SUMMARY

The world’s largest growing economy India is undergoing a rapid economic growth, coupled with demographic, cultural and lifestyle changes poses a serious concern of the health profile of Indian citizens. In India, CVD has been designated as the leading cause of mortality and morbidity, representing a total of 31% of all global deaths (WHO Fact sheet, 2015).

The majority of individuals lying in the age group of 20-69 years will encounter nearly half of the estimated deaths increasing to 24.8% which means losing more productive people to these diseases. Different studies on heart disease confirmed that most of the risk factors for heart disease starts to develop at young age (Berenson, 1998; Pencina et al., 2009;). Studies completed among university students showed that college students have enough risk factors for developing CVD (Hlaing et al., 2007; Spencer, 2002). Awareness towards the RFs as already mentioned, stands of utmost importance and its management and continued practice have resulted in improved situation of individuals (Sarrafzadegan et al., 2009, Rani et al., 2013; Ramanath et al. (2012) Eastwood et al., 2013; Khosravi et al. 2010) such as bringing the SBP, DBP level to normal range, decreased cholesterol levels, smoking cessation, increased physical activity etc. The most important reason for the unawareness is the lack of knowledge which in return affects their attitude and practices, and pertaining to the fact that there is very little existing knowledge on CVD among both sexes and also that they identify CVD as a risk for their health in the coming future (Vanhecke at al., 2006) and also among those who have existing CVD (Celentano et al., 2004). So a person with a positive attitude will divert himself to change his behaviour to practice good things as the existing studies prove that there is significantly low proportion of people having good knowledge (Pandey and Khadka, 2012; Winham and Jones 2011). Positive attitude (Bollu et al., 2015; Oguoma et al. 2014) and fair practice (Mitwalli et al., 2013; Andsoy et al., 2015).

The prevention of CVD primarily depends on awareness and risk perception, and with the increasing incidences of CVD burden in our society, implementation of preventive
strategies in the face of intervention through internet based technology such as websites etc. is very much needed and because of the fact that such technology is very much accepted among early adults it gets more easily adapted among individuals and they can have access to it whenever they want to (Barerra et al., 2009).

The whole study was carried out into three phases, these are broadly discussed as follows:

**Phase I: Preliminary Phase**

a) To know personal attributes and lifestyle variables in early adulthood.

b) To estimate risk of CVD by using perception of risk of heart disease scale.

c) To understand the baseline knowledge, attitude and practice of the study subjects by using an inventory.

**Phase II: Intervention Phase**

d) To intervene an experimental group for nutritional management and behaviourally oriented counselling by using Prohealth website.

**Phase III: Post Intervention Phase**

e) To evaluate the effectiveness of intervention and associate with pre and post phase of the study.

f) To correlate various factors with reference to CVD before and after the intervention.

This study was carried out in urban area of Lucknow. The approaches adopted for the study was cross-sectional and Non-experimental pre-test/post-test design. For this study 250 individuals belonging to early adulthood age groups (20 to 40 years) were selected from two Mohall’s of Lucknow city by adopting multistage random sampling, purposive sampling and convenience sampling procedure. At different stages different sampling techniques were applied. Characteristics of the study subjects were obtained by interviewing them. Knowledge, attitude, practice level were assessed by questionnaire method using a pre-designed and pre-tested inventories. Perception of risk was assessed by using a standardized scale, evaluation for the proposed website was done by a 20-item evaluation sheet, and Intervention was given through a designed website prohealth. The purpose of this chapter is to summarise and interpret the findings of the present study, which has been described under the following heads.
5.1 General characteristics of respondents

