. To attain this objective, the study first examined the relationship between Health Behaviours and Physical and Psychological Health at Time 1 and Time 3. The relationship between Health Belief, and Health Locus of Control (independent variables) and the health behaviours (dependent variable) at Time 1 and Time 3 were also examined.

The study was further directed to estimate the contribution of Health Belief, Health Locus of Control, and Self-Efficacy as predictors of health behaviour modification. The study also examined the change in Health Behaviours over the period of three months that is, from Time 1 to Time 3.

The Health Behaviours that were considered in the present study were: Smoking Behaviour (e.g., the average number of cigarettes smoked and the tar content of the cigarettes), Dietary Habits (e.g., eating fatty meat, chicken skin, whole milk, cheese and eggs, vegetables and fruits and wholegrain and cereals taken in one's diet), and Exercise Behaviour (ie., any physical activity like walking, swimming, cycling, jogging, aerobics).

1.0) Test of Hypotheses

Each of the Hypotheses are analysed separately and results are shown in the tables following the analysis of each Hypothesis.

2.0) Hypothesis 1: It is hypothesized that healthy behaviours at Time 1 and Time 3 are associated with good health (physical and psychological) at the Time of the measurements.

Health Behaviours and Health were assessed at Times 1 and 3.

In both Time 1 and Time 3 correlations analysis was conducted with Health (physical and psychological) and Health Behaviours

Correlations between Health Behaviours Time 1 and Physical and Psychological Health Time1 are shown in Tables 1a and 1b.

Table 1(a) **SUMMARY OF THE CORRELATION BETWEEN HEALTH BEHAVIOURS AT TIME 1 AND PHYSICAL HEALTH AT TIME 1**

HEALTH BEHAVIOURS	PHYSICAL HEALTH								
	PHYS HEALTH	INJU/ ACCID	INFECTION	RESP ILL	GASTRO ILL	HEAD/MIG	CVDILL	MISCELL	TOTAL-ILLNES
SMOKING	.07	-.12	.23	.06	.04	-.17	.	.44**	.15
TAR CONTENT	.17	-.06	.15	.02	.17	.01		-.02	.05
SMOK TIMES TAR	.04	.00	.06	-.01	.23	-.10	.	.23	.17
SATURATED FAT	.26**	.03	.09	-.01	-.10	.10	.13	.00	.10
VEGES & FRUIT	.39***	.23*	.15	-.14	-.00	.16	-.02	.12	.19**
WHGRAIN & CEREAL	.26**	.17	.05	-.04	-.07	.20**	.14	.15	.11
DIET MEAN	.40***	.20*	.13	-.08	-.08	.20**	.10	.11	.18*
EXERCISE	.22**	.00	.32***	-.02	.13	.19*	-.02	.22**	.31***

***P< .001 **P<.01 *P<.05

Note: For Smoking Behaviour N=31.

The number of participants who smoked were very few. Therefore the data based on smoking behaviour does make the results unreliable. However, for the sake of completeness the results are reported but very little could be drawn out of it.

In the above table, Physical Health (PHYS HEALTH) shows significant correlation with the amount of saturated fat consumed (SATURATED FAT) (r=.26), intake of vegetables and fruits (VEGES & FRUIT) (r=.39), and the intake of wholegrains and cereals (WHGRAIN & CEREAL) (r=.26). PHYS HEALTH also shows significant correlation with average dietary habits (DIET MEAN) that is, when average of saturated fats, vegetables and fruits, and wholegrain and cereals are taken together (r=.40). PHYS HEALTH also shows significant correlation with the level of exercise behaviour (EXERCISE) (r=.22). The number of reported injuries or accidents (INJU/ACCID) shows significant correlation with the intake of VEGES & FRUIT (r=.23), and DIET MEAN (r=.20). The number of reported infections (Bacterial or Viral) (INFECTION) shows significant correlation with the level of exercise behaviour (r=.32). The number of times headaches, migraines or neurological disorder reported by the participants

(HEAD/MIG) shows significant correlation with the intake of WHGRAIN & CEREAL (r=.20), DIET MEAN (r=.20), and the level of exercise (r=.19). Also the number of reported Miscellaneous other symptomatogy or illness (MISCELL) shows correlation with the level of Exercise (r=.22) and Smoking Behaviour (SMOKING), that is, the number of cigarettes smoked per person (r=.44). However, when the tar content alone is taken into account, and also when the number of cigarettes smoked and the tar content of the cigarettes are multiplied that is, smoking behaviour times tar content (SMOK TIMES TAR) no significant correlation with PHYS HEALTH is found; nor with any of the illnessses. The number of reported Respiratory illness (RESP.ILL), Gastrointestinal illness (GASTRO.ILL) and Cardiovascular illnesses (CVD.ILL) show no significant correlations with any of the health behaviours. The total of all the illnesses taken together show significant correlation with VEGES & FRUIT (r=.19), DIET MEAN (r=.18) and the level of exercise (r=.31).

Table 1(b) **SUMMARY OF THE CORRELATION BETWEEN HEALTH BEHAVIOURS TIME 1 AND PSYCHOLOGICAL HEALTH AT TIME 1**

HEALTH BEHAVIOURS	PSYCHOLOGICAL HEALTH				
	TOTGHQ	SOMATIC	ANXIETY	SOCDYSF	DEPRESS
SMOKING	-.06	-.09	.00	-.03	-.12
TAR CONTENT	.01	.00	.00	-.12	-.07
SMOK TIMES TAR	-.15	-.09	-.17	-.03	-.12
SATURATED FAT	.17	.21**	.21**	.12	.15
VEGE & FRUIT	.13	.27*	.09	.08	.07
WHGRAIN & CEREAL	.15	.13	.14	.09	.19**
DIET MEAN	.19*	.26**	.19*	.13	.18*
EXERCISE	.23**	.28**	.19*	.16*	.10

***P<.001 **P<.01 *P<.05

NOTE: For Smoking Behaviour N=31.

The above table shows that General Psychological Health (TOT GHQ) shows significant correlation with average dietary habits (DIET MEAN) (r=.19) and level of exercise

(EXERCISE) (r=.23). The number of reported somatic symptom (SOMATIC) shows significant correlation with the amount of saturated fat consumed (r=.21), intake of vegetables and fruits (VEGES & FRUIT) (r=.27), DIET MEAN (r=.26), and the level of EXERCISE (r=.28). Anxiety shows significant correlation with amount of saturated fat intake (r=.21), DIET MEAN (r=.19), and Exercise (r=.19). The reported social dysfunction symptom (SOCDYSF) shows significant correlation with the level of Exercise (r=.16). The Depression (DEPRESS) shows significant correlation with amount of wholegrains and cereals (WHGRAIN & CEREAL) (r=.19) and DIET MEAN (r=.18). However, Smoking Behaviour when taken together with the tar content of the cigarettes smoked (SMOK TIMES TAR) shows no significant correlation with any components of psychological health. There is no significant correlation either when tar content of cigarettes is considered in isolation.

Summary: Overall the results obtained for hypothesis one at Time 1 as seen in tables (1a & 1b), show that if subjects engage in more healthy behaviours then they are more likely to report better physical health. In particular, dietary habits (i.e., average of saturated fat, wholegrains & cereals and vegetables & fruits taken together), and exercise were significantly related to physical health at .001 & .01 significance level. The relationship between healthy behaviours and psychological health is not as clearly positive, but remains significant. Exercise behaviour shows significant relation with over all general psychological health at .05 significance level. That is to say, subjects who reported to have engaged in exercise three months prior to participating in the study, are more likely to report better psychological health. Also average dietary habits (ie., average of saturated fat, vegetables and fruits, and wholegrains and cereals taken together), show significant relation with psychological health at .05 significance level. This confirms the relationship at Time 1. All analysis were then repeated for Time 3.

Correlations between Health Behaviours at Time 3 and Health (physical and psychological) at Time 3 are shown in Tables 2a and 2b.

Table 2(a) **SUMMARY OF THE CORRELATION BETWEEN HEALTH BEHAVIOURS TIME 3 AND PHYSICAL HEALTH AT TIME 3**

HEALTH BEHAVIOURS	PHYSICAL HEALTH								
	PHYS HEALTH	INJU/ ACCID	INFECTI ON	RESP ILL	GASTRO ILL	HEAD/ MIG	CARDIOI LL	MISCEL L	TOTAL-ILLNESS
SMOKING	-.05	-.04	-.12	-.13	-.07	-.27	-.21	-.14	-.24
TAR CONTENT	.00	.07	.15	.04	-.09	-.04	-.26	-.36*	-.22
SMOK TIMES TAR	.02	-.04	-.07	-.04	.10	.11	-.27	-.37	-.27
SATURATED FAT	.08	.19	-.03	-.09	.06	.12	.10	-.00	.00
VEGES & FRUIT	-.04	-.14	.01	-.03	-.14	.15	.06	-.01	-.03
WHGRAIN & CEREAL	-.00	.44***	.12	.00	.07	-.06	.13	-.03	.10
DIET MEAN	.01	.19	.09	-.04	.01	.06	.16	-.03	.06
EXERCISE	.08	-.12	.06	.20*	.07	-.11	.07	.05	.13

***P< .001 **P<.01 *P<.05

NOTE: For Smoking Behaviour N=23 at Time 3 and for the variable of smoking times tar N=12.

From the above table it can be seen that Physical health (PHYS HEALTH) shows no significant correlations with any of the health behaviours. The number of reported injuries or accident (INJU/ACCID) shows significant correlations with the amount of wholegrains and Cereals consumed (WHGRAIN & CEREAL) (r=.44). Also the number of reported INJU/ACCID showed a trend with amount of saturated fat consumed (r=.19) and dietary habit intake (DIET MEAN) (r=.19). The number of times Respiratory illness reported (RESP.ILL), shows significant correlation with the level of Exercise (r=.20). The number of reported miscellaneous other symptomatogy or illness (MISCELL) shows significant negative correlation with the Tar Content (r=-.36). HEAD/MIG shows a trend with the intake of vegetables and fruits (VEGES & FRUIT) (r=.15) and number of reported Cardiovascular illnesses (CARDIO.ILL) showed a trend with average dietary habits (DIET MEAN) (r=.16).