1. Majority of the consumers were aged between 20 to 25 years (n=129; 51.60%), followed by 25 to 30 years (n=53; 21.20%), 35 to 40 years (n=44; 17.60%) and 30 to 35 years (n=24; 9.60%).
2. Except for 1 respondent belonging to Christian community, the majority were Hindu (87.60%) and Muslims (12%).
3. Maximum respondents were of general category (n=130; 52%) and SC (n=79; 31.60%) category.
4. Majority of the respondents were female (n=143, 57.20%).
5. Maximum individuals were single (n=158; 63.20%) or Married (n=90; 36%).
6. Present morbidity situation revealed individual suffering from some disease condition (n=87; 34.80%) commonest being high cholesterol 12 (4.8%), arthritis 9(3.5%), lower abdomen pain 7(2.8%), hypotension 8(3.2%), dengue 3(1.2%), thyroid 3(1.2%), migraine 6(2.4%), 9.20% from diabetes and 10% from hypertension.
7. 87% respondents were regular users of internet and 82% carried smart phone.
8. Most of the consumers were Unemployed (52.40%), whereas 16.40% and 18.40% were professionals and self-employed.
9. Majority of the respondents belonged to Middle Income group (53.20%).
10. Majority of respondents constituted of Nuclear family (n=172; 68.80%).
11. The daily consumption of Milk, vegetables, fruits and pulses was 43.20%, 90.40%, 53.60% and 82.40% respectively. Whilst the consumption of fast food, animal products and milk on “Never “basis was 7.20%, 38.40% and 18.40% respectively.
12. 73.60% did not suffer from any past history of illness, whereas 25.20% suffered from other medical conditions but they preferred allopathic treatment (22.40%) mostly from private hospitals (22.40%) and continued the treatment for more than 6 months (4.80%) not involving any food modifications (82.40%).

5.2 Risk factors of Cardiovascular Disease

1. Family history of high cholesterol was observed only by 20% whilst 24.8% were not sure of its occurrence among the family members.
2. The history of hypertension was prevalent among 37.2% respondents.
3. One fourth (22%) respondents had a history of heart disease running in family.
4. Less than half (43.6%) of the respondents had a history of Diabetes.
5. 16.5% females and 11.6% males had a high waist to hip ratio.
6. More than one fourth individuals were in the category of overweight (24.40%), 6% in the obese class 1 along with 8.80% of those who were in the underweight category.
7. 16.4% respondents fell in the risk category in terms of high cholesterol.
8. 23.6% and 9.6% were categorised into risk and high risk for triglyceride values.
9. Maximum numbers of individuals were at increased risk (88.8%), by having HDL less than the desired values.
10. Less than half respondents had values of LDL at near optimal, borderline high, high and very high as 24.8%, 9.2%, 6% and 3.2% respectively.
11. Maximum respondents (46%) in context of VLDL were at risk.
12. Majority preferred vegetarian diet (51.20%) of which 8.80% were occasional Non-vegetarians.
13. Timing of meals was mostly irregular (58.80%).
14. Mostly people preferred consuming Iodised salts (86.80%).
15. Preference of refined oil was seen among less than half respondents (39.60%), followed by mustard and refined oil both (12.40%).
16. Almost half respondents consumed flour without choker (49.20%).
17. Almost 90% respondents did not have any addiction. However, 4.40% did smoke. The duration for more than 5 years was found among 7.60%.
18. The mean time spent on physical activity was (17.88±23.71), much less than the recommended physical activity as prescribed by WHO (40-45 minutes).
19. More than half respondents (62%) perceived themselves at “risk” category and 16.8% categorised themselves at “Dread risk”. However one fourth (21%) assumed themselves at “Unknown risk”.
20. Age had a strong and significant association with dread risk ($\beta=0.185$, $p<.01$) and Risk ($\beta=0.036$, $p<.01$) Meanwhile Gender had a marginal significant association with total risk ($(\beta=0.1.235$ $p<.10$) and significant association with unknown risk ($\beta=0.903$, $p<.05$).
21. Employment had a significant association with unknown risk ($\beta=0.2.736$, $p<.05$) and marginal association with Total risk ($\beta=0.464$, $p<.10$).
22. Knowledge associated with personal attributes and Attitude had no significant association with either of risk categories, Total risk (β=0.464), (β=0.038).