Table 2(b) **SUMMARY OF THE CORRELATION BETWEEN HEALTH BEHAVIOURS TIME 3 AND PSYCHOLOGICAL HEALTH AT TIME 3**

HEALTH BEHAVIOURS	PSYCHOLOGICAL HEALTH				
	TOTGHQ	SOCDYSF	SOMATIC	ANXIETY	DEPRESS
SMOKING	.-.25	-.12	..22	-.37	-.20
TAR CONTENT	-.44	-.69**	-.28	-.35	-.16
SMOK TIMES TAR	.02	.04	.06	.01	.04
VEGE S & FRUIT	.20	.01	.13	.09	.09
SATURATED FAT	.31*	.09	.30*	.31*	.24*
WHGGRAIN & CEREAL	-.04	-.02	.03	.12	-.02
DIET (MEAN)	.17	.02	.20	.25*	.11
EXERCISE	.16	.04	.13	.24*	.05

***P<.001 **P<.01 *P<.05

Note: For smoking behaviour the N= 23 at Time 3 and the variable of smoking times tar N=12.

The above table shows general psychological health (TOT GHQ) shows a trend with the level of tar content smoked in a cigarette (TAR CONTENT) (r=-.44). It also shows significant correlation with the amount of saturated fat intake (r=.31) and a trend with amount of vegetables and fruits intake (VEGES & FRUIT) (r=.20). The number of reported social dysfunction (SOCDYSF) shows significant negative correlation only with the tar content in the cigarettes smoked (r=-.69). Somatic Health shows significant correlation with saturated fat (r=.30), and a trend with dietary habits (DIET MEAN) (r=.20). Anxiety shows significant correlation with the amount of saturated fat (r=.31), DIET MEAN (r=.25), and level of Exercise (r=.24). Depression (DEPRESS) shows significant correlation with the amount of saturated fat (r=.24).

Summary: From the above tables, (2a & 2b), it can be seen that the relationships that were found at Time 1 are no longer apparent at Time 3. None of the health behaviours were related to self reported physical health. However, significant relations were found between wholegrains and cereals, and reported incidences of injuries or accident, at .001

significance level. That is, the more wholegrains and cereals women consume the less likely are they to report incidences of injuries and accidents. Also women who engaged in exercise reported to have less respiratory illness at .05 significance level. Women who smoked cigarettes with high tar content were more likely to report more incidences of miscellaneous other symptomatogy or illness, significant at .05 level. Headaches and migraines show a trend with the intake of vegetables and fruit and Cardiovascular illnesses showed a trend with diet. Women who smoked showed overall poor psychological health.

Thus the results obtained at Time 1 support the hypothesis. Whereas results obtained at Time 3 partially support the hypothesis. Overall physical health at Time 1 seemed to be the best reflection of healthy behaviours. Additionally, general psychological health, including somatic symptoms, anxiety, and social dysfunction seemed to be the best reflection of exercise behaviour. Exercise and depression revealed no significant relation. It should be noted that at Time 3 overall physical health was not related to any of the health behaviours. However, exercise behaviour was significantly related to the respiratory illness reported to have occurred three months prior to the participation in the study. Intake of wholegrains and cereals was related to the number of reported injuries or accidents. Intake of saturated fat was related to general psychological health, and the general psychological health components in terms of somatic symptom, anxiety and depression. But showed no significant relation with social dysfunction symptom. However, in the smoking behaviour, the level of tar content smoked was related to social dysfunction symptom.

3.0) Hypothesis 2: It is hypothesised that Health Beliefs at Time 1 and Time 3 are predictive of Health behaviours and Health (physical and psychological) at those Times.

This Hypothesis is divided into two parts that is 2a and 2b.

2a) The greater the reported Likelihood of having bad health in the Near and Distant Future, the greater the Concern about having bad health in the Near and Distant Future and greater the Seriousness with which women view having bad health in the Near and

Distant Future at Time 1, the healthier would be the Behaviours they would engage in at Time 1 and the better would be their Health at Time 1.

For hypothesis 2a, first the correlations analysis was conducted between Health Beliefs and Health Behaviours at Time 1 and results are presented in the Table 3 below. Correlations analysis was also conducted between Health Beliefs and Health (Physical and Psychological), at Time 1 and results obtained are presented in the Tables 4a (i) and 4a (ii).

Stepwise regression analysis was then applied to determine the role of Health Belief, Health Locus of Control, and Self-Efficacy in predicting change in Health Behaviours over the period of three months. Although it was determined that .05 should be accepted as the minimum significance level for F, a significance level of .5 for F was used as the limit for entry into the model. This had the effect of excluding variables that only explained very small amounts of variance and that added very little to the regression equation, but nevertheless provided a picture of the contribution of variables to self-reported Health Behaviours

Table 3 **SUMMARY OF THE CORRELATION BETWEEN HEALTH BELIEFS AND HEALTH BEHAVIOURS TIME 1**

HEALTH BEHAVIOURS	HEALTH BELIEFS					
	LIKNEAR	LIKDIST	CONEAR	CODIST	SERNEAR	SERDIST
SMOKING	-.10	-.17	.07	.19	-.01	-.12
TAR CONTENT	-.02	.02	.04	.15	.09	.01
SMOKE TIME TAR	-.31*	-.25	-.02	.11	.08	.08
SATURATED FAT	-.26**	-.25**	-.17*	-.18*	-.10	-.23**
VEGE S & FRUIT	-.24**	-.14?	-.15?	-.12?	-..04	-.04
WHGRAIN & CEREAL	-.32***	-.17*	-.13	-.10	-14	-.01
DIET (MEAN)	-.35***	-.23**	-.19*	-.17*	.04	-.11
EXERCISE	-.21*	-.27**	-.15	-.09	.03	.00

***P< .001 **P<.01 *P<.05

From the above table women's perception of the likelihood of having bad health in the near future (LIKNEAR) shows significant negative correlation with intake of saturated fat (r=-.26), vegetables and fruit (VEGES & FRUIT) (r=-.24), wholegrains and cereal (WHGRAIN & CEREAL) (r=-.32), average dietary habits (DIET MEAN) (r=-.35), and the level of exercise (EXERCISE) (r=-.21). Likelihood with which women perceive having bad health in the distant future (LIKDIST) shows significant negative correlation with saturated fat intake (r=-.25), WHGRAIN & CEREAL intake (r=-.17), DIET MEAN (r=-.23), and Exercise (r=-.27). Concern about having bad health in the near future (CONEAR) shows significant negative correlation with saturated fat intake (r=-.17), average dietary habits (DIET MEAN) (r=-.19). Concern about having bad health in the distant futurte (CODIST) shows significant negative correlation with the amount of saturated fat intake (r=-.18), DIET MEAN (r=-.17). Seriousness with which women view having bad health in the near future (SERNEAR) shows a trend with the amount of wholegrains and cereals intake (WHGRAIN & CEREAL) (r=-.14). Seriousness with which women view bad health in the distant future (SERDIST) shows significant negative correlation with amount of saturated fat intake (r=-.23). However, smoking behaviour shows no relation with any of the health beliefs.

Summary: The results obtained showed that health behaviours were mostly negatively correlated with the health beliefs. This concludes then that women who reported less likelihood of having bad health in the near and the distant future, showed less concern about having bad health in the near and the distant future, and showed less seriousness about having bad health in the near and the distant future reported better healthy behaviour patterns. Correlations analysis is repeated for health beliefs and physical health for Time 1, shown in tables below.

Table 4 (i) **SUMMARY OF THE CORRELATION BETWEEN HEALTH BELIEFS AND PHYSICAL HEALTH AT TIME 1**

PHYSICAL HEALTH	HEALTH BELIEFS					
	LIKNEAR	LIKDIST	CONEAR	CODIST	SERNEAR	SERDIST
PHYS.HEALTH	-.28**	-.23**	-.32***	-.16	-.03	-.03
INJU/ACCI	-.10	-.02	-.11	-.02	-.04	-.07
INFECTION	-.15	-.17	-.25**	-.11	.05	.06
RESP.ILL	.05	.13	.05	.06	-.04	.01
GASTRO ILL	-.04	-.02	-.08	.07	.02	.10
HED/MIG	-.13	-.11	-.07	-.02	.04	-.03
CARDIO.ILL	-.05	-.00	-.09	-.06	.01	.00
MISCELL	-.11	-.17	.00	-.04	.04	-.03
TOT.ILLNESS	-16	-.13	-.18	-.01	.04	.02

***P< .001 **P<.01 *P<.05.

It can be seen from the above table, that self reported physical health (PHYS HEALTH) shows significant negative correlation with likelihood with which women view having bad health in the near future (LIKNEAR) (r=-.28), likelihood with which women view having bad health in the distant future (LIKDIST) (r=-.23), concern about having bad health in the near future CONEAR (r=-.32). Self-reported physical health shows a trend with concern about having bad health in the near future, (CODIST) (r=-.16). The number of reported incidences of infections (Bacterial or Viral) (INFECTION) shows significant negative correlation with CONEAR (r=-.25). However, number of reported infections show trend with likelihood with which women view having bad health in the distant future (LIKDIST) (r=-.17). None of the Health Belief components showed any significant correlation with respiratory illness (RESP.ILL), gastrointestinal illness (GASTRO.ILL), headaches and migraines or neurological disorder (HEAD/MIG), cardiovascular illness (CARDIO.ILL), and miscellaneous other symptomatology or illness (MISCELL). Also illness when taken together, showed no significant relations with any of the Health Beliefs.

Summary: The results obtained shows overall significant negative relations between physical health and health beliefs. Seriousness component of health beliefs however, showed no relation with physical health. Concern about having bad health in the near future showed negative relationship with the number of reported infections. Whereas none of the other health beliefs showed any relations with any of the illness components. Correlation analysis are repeated for health beliefs and psychological health for Time 1.

Table 4 (ii) **SUMMARY OF THE CORRELATION BETWEEN HEALTH BELIEFS AND PSYCHOLOGICAL HEALTH AT TIME 1**

PSYCHOLOGICAL HEALTH	HEALTH BELIEFS					
	LIKNEAR	LIKDIST	CONEAR	CODIST	SERNEAR	SERDIST
SOMATIC	-.24**	-.20*	-.37***	-.19*	.04	.02
ANXIETY	-.30**	-.16	-.30***	-.13	.01	-.03
SOCDYSF	-.20*	-.15	-.16	-.08	.02	.05
DEPRESS	-.22*	-.10	-.24**	-.08	-.02	-.06
TOT.GHQ	-.26**	-.20*	-.31***	-.16	.00	-.01

***P< .001 **P<.01 *P<.05

The above table shows that women's perception of the likelihood of having bad health in the near future (LIKNEAR) is negatively related with reported somatic symptom (SOMATIC) (r=-.24), anxiety (ANXIETY) (r=-.30), social dysfunction (SOCDYSF) (r=-.20), depression (DEPRESS) (r=-.22), and overall psychological health (TOT.GHQ) (r=-.26). Likelihood with which women perceive having bad health in the distant future (LIKDIST) shows significant negative relations with reported somatic symptom (SOMATIC) (r=-.20), and overall psychological health (TOT.GHQ) (r=-.26). Concern with which women perceive having bad health in the near future (CONEAR) shows significant negative correlation with Somatic Health (r=-.37), Anxiety (r=-.30), depression (DEPRESS) (r=-.24), and overall psychological health (TOT.GHQ) (r=-.31). Concern about having bad health in the distant future (CODIST) shows significant negative correlation with Somatic Health (r=-.24). Seriousness with which women view having

bad health in the near and the distant future (SERNEAR, & SERDIST), revealed no relations with overall psychological health or any of the subscales.

Summary: The results obtained strong negative relations with health belief in terms of likelihood and concern in the near and the distant future, show relation with somatic symptom, anxiety, social dysfunction and general psychological health. The results, however, revealed no relationship between the seriousness with which women viewed their health in the near and the distant future and overall psychological health, including somatic sympto, anxiety, social dysfunction, and depression. That means, women's perception of the seriousness of having bad health in the near and the distant future did not have any affect on their overall psychological health including somatic health, anxiety, social dysfunction, and depression. The results obtained are in the opposite direction than predicted. Thus fails to support the hypothesis two in terms of psychological health and health beliefs.

In conclusion, then the results obtained for hypothesis 2a, at Time 1 revealed mostly significant negative relationship between health beliefs in terms of likelihood, concern, and seriousness in the near and the distant future, and health behaviours (ie., smoking, diet, and exercise). Results also showed these components of health beliefs (i.e., likelihood, concern, and seriousness), to be significantly negatively related with overall physical health, including number of reported infections (bacterial or viral), and also with general psychological health. The health belief component (i.e., likelihood and concern), showed most significant relations with overall psychological health including somatic symptom, anxiety, social dysfunction, and depression. However, seriousness with which women perceived their having bad health in the near and the distant future showed no relations with health behaviours, psychological health or physical health. It may be noted that the results obtained are in the opposite direction than predicted. Hence fails to support the hypothesis 2a, at Time 1.

Subsequently, and as explained in earlier, stepwise multiple regression analysis was applied for hypothesis 2a, to determine the predictive value of Health Beliefs on each of the Health Behaviours and Health (Physical and Psychological) at Time 1. Health Belief components were entered into the regression equation analysis with each of the Health

Behaviours individualy. Likelihood with which women viewed their having bad health in the near future and the seriousness about having bad health in the distant future, best predicted self-reported health behaviours in terms of the saturated fat intake at Time 1. Likelihood Near Future accounted for 25% of the explained variance, F (1, 109)=7.85 p<.01. However, when Serious Distant Future variable was added to the regression equation it accounted for 33% of the variance, F (2, 108)=7.00 p<.01. Consumption of vegetables and fruits and wholegrains and cereals at Time 1 was predicted by Likelihood Near Future, accounting for 24% and 32% of the variance respectively, F (1, 109) =6.77 p<.05 and for wholegrains and cereals, F (1, 109)=12.69 p<.001. Average dietary habits, that is the average of saturated fat, wholegrains and cereals, and vegetables and fruits taken together, was also best predicted by Likelihood Near Future accounting for 35% of the variance, F(1, 109)=15.73 p<.001. However Exercise Behaviour was best predicted by Likelihood Distant Future accounting for 27% of the variance, F(1, 109)=8.61 p<.01.

Of the measures of Health Belief, CONEAR, that is, concern about having bad health in the near future was the best predictor of self-reported physical health at Time 1. It accounted for 32% of the variance, F(1, 106)=12.30 p<.001. Infections (Bacterial or Viral) was also best predicted by the variable of CONEAR of the Health Belief measure. It accounted for 24% of the explained variance, F(1, 107)=6.98 p<.01.

2b) It is hypothesized that the greater the reported Likelihood of having a bad health in the Near and the Distant Future, the greater the Concern about having bad health in the Near and the Distant Future and greater the Seriousness with which women view having bad health at Time 3, the healthier would be the Behaviours they would engage in at that Time and better would be their Health (physical & psychological) at that Time.

For Hypothesis 2b, first correlations analysis was conducted in the same manner as was carried out for hypothesis 2a, between Health Beliefs and Health Behaviours but this was for Time 3. Results obtained are presented in the Table 5. Correlations between Health Beliefs and Health (Physical and Psychological), at Time 3 are also presented in the Tables 6 (i) and 6 (ii).

Table 5 **SUMMARY OF THE CORRELATION BETWEEN HEALTH BELIEFS TIME 3 AND HEALTH BEHAVIOURS TIME 3**

HEALTH BEHAVIOURS	HEALTH BELIEF					
	LIKNEAR	LIKDIST	CONEAR	CODIST	SERNEAR	SERDIST
SMOKING	-.18	-.31	-.32	.19	.25	.08
TAR CONTENT	.40	-.06	.13	.22	.21	.04
SMOKE TIME TAR	.35	.04	-.00	.29	.19	.03
SATURATEDFAT	.02	.04	-.12	-.01	-.16	-.05
VEGE S & FRUIT	-14	.15	-.35**	-.25*	-.26*	-.08
WHGRAIN & CEREAL	-.10	.01	-.07	-.17	-.29**	-.11
DIET MEAN	-.13	.09	-.25*	-.23*	-.39**	-.13
EXERCISE	-.09	-.20*	-.02	.05	.10	.12

***P< .001 **P<.01 *P<.05

From the above table, likelihood distant future (LIKDIST) shows significant negative correlation with the level of Exercise (r=-.20). Concern near future (CONEAR) shows significant negative correlation with vegetables and fruits (VEGES & FRUIT) (r=-.35), average dietary habits (DIET MEAN) (r=-.25). Concern distant future (CODIST) shows significant negative correlation with VEGES & FRUIT (r=-.25), and DIET MEAN (r=-.23). Serious distant future (SERNEAR) shows significant negative correlation with VEGES & FRUIT (r=-.26), wholegrains & cereals (WHGRAIN & CEREAL) (r=-.29), and DIET MEAN (r=-.39). LIKNEAR and SERDIST show no significant correlation with any of the Health Behaviours.

Summary: It is concluded that at Time 3 health behaviours are mostly negatively correlated with the Health Beliefs. Showing therefore, less likely, less concern, and less serious women are in terms of their perceiving having bad health in the near and the distant future, better healthy behaviour patterns they reported to indulge in. From the above results it is drawn that health beliefs in terms of likelihood near future and seriousness distant future showed no relations with any of the health behaviours. The hypothesis 2b therefore is not supported.

Table 6 (i) **SUMMARY OF THE CORRELATION BETWEEN HEALTH BELIEFS AT TIME 3 AND PHYSICAL HEALTH AT TIME 3**

PHYSICAL HEALTH	HEALTH BELIEFS					
	LIKNEAR	LIKDIST	CONEAR	CODIST	SERNEAR	SERDIST
PHYS.HEALTH	-.23*	-.02	.06	.24*	-.03	.10
INJU/ACCID	-.10	-.17	-.07	-.18	-.12	-.13
INFECTION	-.01	.11	-.17	-.07	.16	.11
RESP.ILL	.01	-.01	.10	.18	.15	.15
GASTRO.ILL	-.04	-.06	-.20	.05	-.01	.05
HEAD/MIG	.14	.19?	-.03	-.08	-.07	-.10
CARDIO.ILL	-.17	-.08	-.28*	-.22?	-.17	-.23*
MISCELL	-.36**	-.29*	-.08	-.15	-.12	-.14
TOT.ILLNESS	-.24*	-.09	-.23	-.11	-.11	-.12

***P< .001 **P<.01 *P<.05

From the above table, likelihood near future (LIKNEAR) shows significant negative correlation with physical health (PHYS HEALTH) (r=-.23), miscellaneous other sympotmatology or illness (MISCELL) (r=-.36), and total of illness taken together (r=-.24). Likelihood distant future (LIKDIST) shows significant negative relation with MISCELL (r=-.29). Concern near future (CONEAR) shows significant negative correlation with cardiovascular illness (CARDIO.ILL) (r=-.28) and trend with illness. Concern distant future (CODIST) shows significant positive relation with physical health (r=.24). Serious near future (SERNEAR) shows no significant correlation with physical health and any of the illnesses. Serious distant future (SERDIST) also shows relationwith cardivascular illness.

Summary: It is concluded that at Time 3 physical health showed negative relations with likelihood near future. That is to say women who reported better physical health did not perceive suffering from health problems as more likely in the near future. However, results indicated that the better the physical health reported by women, more concerned they appeared about their health in the distant future.