23. Knowledge related to other risk factors with Dread risk was found to be highly significant (β=0.228, p<.01), also practice score was found to be significantly highly associated with Dread risk (β=0.513, p<.10).

5.3 Knowledge, Attitude and Practice scores related to CVD

5.3.1 Knowledge

1. A total of 12.40% respondents fell in the “high category”, 22.40% in “moderate level” and 25.20% in the “low level category”.

2. A low level of knowledge for awareness of types of CVD such as Coronary heart Disease, angina pectoris (Chest Pain), atherosclerosis, stroke, Peripheral Artery Disease, rheumatic Heart Disease and Myocardial Infarction (Heart Attack) were 58%, 80.40%, 82.40%, 59.20%, 69.40%, 70.40% and 76.40% respectively.

3. More than 50% people did not recognize the important symptoms such Pain or discomfort in the jaw, neck or back (70.80), Feeling weak, light-headed, or faint (64.00), Sudden numbness or weakness of the face, arm, or leg (72.80), Sudden confusion or trouble speaking or understanding others (76.80), Severe headache with no known cause (78.40), Sudden dizziness, trouble walking, or loss of balance or coordination (71.60) and Sudden trouble seeing in one or both eyes (74.40).

4. Majority of respondents could tell the activity associated in elevating the risk of CVD such as smoking (72.80), Unhealthy diet such as diets high in saturated fats, cholesterol and salt (70.00), physical inactivity (65.20), obesity (66.00), stress (59.20), high cholesterol levels (47.60), high BP (51.20) and previous history of heart attack (51.20).

5. Controllable risk factors associated knowledge showed affirmative responses such as obesity (58.00), stress (52.80), smoking (67.60), and high fat intake (59.20), diabetes (40.00), High cholesterol (49.20), and High BP (44.80).

6. Other risk factors associated knowledge was found to be 9.20% in the high level category, 21.60% in moderate and 69.20% in low level category.
7. Knowledge related to standard values for HDL, LDL, Blood sugar, Blood pressure and BMI was not known by 231 (92.4%), 231 (92.4%), 194 (77.60%), 151 (60.40%) and 193 (77.20%) people respectively.

8. Only 124 (49.60%) respondents were aware of any CVD clinic in their area in case of emergency. 181 (72.40%) were unaware that lifestyle diseases are related to high risk of CVD, and 37.60% knew that CVD is preventable.

9. Eating disorders, high fat diet and excessive sodium all contribute to risk of CVD was known by 38.00%, 60.80% and 64.80%. Modified diet for CVD was not known by 77.60%.

10. Physical activity knowledge reveals that only 60.40% agreed that “there is any relationship between exercise and heart attack”, whilst 41.20% disagreed that irregular physical activity will increase the risk of having a heart disease.

11. Two hundred eight (83.20%), one seventy eight (71.20%), one eighty two (72.80%) respondents agreed that smoking, alcohol and tobacco (any form) has a bad effect on health respectively.

5.3.2 Attitude

1. One the basis of attitude score a total of 27.2% respondents fell in the “positive attitude category”, 35.20% in “neutral attitude category” and 37.60% in the “Negative attitude category”.

2. More than half respondents (69.20%) agreed that diet control can act as a central pillar for CVD management, 72.40% individuals agreed of avoiding salt in their diet.

3. A positive attitude for physical activity associated attitude such as 76.80% and 77.20% agreed that physical exercise and yoga along with meditation have a positive effect on CVD.

4. Almost half of the respondents disagreed for smoking responsible for heart diseases, however agreeing to excessive medication (32.80%) as a root cause for heart problems.