Table 6 (ii) **SUMMARY OF THE CORRELATION BETWEEN HEALTH BELIEFS AT TIME 3 AND PSYCHOLOGICAL HEALTH AT TIME 3**

PSYCHOLOGICAL HEALTH	HEALTH BELIEFS					
	LIKNEAR	LIKDIST	CONEAR	CODIST	SERNEAR	SERDIST
SOMATIC	-.26	.02	-.18	-.33*	-.15	-.16
ANXIETY	-.29*	-.07	-.05	-.16	-.11	-.12
SOCDYSF	-.10	.02	-.17	-.08	-.15	-.02
DEPRESS	-.23	-.10	-.25	-.20	-.27*	-.11
TOTGHQ	-.21	.01	-.16	-.22	-.17	-.05

***P< .001 **P<.01 *P<.05

The above table shows significant negative correlation between likelihood near future (LIKNEAR) and Anxiety (r=-.29). Concern distant future (CODIST), shows significant negative correlation with Somatic Health (r=-.33). Serious near future (SERNEAR) shows significant correlation with depression (r=-.27). However, likelihood distant future (LIKDIST), and serious distant future (SERDIST) did not show any significant correlations with overall psychological health or any of the components of psychological health when taken separately.

Summary: From the results it could be concluded that overall psychological health did not reveal any relationship with health belief components in the near and the distant future. The results were mainly in the opposite direction. In conclusion, hypothesis two was not supported by the results obtained in the present study.

Stepwise regression analysis was computed for the Hypothesis 2b at Time 3 to determine the predictive value of Health Beliefs on each of the Health Behaviours and Health (physical and psychological) at Time 3. Wholegrains and cereals was the only Health Behaviour at Time 3 which was predicted by one of the components of illness that is by injuries and accidents. It accounted for 19% of the variance, F (1, 61)=14.6, P<.001. Tar content was predicted by Social dysfunction, one of the components of Psychological

Health. It explained 48% of the variance, F (1, 9)=8.30, p<.05. Saturated fat was best predicted by anxiety at Time 3 and its contribution to the explained variance was 31%, F (1, 43)=4.79, p<.05.

4.0) Hypothesis 3: It is hypothesized that Health Locus of Control at Time 1 and Time 3 are predictive of Health behaviours and Health (physical and psychological) at those Times.

This hypothesis is divided into two parts 3a and 3b:

3a) It is predicted that the higher the Internal Locus of Control and the lower the Powerful Others and Chance Locus of Control at Time 1, the healthier would be the Behaviours that women would engage in at that Time and better would be their Health at that Time.

For hypothesis 3a, correlations between Health Locus of Control and Health Behaviours at Time 1 are presented in the Table 7. Correlations between Health Beliefs and Health (physical and psychological), at Time 1 are presented in the Tables 8 (i) and 8 (ii). Regression analysis for this hypothesis is also reported.

Table 7 **SUMMARY OF CORRELATION BETWEEN HEALTH LOCUS OF CONTROL AT TIME 1 AND HEALTH BEHAVIOURS AT TIME 1**

HEALTH BEHAVIOURS	HEALTH LOCUS OF CONTROL		
	INTERNAL	EXTERNAL	CHANCE
SMOKING	.05	-.09	-.21
TAR CONTENT	.14	.20	.12
SMOK TIMES TAR	.16	.10	.09
SATURATED FAT	-.06	-.01	.14?
VEGES & FRUIT	.00	.24**	.10
WHGRAIN & CEREAL	-.11	.09	.27**
DIET MEAN	-.07	14	.22*
EXERCISE1	-.15?	.04	-.00

***P< .001 **P<.01 *P<.05

The above table shows that external health locus of control (EXTERNAL) is significantly correlated with vegetables & fruits (VEGES & FRUIT) (r=.24). Chance health locus of control (CHANCE) shows significant correlation with wholegrains and cereals (r=.27) and average dietary habits (DIET MEAN) (r=.22). Whereas internal health locus of control (INTERNAL) showed no significant correlation with any of the self reported health behaviours.

Table 8 (i) **SUMMARY OF CORRELATION BETWEEN PHYSICAL HEALTH AT TIME 1 AND HEALTH LOCUS OF CONTROL AT TIME 1**

PHYSICAL HEALTH	HEALTH LOCUS OF CONTROL		
	INTERNAL	EXTERNAL	CHANCE
PHYS HEALTH	-.19*	-.03	-.00
INJU/ACCI	.03	.02	-.08
INFECTION	-.08	.03	-.09
RESP.ILL	.11	-.14	-.15
GASTRO.ILL	.05	-.22*	-.11
HEAD/MIG	-.10	.09	.09
CARDIO.ILL	.09	-.13	-.10
MISCELL	-.01	.02	.01
TOT ILLNESS	-.04	.00	-.06

***P< .001 **P<.01 *P<.05

The above table shows that the greater the internal health locus of control, the better is the physical health reported by subjects. However, external health locus of control is related to gastrointestinal illness. The greater the external health locus of control women have, the less they report suffering from the reported gastrointestinal illness prior to the three-months of the participation in the study. From the above table, internal health locus of control (INTERNAL), showed significant correlation with self-reported physical health (r=-.19). While external health locus of control (EXTERNAL) showed significant correlation with gastrointestinal illness (r=.24).

Table 8 (ii) **SUMMARY OF CORRELATION BETWEEN PSYCOLOGICAL HEALTH AT TIME 1 AND HEALTH LOCUS OF CONTROL AT TIME 1**

PSYCHOLOGICAL HEALTH	HEALTH LOCUS OF CONTROL		
	INTERNAL	EXTERNAL	CHANCE
SOMATIC	.02	-.02	-.12
ANXIETY	.00	-.01	-.06
SOCDYSF	-.00	-.05	.03
DEPRESS	.00	.01	.12
TOTGHQ	.03	-.01	-.01

***P< .001 **P<.01 *P<.05

From the above table it can be seen that none of the health locus of control variables are significantly related to either general psychological health or any of the individual components of general psychological health.

Health locus of control components were entered into the regression equation analysis with each of the Health Behaviours individually. The only measure of health locus of control that predicted any of the health behaviours was Chance Health Locus of Control. It accounted for 22% of the variance, F (1, 105)=5.40, p<.05. External Health Locus of Control was the best predictor of Physical Health with an explained variance of 22%, F (1, 103)=5.50, p<.05. External Health Locus of Control also was the best predictor of illnesses in terms of Gastrointestinal illness. None of the components of Health Locus of Control predicted Psychological Health.

3b) It is predicted that higher the Internal Locus of Control, and the lower the Powerful Others and the Chance Locus of Control at Time 3, the healthier would be the Behaviours that women would engage in at that time and better would be their Health at that Time.

For Hypothesis 3b, correlations between Health Locus of Control and Health Behaviours at Time 3 are presented in the Table 9. Correlations between Health Beliefs and Health (physical and psychological), at Time 3 are presented in the Tables 10 (i) and 10 (ii). Regression analysis for this hypothesis is also reported.

Table 9 **SUMMARY OF CORRELATION BETWEEN HEALTH BEHAVIOURS AT TIME 3 AND HEALTH LOCUS OF CONTROL AT TIME 3**

HEALTH BEHAVIOURS	HEALTH LOCUS OF CONTROL		
	INTERNAL	EXTERNAL	CHANCE
SMOKING	-.47*	-.08	.05
TAR CONTENT	.02	.06	.12
SMOK TIMES TAR	.01	.26	.20
SATURATED FAT	.07	.19?	.04
VEGES & FRUIT	.03	.14	.13
WHGRAIN & CEREAL	.11	-.27**	.01
DIET MEAN	.12	-.07	.08
EXERCISE	-.04	.13	.05

***P< .001 **P<.01 *P<.05

The above table shows that internal health locus of control (INTERNAL) showed significant correlation with smoking behaviour (SMOKING) that is the number of cigarettes smoked (r=-.47). External health locus of control (EXTERNAL) is significantly correlated with the amount of wholegrains & cereals intake (WHGRAIN & CEREAL) (r=-.27). However, chance health locus of control (CHANCE) shows no significant correlation with any of the self reported health behaviours.

Table10 (i) **SUMMARY OF CORRELATION BETWEEN PHYSICAL HEALTH AT TIME 3 AND HEALTH LOCUS OF CONTROL AT TIME 3**

PHYSICAL HEALTH	HEALTH LOCUS OF CONTROL		
	INTERNAL	EXTERNAL	CHANCE
PHYS HEALTH	-.01	-.18	-.08
INJU/ACCID	.02	-.06	-16
INFECTION	-.06	.00	.00
RESP.ILL	-.20	-.03	.11
GASTRO.ILL	.04	.01	.03
HEAD/MIG	-.01	.03	.05
CARDIO.ILL	.02	.07	-.01
MISCELL	.01	-.22*	-.16
TOT ILLNESS	-.18	-.15	-.12

***P< .001 **P<.01 *P<.05

The above table shows that external health locus of control is significantly correlated with the number of reported miscellaneous other symptomatology or illness by women over the three month period (MISCELL) (r=-.22). Internal health locus of control and the external health locus of control did not show significant correlation with either self reported physical health, or any of the illnesses reported to have occurred prior to three months participation in the study.

Table 10 (ii) **SUMMARY OF CORRELATION BETWEEN PSYCHOLOGICAL HEALTH AT TIME 3 AND HEALTH LOCUS OF CONTROL AT TIME 3**

PSYCHOLOGICAL HEALTH	HEALTH LOCUS OF CONTROL		
	INTERNAL	EXTERNAL	CHANCE
SOMATIC	.07	-.10	-.05
ANXIETY	-16	-.08	-.05
SOCDYSF	.26 (N=53)	-.06	-.05
DEPRESS	.09	-.11	-.16
TOTGHQ	.09	-21	-.17

***P< .001 **P<.01 *P<.05

From the above table it can be seen that none of the health locus of control variables are significantly related to either general psychological health or any of the individual components of psychological health that is somatic health, anxiety, depression and social dysfunction symptom.

Regression analysis for health locus of control and health behaviours and health (physical and psychological) was computed. External health locus of control was the best predictor of dietary habits in terms of the consumption of wholegrains and cereals with 27% of the explained variance, F (1, 69)=5.48, p<.05.

5.0) Hypothesis 4: It is predicted that as a result of information provided to women, they would report increased Likelihood about having bad health in the Near and the Distant Future, increased Concern about having bad health in the Near and the Distant Future and increased Seriousness about having bad health in the Near and the Distant Future. However, no significant changes are predicted in the Health Locus of Control dimensions and measures of Self-efficacy.

For hypothesis 4, multivariate analysis of variance (MANOVA) was computed to find out the significant difference in terms of change in Health Behaviours over the period of three

months. MANOVA was also used to find the significant difference in terms of the change from Time 1 to Time 2 in terms of each of the variables, Health Belief, Self-Efficacy, and Health Locus of Control. MANOVA was used because each of the variables of Health Behaviours were interrelated to each other. The measures in Health Belief, Health Locus of Control and Self-Efficacy were also interrelated. The mean and standard deviation of Health Beliefs, Health Locus of Control, and Self-Efficacy are presented in Tables 11, 12, and 13.

Table 11 **MEAN AND STANDARD DEVIATION OF HEALTH BELIEFS FROM TIME 1 TO TIME 2**

HEALTH BELIEFS	MEAN		SD	
	TIME1	TIME2	TIME1	TIME2
LIKNEAR	3.36	3.28	.80	.81
LIKDIST	3.06	2.96	.79	.73
CONEAR	3.00	3.27	1.00	.86
CODIST	2.69	2.56	.99	1.02
SERNEAR	1.94	1.79	.93	.91
SERDIST	1.95	1.69	.94	.79

Multivariate main effect showed overall change in Health Beliefs measures from Time 1 to Time 2. Wilks Lambda= .79, F (6, 78)=3.37, P<.01. Univariate effect showed this difference in Health Belief measure to be because of change in concern about having bad health in the near future F (1, 83)=5.19, p<.05, and seriousness with which women view having bad health health in the distant future F (1, 83)=5.54, p<.05.

Table 12 **MEAN AND STANDARD DEVIATION OF HEALTH LOCUS OF CONTROL FROM TIME 1 TO TIME 2**

HEALTH LOCUS OF CONTROL	MEAN		SD	
	TIME1	TIME2	TIME1	TIME2
INTERNAL	27.23	25.37	5.43	6.33
EXTERNAL	15.43	15.26	5.24	5.31
CHANCE	13.58	13.23	5.08	5.03

N=82

Multivariate main effect showed overall change in Health Locus of Control measures from Time 1 to Time 2. Wilks Lambda=.88, F (3, 79)=3.48, $p<.05$. Univariate effect showed this difference in terms of Internal Health Locus of Control measure, F (1, 81)=9.01, $p<.01$. Whereas none of the other variables showed any significant change over time.

Table 13 **MEAN AND STANDARD DEVIATION OF SELF-EFFICACY FROM TIME 1 TO TIME 2**

SELF-EFFICACY	MEAN		SD	
	TIME1	TIME2	TIME1	TIME2
SMOKING SEF	2.95	2.65	2.21	2.0
TAR CONTENT SEF	1.05	.75	.94	.78
SMOK TIMES TAR CONF	80.65	79.75	20.6	17.2
SATURATED FAT SEF	2.56	2.37	.74	.60
SATURA TED FAT CONF	85.6	83.28	18.57	20.48
VEGE S & FRUIT SEF	1.81	1.83	.72	.73
VEGES &FRUIT CONF	88.54	86.80	13.31	18.03
WHGRAIN & CEREAL SEF	2.53	2.07	2.32	.68
WHGRAIN & CEREALCONF	86.95	84.47	16.15	18.42
EXERCISE SEF	3.51	3.09	2.54	2.72
EXERCISE CONF	79.54	85.54	22.28	17.36

Multivariate main effect showed no significant overall change in Smoking Self-Efficacy from Time 1 to Time 2. Wilks Lambda=.76, F (3, 17)=1.76, p>.10. Multivariate main effect did not show significant overall change in Dietary Habits and Exercise Behaviour. F (3, 79)=, p>.10. Univariate effect however showed a trend in terms of Saturated Fat Self-efficacy F (1, 65)=2.9, p>.05. Wholegrains and Fruits self-Efficacy, F (1, 65)=4.61, p>.05, Exercise Self-Efficacy F (1, 65)=3.14, p>.05, and Exercise confidence, F (1, 65)=3.9, p>.05.

6.0) Hypothesis 5: It is predicted that the change in Health Behaviours from Time 1 to Time 3 is related to the change in Health Beliefs from Time 1 to Time 2. However, no significant relation is predicted in Self-Efficacy, and Health Locus of Control with change in Health Behaviours from Time 1 to Time 2.

For this hypothesis, it was necessary first, to see whether there was a change in women's self reported Health Behaviours over time that is from Time 1 to Time 3. To determine the change in women's health behaviours over time, repeated measures multivariate analysis of variance (MANOVA) was computed. The multivariate main effect for Smoking Behaviour of women over time was significant Wilks Lambda=90, F (4, 64) =6.77, p<.001. Univariate F tests showed the overall change in Smoking Behaviour was accounted by the change in the number of cigarettes smoked, (df (2, 32) p<.05) and the tar content per cigarette smoked (df(2, 32) p<.001).

In terms of dietary habits that is, the composite of saturated fat, vegetables and fruits, and wholegrains and cereals, and exercise behaviour there was an overall change over time. Wilks lambda=.79, F (3, 68)=6.77, p<.001. This change was however, because of the change in the average dietary habits, F(1, 70)=6.04, p<.05 vegetables and fruits F (1, 70)=4.88, p<.05, and exercise behaviour, F (1, 70)=4.88, p<.05. No significant change was found in terms of the consumption of wholegrains and cereals.

The mean and standard deviation are shown in Table 14.

Table 14 **SELF-REPORTED HEALTH BEHAVIOURS FROM TIME 1 TO TIME 3**

HEALTH BEHAVIOURS	MEAN		SD	
	TIME1	TIME3	TIME1	TIME3
SMOKING	4.22	2.87	2.13	1.8*
TAR CONTENT	1.61	1.17	.65	.98*
SMOKE TIMES TAR	7.08	4.75	4.52	5.54 N=12
SATURATED FAT	2.84	2.54	.73	.65
VEGE S & FRUIT	2.09	1.88	.74	.68
WHGRAIN S & CEREAL	2.62	2.63	.86	1.23
DIET (MEAN)	7.54	7.00	1.66	1.61
EXERCISE	5.23	4.26	3.60	3.30

*Number of subjects for this behaviour that is smoking were N= 23

For the above Hypothesis once the change in self-reported Health Behaviours was established, then regression analysis was computed to determine whether the change in Health Behaviours over time is predicted by the change in Health Beliefs, Self-efficacy and Health Locus of Control from Time 1 to Time 2.

Results of correlation between Health Behaviours and Health Beliefs, Self-efficacy and Health Locus of Control are presented in Tables 15, 16, and 17.

Table 15 **SUMMARY OF CORRELATION BETWEEN CHANGED HEALTH BEHAVIOURS AND CHANGED HEALTH BELIEFS**

CHANGED HEALTH BEHAVIOURS	CHANGED HEALTH BELIEFS FROM TIME 1 TO TIME 2					
	LIKNEAR	LIKDIST	CONEAR	CODIST	SERNEAR	SERDIST
SMOKING	-.33	-.11	.31	.33	.10	.29
TAR CONTENT	-.30	-.01	.14	.17	.33	.44*
SMOK TIMES TAR	-.17	.30	.62*	-.03	.11	.29
SATURATED FAT	-.15	.07	-.02	-.05	.03	-.01
VEGE S& FRUIT	-.23*	-.04	-.08	.15	.07	.06
WHGR & CEREAL	-.21*	.01	-.01	.26*	.25*	.31**
DIET (MEAN)	-.32**	.01	-.06	.24*	.25*	.26*
EXERCISE	-.00	-.10	-.13	-.22*	-.00	-.06

****P<.0001 ***P< .001 **P<.01 *P<.05

The above table shows that the change in Serious Distant Future is related to the change in Tar content per cigarette smoked, amount of Wholegrains and Cereals and average Dietary Habit. change in Serious Near Future is related to the change in Wholegrain and Cereals and average Dietary Habit. Concern Distant Future is related to the change in the amount of Wholegrain and Cereals and average Dietary Habit and Exercise Behaviour. Concern Near Future is related to the change in theSmok Times Tar that is, number of cigarettes smoked and the tar content per cigarette smoked. Change in the Liklihood Near Future is related to the change in amount of Wholegrain and Cereals Vegetables and Fruits and average Dietary Habit.

Table 16 **SUMMARY OF CORRELATION BETWEEN CHANGED HEALTH BEHAVIOURS AND CHANGED HEALTH LOCUS OF CONTROL**

CHANGED HEALTH BEHAVIOURS	CHANGED HEALTH LOCUS OF CONTROLFROM TIME 1 TO TIME 2		
	INTERNAL	EXTERNAL	CHANCE
SMOKING	-.35*	-.18	.11
TAR CONTENT	-.14	-.18	-.15
SMOK TIMES TAR	-.30	-.09	-.25
SATURATED FAT	.00	-.06	-.06
VEGES & FRUIT	.10	-.02	-.13
WHGRAIN & CEREAL	-.04	.20*	.04
DIET (MEAN)	.01	.11	-.05
EXERCISE	-.15	.11	.02

***P< .001 **P<.01 *P<.05

From the above table it can be seen that only the wholegrains and cereals (WHGRAIN & CEREAL) show correlation with external health locus of control component (EXTERNAL) (r=.20).