5.3.3 Practices

1. Majority respondents (87.60%) fell in the poor practice category, 12.40% in fair practice and 0% in the good practice.
2. Majority (83.20%) have till date not attended any behavioural counselling session related to CVD, whilst around 50% did not follow any wellness strategy.
3. More than half of the respondents (62.40%) did not follow any primordial practices to delay the onset of heart diseases; while 41.20% always preferred to receive medicine treatment and very few (56.40%) reported getting their blood profile checked.
4. Yoga or meditation was found to be practiced by only 14% respondents, and 37.20% experienced restlessness during walking or exercise.
5. The practice of doing physical exercise or brisk walking regularly was found among 32.40% and 31.20% respectively.
6. The consumption of alcohol and smoking was seldom seen among 40% and 45% respectively.
7. 69% subjects did not accept of adopting any change after knowing the harmful effects of tobacco on health whilst only 3.20% people reported of consuming any anti-depressants or sleeping drugs.

5.4 Correlation among factors related to CVD
5.4.1 Correlation between Knowledge, Attitude and Practice scores
1. Correlation between KPA and Kother was found to be highly significant (r=0.642, p<.01) along with a strong and significant association with attitude (r=0.616, p<.01) and practice score (r=0.234, p<.01).
2. Kother Score was correlated to KPA and Attitude score, a significant positive correlation was observed with the values (r=0.642 and r= 0.613) at p<.01 significance however its correlation with Practice was observed less significant at p<.10.
3. A statistically significant correlation was observed between Attitude and KPA, Kother and Practice with values as (r=0.616, r= 0.613 and r= 0.297) at p<.01 level of significance.
4. Significant association of practice score with and KPA and attitude score with values significant (r=0.234 and r= 0.297) at p<.01 level was observed though its association with Kother score (r=0.107) was marginally significant (p<.10).
5.4.2 Perception of risk of Heart Diseases according to Demographic Variables

1. Age had a strong and significant association with dread risk (β=0.185, p<.01) and Risk (β=0.036, p<.01).

2. Gender had a marginal significant association with total risk ((β=0.1.235 p<.10) and significant association with unknown risk (β=0.903, p<.05).

3. Perception of risk according to the type of family had no significant association. Although Employment had a significant association with unknown risk (β=0.2.736, p<.05) and marginal association with Total risk (β=0.464, p<.10).

4. Gender having a marginal association with total risk proves that even though men and women are at similar risk, women perceive risk more (49.05±4.5) than men, retired individuals perceived more risk than other counterparts (52±3.7).

5.4.3 Perception of risk of Heart Diseases with KAP

1. Knowledge associated with personal attributes and Attitude had no significant association with either of risk categories, with values of Total risk as (β=-0.019), (β=0.038).

2. Knowledge related to other risk factors with Dread risk was found to be highly significant (β=0.228, p<.01), also practice score was found to be significantly highly associated with Dread risk (β=0.513, p<.10).

5.5 Factors associated with Cardiovascular Disease

5.5.1 Morbidity status associated with CVD indicators

1. Age and gender had a significant association with morbidity status at $\chi^2 = 67.142$, p<.05 and $\chi^2 = 13.946$, p<.10 respectively. However there was no significant association observed with religion and caste of the respondents.

2. Significant association was observed between Morbidity status and marital status of the respondents with the value of $\chi^2 = 162.958$, df=10 highly significant at, p<.01 level.

3. Significant association was observed with employment of individuals with the value of $\chi^2 = 51.294$, df= 20 highly significant at, p<.01 level.
4. A non-significant observation with morbidity status was observed for both type of family the respondents is living and the monthly income that he is getting.

5.5.2 Age associated with CVD indicators

1. A significant relationship was observed among the age groups with milk and fruit consumption pattern having the chi-square values as $\chi^2=40.147$, df=12 and $\chi^2=41.910$, df=12 significant at p<.01 level.

2. Highly significant association was observed with fast food consumption significant at p<.01 level ($\chi^2=45.486$, df=12) where majority (46.8%) individuals consumed fast food on an occasional basis.

3. Consumption of vegetables and animal products had a significant association with age groups at p<.10 level of significance ($\chi^2=19.756$, df=9 and $\chi^2 =19.374$, df=12) respectively.