Table17 **SUMMARY OF CORRELATION BETWEEN CHANGED HEALTH BEHAVIOURS AND CHANGED SELF-EFFICACY FROM TIME 1 TO TIME 2**

HEALTH BEHAVIOURS	SELF-EFFICACY						
	CHSMOK SEF	CHTAR SEF	CHSMKTAR CONF	CHFAT SEF	CHFAT CONF	CHVEGES EF	CHVEGE CONF
CHSMOKE	.20						
CHTAR CONTENT		.40?					
CHSMOK TIME TAR							
CHFAT				.52***	.11		
CHVEGE & FRUIT						.27*	.21*
CHWHGR & CEREAL							

Table Continued

	CHWHG RAIN SEF	CHWHG RAIN CONF	AVG DIET SEF	AVG DIET CONF	EXERCISE SEF	EXERCISE CONF
CHWHGR & CEREAL	.13	.03				
CHDIET (MEAN)			.26*	.18?		
CHEXERCISE					44***	13

***P< .001 **P<.01 *P<.05

The above table shows that saturated fat self-efficacy is correlated with the change in the intake of saturated fat diet. Vegetables and fruit self-efficacy and confidence is correlated with the change in vegetables and fruits intake. Exercise self-efficacy shows significant correaltion with the change in the exercise behaviour. Average dietary habits showed correlation with the change in average dietary habits. However, no correlation was found in terms of the change in the consumption of the wholegrains and cereals.

Regression analysis was computed to determine the predictive value of each of the independent variables that is, Self-efficacy, Health Locus of Control and Health Beliefs in terms of the change in the Health Behaviours that is, Smoking, Dietary Habits and Exercise.

It was found that concern about having health problems in the near future predicted smoking behaviour with an explained variance of 62%, $\underline{F}$ (1, 10)=6.35, $p<.05$. Tar content was predicted by seriousness with which suffering from major illness or health problem is perceived in the distant future, with a variance of 44%, $\underline{F}$ (1, 18)=4.73, $p<.05$. Serious Near Future was the best predictor of Wholegrains and Cereals with an explained variance of 25%. When Serious Distant Future is added to the regression equation as another variable, it accounted for 31% of the explained variance.

CHAPTER 4

DISCUSSION

This study adopted self-reported Health Behaviour as a dependent variable. Subjects who completed this study were given a first set of questionnaires relating to Health Behaviour, Health Belief, Health Locus of Control, Self-Efficacy, Physical Health and Psychological Health. These questionnaires were given to women to ascertain the relationship between self reported health behaviours of participants three months prior to the participation in the study and health beliefs, health locus of control, self-efficacy, physical health and psychological health.

The answers to this questionnaires were then compared to the responses to a second set of questionnaires. These were, Health Belief, Health Locus of Control, and Self-Efficacy. The second set of questionnaires were administered after the participants were given written material to read, that is at Time 2, which included information about health and healthy behaviours. These set of questionnaires were provided to determine whether reading material about health and health behaviours, effected participants health beliefs, locus of control, and self-efficacy. A further set of responses were considered after the participants were given a third, complete set of questionnaires at Time 3, comprising the first and second sets of questionnaires, except the Self-Efficacy questionnaire.

The results were then analysed in relation to each of the Hypotheses adopted in this study. The discussion of the Hypotheses in this Chapter is presented in the same order as previously identified. Each Hypothesis is discussed in terms of the findings of the present study.

1.0) Hypothesis 1: It is hypothesised that healthy behaviours at Time 1 and Time 3 are associated with good health (physical and psychological) at the Time of the measurements.

The results for this hypothesis is discussed separately for Time 1 and Time 3. First discussion for the results obtained for this hypothesis at Time 1 is presented.

The results obtained in the present study partially support this Hypothesis. The relationship between Smoking Behaviour and Physical Health was studied with reference both to the number of cigarettes smoked and the tar content of the cigarettes. The analysis in this regard included the multiple of cigarettes and the tar content because more the tar content in the cigarettes smoked and fewer cigarettes smoked would have the same effect as more cigarettes smoked with less tar. Results indicated that there was no relation between Physical Health and the Tar Content of the cigarettes smoked. There was also no relation between Physical Health on one hand and the multiple of the tar content and the number of cigarettes smoked on the other.

Except Miscellaneous other symptomatology or illness, Smoking Behaviour did not show relation with any of the other illnesses reported to have occurred three months prior to the participation in the study. Despite the correlation with Miscellaneous other symptomatology or illness, Smoking Behaviour was not related to the Total illnesses. The illnesses that were taken into account in the present study were Injuries/Accident, Headaches Migraines and Neurological Disorder, Respiratory Illness, Gastrointestinal illness, and Cardiovascular illness. No relation was found between Smoking Behaviour and General Psychological Health, either in terms of the number of cigarettes smoked or the number of cigarettes smoked multiplied by the tar content of the cigarettes. No relationship was likewise found between Smoking Behaviour and each of the components of the General Psychological Health that is, Somatic symptom, Anxiety, Social dysfunction, and Depression.

It may be, however, noted that smokers constituted a very small number, for the present study. Therefore, the results obtained may not be conclusive because of a fewer sample for smoking behaviour. However, there seems to be no reason that this would have biased the results obtained in the present study.

Unlike smoking behaviour, dietary habits showed significant correlation with physical health. The results established significant correlation with average dietary habits as also with specific diets such as saturated fat, vegetables and fruit, and wholegrain and cereals. The less the amount of saturated fat consumed and the more the intake of vegetables and fruit, and wholegrains and cereals the better was the physical health of the women who were the participants in the present study. Average dietary habits showed significant correlation with total of all illness taken together, as also with respect to the number of reported incidences of injuries or accidents and headaches and migraines that were reported to have occurred three months prior to participation in the study. Significant relation was found to exist between average dietary habits and overall psychological health, including somatic symptoms, anxiety, and depression, whereas, no relation was found with number of reported social dysfunction.

The amount of saturated fat consumed was found not to be related to any of the illnesses reported to have occurred three months prior to the participation of the women in this study. The amount of saturated fat consumed was related to somatic symptoms and anxiety but was not related to overall psychological health, social dysfunction and reported incidences of depression.

The quantity of vegetables and fruits consumed showed relation with the number of incidences of illnesses reported to have occurred three months prior to the participation of the women in the study. But this was not related to the reported number of incidences of injuries or accidents, headaches and migraines or neurological disorder, infections (Bacterial or Viral), cardiovascular illness, or gastrointestinal illness.

The quantity of vegetables and fruits intake showed significant relation only with somatic symptom. The amount of wholegrains and cereals consumed was related to number of times headaches and migraines or neurological disorder, reported to have occurred. wholegrains and cereals intake was not related to any of the illness reported to have occurred three months prior to the participation of the women in the study. The amount of wholegrains and cereals also showed significant relation with depression symptom.

The correlation between physical health and dietary habits has been quite extensively researched. There is significant evidence linking diets of people in western societies to particular diseases (Cannon, 1992). People whose diet includes foods that are low in saturated fat, and includes more vegetables and fruits, and more wholegrain and cereals are healthier than those whose diet includes high saturated fats, fewer vegetables and fruits, and less wholegrain and cereals (e.g., Sheridan & Radmacher, 1992). These previous findings are in accord with the results found in the study in connection with the Hypothesis 1a.

Exercise behaviour was found to be significantly related to physical health. Exercise behaviour was also found to be related to the total of all illnesses to have occurred three months prior to the participation of the women in the study. It was also related to miscellaneous illness, headaches, migraines or neurological disorder, and Infections reported to have occurred Significant relation between exercise behaviour and the overall psychological health was also found. This relation was also found with reference to the specific components of psychological health including somatic symptom, anxiety and social dysfunction.

The physiological effects of exercise have been found to be associated with a higher concentration of while blood cells which are in an important factor in the immune system contributing in protecting the body from disease (Cannon & Kluger, 1983). Filteau et al (1992) came to a similar conclusion. Shepard et al (1991) similarly concluded that exercise increased the resistance to viral infections and decreased the risk of cancer. These researches support the findings of the present study in relation

to Hypothesis 1a. The findings in relation to Hypothesis 1b are also partially supported by these researchers.

It can therefore be concluded that the results partially support Hypothesis 1a and reinforces the findings of previous studies, to the extent that dietary habits and exercise behaviour were related to 'good' physical and overall psychological health. Not all of the other reported illness were, however, related to the average of dietary habits that is, the amount of saturated fat consumed, the quantity of vegetables and fruits, and the amount of wholegrains and cereals intake in one's diet; and individually with saturated fat, vegetables and fruits, and wholegrains and cereals. Nor were all individual components of overall psychological health related to exercise behaviour and dietary habits. With respect to smoking behaviour, the only reported illness that was found to be related to this behaviour at Time 1 was miscellaneous other symptomatology or illness. That is, the number of cigarettes smoked was associated with the reported miscellaneous other symptomatology illness of the participants. But showed no relation with good physical and overall psychological health. One of the reasons why Hypothesis 1a may not have been supported with respect to smoking behaviour could be because the percentage of smokers among the participants in this study was lower.

Discussion of the results obtained for hypothesis 1 at Time 3 is presented in the following section:

To test this Hypothesis, at Time 3 the relation between Smoking Behaviour and Physical Health was studied with reference both to the number of cigarettes smoked and the tar content of the cigarettes at Time 3. The multiple of cigarettes and the tar content of the cigarettes was included in the analysis for the same reasons as referred to in the discussion of results of Hypothesis 1a.

The results obtained in the present study does not support this Hypothesis. Only Tar content showed negative relation with the number of reported miscellaneous other

symptomatology or illness. This finding is contrary to the hypothesis because the result showed that the tar content per number of cigarette smoked was inversely related with miscellaneous other symptomatology or illness reported to have occured within the three months period of this study. Tar content was related to social dysfunction symptom, but not to somatic symptoms, anxiety and depression, or to the overall psychological health. Individual smoking behaviour and the multiple of the tar content and the number of cigarettes smoked did not show any relation either with the overall psychological health of women, or with any of the individual components of psychological health including, somatic symptoms, anxiety, depression and social dysfunction at Time 3.

Average dietary habits did not show any relation with physical health or with any other reported illness. However, individual items that comprised the diet of the women participants that is, saturated fat, vegetables and fruit, and wholegrains and cereals showed relation with number of reported injuries or accidents, during the three month period of the study. Average dietary habits showed relation with anxiety, and a trend with somatic symptom average dietary habits was not however, found to be related to overall psychological health or to social dysfunction and depression. With reference to specific dietary habits, only saturated fat was found to be related to overall psychological health. Saturated fat was also found to be related to somatic symptoms, anxiety, and depression but not to social dysfunction. Vegetables and fruits showed a trend with overall psychological health, but was not found to be related to social dysfunction, anxiety and depression. Wholegrains and cereals consumption was not related either to overall psychological health or to any of its components.

Results showed that exercise behaviour at Time 3 was not related to physical health at Time 3. However, this behaviour showed relation with number of reported respiratory illness, but not with any of the other illnesses, over the period of three months of this study. Exercise behaviour showed relations, only with anxiety, and no relation was found with overall psychological health or any of its components.

It is concluded that the results do not support Hypothesis 1, at Time 3, with respect to the relationship between smoking behaviour, and physical and psychological health. It is suggested that with respect to smoking behaviour, the results might not have reflected the true state of affairs because of the further dropping out of participants who smoked, between Time 1 and Time 3. At Time 1, with there were few smokers among the number of participants. Between Time 1 and Time 3, there was a further reduction in the number of smokers in the group of participants. Another reason for this result might have been the failure of the participants to respond to all the questions related to smoking behaviour.

Although Hypothesis 1 at Time 3 is not proved with respect to the relationship between smoking behaviour, and physical and psychological health, it is partially confirmed with respect to the relationship between dietary habits and overall psychological health. Vegetables and fruit, and saturated fat showed relation, in the results, with overall psychological health. Saturated fat showed relation with somatic symptoms, anxiety and depression. Average dietary habits also show relation with anxiety. These results indicate that with respect to women, anxiety, depression, and somatic symptoms influence the intake of saturated fat, vegetables and fruits, and wholegrain and cereals. Although average dietary habits is a composite of individual dietary habits, the absence of a relation, in the results, between dietary habits and overall psychological health can be explained by the fact that the individual dietary habits were not all related to overall psychological health; nor did they bear significant relation with all the variables of psychological health. Indeed, only vegetables and fruits showed relation with overall psychological health and wholegrain and cereals was not related either to overall psychological health or any of its individual components.

2.0) Hypothesis 2: It is hypothesised that Health Beliefs at Time 1 and Time 3 are predictive of Health behaviours and Health (physical and psychological) at those Times.

This hypothesis had two parts, 2a and 2b.

Hypothesis 2a) The greater the reported Likelihood of having bad health in the Near and Distant Future, the greater the Concern about having bad health in the Near and Distant Future, and greater the Seriousness with which women view having bad health in the Near and Distant Future at Time 1, the healthier would be the Behaviours they would engage in at Time 1 and the better would be their Health at Time 1.

To test Hypothesis 2a, correlations between Health Beliefs and Health Behaviours and Health (physical and psychological) were examined at first. Stepwise regression analysis was computed to find the role of Health Beliefs in predicting the compliance of self-reported Health Behaviours. The results obtained were in the opposite direction than expected in terms of the Hypothesis.

The relationship between health behaviours and health beliefs was studied with reference to average dietary habits, as well as specific dietary habits that is, intake of saturated fat, vegetables and fruits, and wholegrain and cereals. The results show that average dietary habits was related with health beliefs in terms of Likelihood near future, likelihood distant future, concern near future, and concern distant future. Saturated fat was negatively correlated with current health beliefs in terms of Likelihood near future, likelihood distant future, concern near future, concern distant future and serious distant future. The consumption of vegetables and fruit was negatively related in a significant way only with likelihood near future and showed a trend with likelihood distant future, concern near future, and concern distant future. Wholegrain and cereals showed negative relation with Likelihood near future, and likelihood distant future, and showed a trend with seriousness near future. The results also showed negative correlation between exercise behaviour and health beliefs in terms of Likelihood near future, and likelihood distant future.

In terms of physical health, results showed that physical health was significantly correlated with health beliefs in terms of likelihood of having bad health in the near future, likelihood of having bad health in the distant future and concern of having bad health in the near future and showed a trend with concern of having bad health in the distant future. The results also showed that the number of infections reported by women in the period of three months prior to the participation in this study was negatively correlated with health beliefs in terms of concern of having bad health in the near future, and showed a trend with reported likelihood of having bad health in the distant future.

Health Beliefs showed correlation with overall psychological health in terms of Likelihood with which women viewed health problems in the near future, likelihood of having health problems in the distant future, and concern about having bad health in the near future. Somatic symptoms showed relation with health beliefs in terms of likelihood of having bad health in the near future, likelihood of having bad health in the distant future, concern of having bad health in the near future, and concern of having bad health in the distant future. Both anxiety and depression were related to likelihood with which women viewed having bad health in the near future and the concern about having bad health in the near future. Social dysfunction showed relation only with likelihood of having bad health in the near future.

The significance of the negative correlation between health beliefs and health behaviours mean that women who reported less likelihood of having a bad health in the near and the distant future, showed less concern about having bad health in the near and distant future, and reported being less serious about having bad health in the near and distant future, indulged in better healthy behaviour patterns.

The negative correlation can be attributed to the fact that women who engaged in healthy dietary and exercise behaviour did not perceive suffering from any major illness or health problems as more likely, did not seriously contemplate having bad health or suffer from any major illness, or considered showing more concern in this

regard. This Hypothesis is therefore not proved by the results obtained. However, the significant correlation albeit in a negative direction, indicate that the relationship between Health Behaviours and Health Beliefs could be the subject of inquiry.

This Hypothesis was connected with health beliefs. Although health beliefs comprising the Health Beliefs Model have been used to determine the broad range of Health Behaviours, numerous limitations have been identified (Sheeran & Abraham, 1992). It has however been suggested that Health Beliefs could be seen as a contributing factor to subsequent responses on action relating to Health Behaviour (e.g., Rosenstock, 1974). Simon and Das (1984) found both positive and negative multiple correlations between Health Beliefs and the degree of motivation in Health Behaviours in preventing disease. These previous findings partially justify the reasons why Hypothesis 2a was not proved.

Hypothesis 2b: It is hypothesised that the greater the reported Likelihood of having bad health in the Near and Distant Future, the greater the Concern about having bad health in the Near and Distant Future, and greater the Seriousness with which women view having bad health in the Near and Distant Future at Time 3, the healthier would be the Behaviours they would engage in at that Time and the better would be their Health (physical & psychological) at that Time.

For this Hypothesis, correlations between Health Beliefs and Health Behaviours and Health (physical and psychological) were looked at, and regression analysis for the same were computed. This was done for the same reasons as was done with Hypothesis 2 a.

The results obtained at Time 3 that is, within three months of the women's participation in the present study, bear resemblance with the results obtained at the beginning of the study that is, Time 1, to the extent that most of the relationship between the variables are significantly correlated in a direction opposite to what was expected. However, some results at Time 3 indicate a positive relation. This is in

conformity with Hypothesis 2b. The positive correlation, however is insignificant to prove the Hypothesis.

The relationship between Health Beliefs and Health Behaviours was studied with reference to both average dietary habits and specific dietary habits like consumption of saturated fat, vegetables and fruits, and wholegrains and cereals, as well as exercise behaviour at Time 3. The results show a trend between saturated fat and health beliefs in the serious near future. Vegetables and fruits show significant relation with health belief in terms of concern about having bad health in the near future, concern about having bad health in the distant future and, the seriousness with which women viewed bad health in the near future. Wholegrains and cereals show significant relation only with the seriousness with which women viewed bad health in the near future. In respect of the relationship of average dietary habits and health beliefs, the results indicate that average dietary habits was significantly related with health beliefs in terms of concern about having bad health in the near future, concern about having about having bad health in the distant future, and the seriousness with which women viewed bad health in the near future. Results indicate that exercise behaviour was related to the likelihood of having bad health in the distant future.

The relationship between health beliefs and physical health was studied with reference to physical health and illnesses such as, injuries or accident, headaches, migraines or neurological disorder, infections (Bacterial or Viral), respiratory illness, gastrointestinal illness, and cardiovascular illness in this study, and miscellaneous other symptomatology or illness. The only significant results in this study were in relation to physical health, cardiovascular illness, miscellaneous other symptomatology or illness, or illnesses when taken together that is, total of all illnesses taken together. In terms of physical health, the result showed significant relation between physical health and health beliefs in terms of likelihood of having bad health in the near future, and concern in the distant future. Results showed significant relation with cardiovascular illness and health beliefs in terms of concern in the near future and seriousness in the distant future. Miscellaneous other symptomatology or illness was related in a significant way with health beliefs only in terms of likelihood of

having bad health in the near future, and likelihood of having bad health in the distant future. Illnesses when taken together that is, showed significant relation with health beliefs only in terms of likelihood of having bad health in the near future, and a trend with concern about having bad health in the near future.

The relationship between psychological health and health beliefs was studied in relation to overall psychological health and individual components of psychological health that is, somatic symptoms, social dysfunction, anxiety and depression. The results showed that only somatic symptoms, anxiety and depression were correlated with health beliefs. Somatic symptoms were significantly correlated with health beliefs in terms of concern about having bad health in the distant future. Anxiety was significantly correlated with health beliefs in terms of likelihood of having bad health in the near future. Depression was negatively related with seriousness with which women viewed bad health in the near future.

The significance of these results can be explained in the same way as the results obtained in Hypothesis at Time 1. Hypothesis 2b is therefore not proved as was the case with Hypothesis 2a. However, the relationship between Health Beliefs with the specific variables of physical and psychological health is indicative of some relationship between the two. The limitations of the health beliefs as measures of predictors of health behaviours as highlighted in the discussion on Hypothesis 2a also partially explained why Hypothesis 2b has not been proved.

3.0) Hypothesis 3: It is hypothesised that Health Locus of Control at Time 1 and Time 3 are predictive of Health behaviours and Health (physical & psychological) at those Times.

This hypothesis is divided into two parts 3a and 3b:

3a. It is predicted that the higher the Internal Health Locus of Control and the lower the External Health Locus of Control, and Chance Health Locus of Control at Time 1,

the healthier would be the Behaviours that women would engage in at that Time and better would be their Health at that Time.

3b. It is predicted that higher the Internal Health Locus of Control, and the lower the External Health Locus of Control or External Health Locus of Control and the Chance Health Locus of Control at Time 3, the healthier would be the Behaviours that women would engage in at that time and better would be their Health at that Time.

The relationship between health locus of control on the one hand and health behaviours, physical health and psychological health on the other were studied at Times 1 and 3. Because of the low level of correlations between health locus of control and the different variables of health behaviours, physical and psychological health, the discussion of the results is presented together.

The results showed that vegetables and fruits were significantly related only with external health locus of control and only at Time 1. Wholegrains and cereals was related only with chance health locus of control at Time 1 and significantly related in a negative way with external locus of control only at Time 3. Average dietary habits was significantly correlated with chance health locus of control only at Time 1. Smoking behaviour was significantly correlated in a negative way only with internal health locus of control, and only at Time 3.

In respect of the relationship between health locus of control and physical health, physical health was related in a significant way only with internal health locus of control, and only at Time1. Gastrointestinal illness reported by women showed relation only with external health locus of control and only at Time1. Miscellaneous illness was correlated only with external health locus of control and only at Time 3. Results also showed a trend of correlation between the number of reported respiratory illness with internal health locus of control at Time 3. No relation between health locus of control and psychological health was established by the results. There was only a trend between social dysfunction and internal health locus of control.

An evaluation of the results indicate that only some health behaviours were correlated to some components of health locus of control. Vegetables and fruits, for example, was correlated to external health locus of control at Time 3. Wholegrains and cereals was correlated to external health locus of control at Time 3. Smoking behaviour and physical health were correlated with internal health locus of control at Time 3 and at Time 1 respectively. Social dysfunction showed only a trend with internal health locus of control at Time 3. Wholegrains and cereals and miscellaneous illness was related to external health locus of control at Time 3 so was gastrointestinal illness at Time 1. Physical health showed a trend with internal health locus of control at Time 3, and wholegrain and cereals and average dietary habits showed relationship with chance health locus of control at Time 1. No relationship was found between physical health and health locus of control.

On regression analysis, none of the health locus of control variables viz., internal health locus of control, external health locus of control, and chance health locus of control predicted self reported health behaviours that were examined in the present study such as smoking behaviour, dietary habits, and exercise behaviour, both at Time 1 and Time 3.

The results in relation to this Hypothesis was unexpected and is not borne out by previous studies on the relationship between Health Locus of Control and Health Behaviour (e.g., Wallston & Wallston, 1982). One reason for this may be that the focus of inquiry in the present study was a bit different than the previous ones in as much as health value was not taken into account in the present study. The other reason might be that in the present study a multidimensional health locus of control scale was used, whereas some researchers like Wallston and Wallston (1981) have claimed that specific health locus of control scales are better measures of locus of control beliefs relating to particular behaviours than the more general scales.

Hypotheses 3a and 3b are therefore not proved by the results obtained. It is suggested that these Hypotheses may have been proved if specific health locus of

control scales, instead of one general health locus of control, was used to predict each of the specific Health Behaviours included in the study.

4.0) Hypothesis 4: It is predicted that as a result of information provided to women, they would report increased Likelihood about having bad health in the Near and Distant Future, increased Concern about having bad health in the Near and Distant Future, and increased Seriousness about having bad health in the Near and Distant Future. However, no significant changes are predicted in the Health Locus of Control dimensions and measures of Self-Efficacy.

The results in terms of this hypothesis showed that there was an overall change in Health Beliefs from Time 1 to Time 2. The statistical tests showed significant change. This change in Health Beliefs was associated with change in terms of concern in the near future about women's health, and the seriousness with which health is perceived in the distant future. However, the change in the health beliefs in terms of concern about having bad health in the near future was in the opposite direction and is contrary to the Hypothesis.

In terms of the change in the health locus of control from Time 1 to Time 2, the results obtained, showed overall change over time. The statistical tests showed significant change. This change in health locus of control was reflected only in terms of internal health locus of control. The external health locus of control and the chance health locus of control did not show any significant change.

The results in relation to self-efficacy from Time 1 to Time 2, did not show any overall change. However, some variables of self-efficacy showed trends of change between Time 1 and Time 2. These relate to self-efficacy in exercise behaviour and confidence in achieving the recommended exercise behaviour. Confidence self-efficacy in relation to the consumption of saturated fat and wholegrains and cereals also showed some trends.

The Hypothesis is therefore substantially proved. The only variance in terms of this Hypothesis was that the change in Health Beliefs, relating to a concern about having bad health in the near future, at Time 1 and Time 2 was in the opposite direction than expected. This means that instead of being more concerned about health in the near future after being given the written information the women who were the participants in this study appears to have had less concern about their health in the near future. The reason for this appears to be that the participants over-perceived threats to their health before getting the written information. The written information appeared to have placated some of the misapprehension about their health.

5.0) Hypothesis 5: It is predicted that the change in Health Behaviours from Time 1 to Time 3 is related to the change in Health Beliefs from Time 1 to Time 2. However, no significant relation is predicted in Self-Efficacy, and Health Locus of Control with change in Health Behaviours from Time 1 to Time 2.

The thrust of this Hypothesis was first, to examine the change in Health Behaviours over the period of three months, that is from Time 1 to Time 3, and then to see if this change was related to changes in Health Beliefs, Health locus of Control and Self-efficacy from Time 1 to Time 2.

To obtain the results in relation to the Hypothesis, the responses of the participants were computed by multivariate analysis of variance to get the true significance of the change over time. The results showed that there was a change in health behaviours as it related to overall smoking behaviour that is, number of cigarettes smoked and the tar content per cigarette smoked. The results also showed that there was a change in health behaviours between Time 1 and Time 3, in terms of average dietary habits, and consumption of vegetables and fruits, but no change was shown in relation to wholegrain and cereals. In terms of exercise behaviour, results did not indicate any change in this behaviour between Time 1 and Time 3.

In the analysis of the results these changes in health behaviour between Time 1 and Time 3, were then studied to in relation to change in health beliefs, health locus of control and self-efficacy.

The results indicated that individual variables of health beliefs were predictors of specific changes in health behaviour. Thus concern about having bad health in the near future was found to be a predictor of smoking behaviour in terms of the number of cigarettes smoked. Seriousness with which women viewed having bad health in the distant future was found to be a predictor of tar content of the cigarettes smoked, of wholegrains and cereals consumption, and of average dietary habits. Seriousness with which women viewed their having bad health in the near future was found to be a predictor of wholegrains and cereals. Likelihood of having bad health in the near future was found to be a predictor only of average dietary habits. In connection with Hypothesis 2b, previous studies highlighting certain limitations of Health Beliefs as predictors of change in Health Behaviours were highlighted. However, it was pointed out in connection with the use of health beliefs as predictors of health behaviour change that these may provide the setting for subsequent responses in this regard. The results in the study on the relationship between health beliefs as predictors of near and distant smoking behaviour, and of specific dietary habits testified to this relative importance of health beliefs.

Evaluation of results directed to examine whether changes in health behaviours from Time 1 to Time 3 indicated that health locus of control was not predictive of changes in the behaviours examined in the present study.

Results relating to self-efficacy as predictors of change in health behaviour from Time 1 to Time 3 indicated mixed findings. Smoking self-efficacy and confidence was not found to be predictive of health behaviour in terms of smoking habit both in relation to the number of cigarettes smoked and the tar content per cigarettes smoked. Vegetables self-efficacy and confidence was predictive of health behaviour relating to the consumption of vegetables and fruits. Average dietary habits was predicted by the average diet self-efficacy variable, but not by the confidence in terms of dietary Habit.

The result showed that exercise self-efficacy was predictive of health behaviour, but was not predicted by the confidence in terms of achieving such behaviour. Previous studies in this area partially support these findings. Perceived self-efficacy was found to be a significant motivating factor in the intention to exercise and in maintaining the practice (Weiss et al. 1989; Dzewaltowski et al., 1990; Feltz & Riessinger, 1990; McAuley, 1992, 1993).

The results in relation to vegetables and fruits self-efficacy, and health behaviour relating to the consumption of vegetables and fruits, indicate that the higher the expectation of achieving good healthy behaviour at Time 3 the higher would be their level of vegetables and fruits self-efficacy. These results reinforce previous general findings that Self-Efficacy can predict intentions and action in different areas of the functioning of the individual health (Schwarzer & Fuchs, 1995).

Hypothesis 5 is substantially proved with respect to health beliefs and health locus of control variables, but only partially with respect to self-efficacy. In conformity of Hypothesis 5, health locus of control was found not to be a predictor of any of the health behaviours examined in the present study. Health beliefs, in terms of concern about having bad health in the near future, was found to be a predictor of smoking behaviour. Seriousness with which women viewed their having bad health in the in the distant future predicted tar content, wholegrain and cereals and average dietary habits. The seriousness with which they viewed their having bad health in the near future was predictive of health behaviours in relation to wholegrains and cereals. The likelihood of having bad health in the near future predicted health behaviour in relation to average dietary habits. In conformity with this Hypothesis self-efficacy was not found to be a predictor of change in smoking behaviour. However, Self-efficacy was found to be a predictor of change in health behaviours relating to intake of vegetables and fruits intake, average dietary habits and exercise behaviour.