4. Pulses consumption was non-significantly associated with age group.

5. The association of age group with family history of disease such as high cholesterol, high blood pressure, diabetes and Heart diseases was found to be statistically non-significant.

6. A significant association of age was identified with past history of illness at p<.10 level of significance ($\chi^2=16.798$, df=6).

7. Type of treatment, Place of treatment, duration of treatment and consumption of modified diet did not statistically related with the age categories of the respondents.

8. Levels of VLDL had a very strong and significant relationship with age category at p<.01 level of significance having $\chi^2=18.509$, df=9. Similarly both HDL and triglycerides level showed a significant relationship with age p<.10 level of significance ($\chi^2=6.788$, df=6 and $\chi^2=13.911$, df=9 respectively), whilst no association was observed with cholesterol and LDL levels.

9. Age had a significant association with BMI p<.10 level of significance ($\chi^2 =15.813$, df=9),
5.5.3 Gender associated with CVD indicators

1. A significant association was observed between gender with animal products and fast foods consumption ($\chi^2=11.642$, df =4 and $\chi^2=9.593$, df=4), results were significant at p<.10 level.
2. A non-significant relationship of gender with milk, vegetables, fruits and pulses with chi-square values as $\chi^2=3.122$, p=.538; $\chi^2=1.149$, p=.765; $\chi^2=6.111$, p=.191; $\chi^2=2.007$, p=.734 respectively was observed.
3. The association of gender with family history of disease such as high cholesterol, high Heart diseases and diabetes was found to be statistically significant at p<.10 level of significance having values as $\chi^2=4.670$, df =2, $\chi^2=5.920$, df=2 and $\chi^2=7.614$, df=2 respectively.
4. A very high significance was observed for gender and high cholesterol level, value of $\chi^2=14.842$, df=2 being significant at p<.01 level of significance.
5. A non significant relationship of cholesterol, HDL and LDL levels with gender category was observed.
6. Levels of VLDL and triglycerides both have a strong and significant relationship with gender category at p<.05 level of significance having $\chi^2=7.64$, df=1 and $\chi^2=11.36$, df=2 values respectively, gender had a significant association with BMI at p<.05 level of significance ($\chi^2=12.517$, df=3).

5.5.4 Marital Status associated with CVD indicators

1. Statistically high significant association were identified between marital status and consumption pattern of milk ($\chi^2=34.7$, df=8, p<.01), fruits ($\chi^2=28.94$, df=8, p<.01) and fast foods ($\chi^2=36.03$, df=8, p<.01). However, no association was observed with vegetables, pulses and animal products.
2. A statistically significant relationship of marital status was identified with BMI ($\chi^2=17.8$, df=4, p<.05) and VLDL ($\chi^2=12.2$, df=4, p<.05).
3. Both HDL ($\chi^2=6.91$, df= 4) and triglycerides ($\chi^2=9.99$, df=4) level were significant at p<.10 level of significance.
4. Other associations between marital status and lipid profile (cholesterol and LDL) were not statistically significant.
5.5.5 Employment associated with CVD indicators

1. History of high cholesterol and blood were strongly associated with employment at p<.01 level of significance having values as \( \chi^2 = 29.54 \), df=4 and \( \chi^2 = 27.42 \), df=4 respectively.

2. Whereas, for both heart diseases and blood sugar the association was identified at p<.10 level of significance having values as \( \chi^2 = 13.7 \), df=4 and \( \chi^2 = 14.09 \), df=4 respectively.

3. Blood sugar was predominant among 43.6% families of which majority was among the unemployed (47.3%). Family history of heart was observed only among 22%, and 13.6% were not sure of any such case.

4. For BMI and HDL an association was identified with employment at p<.10 level of significance having values as \( \chi^2 = 21.21 \), df=4 and \( \chi^2 = 9.79 \), df=4, respectively.

5. VLDL and triglycerides was observed at p<.05 level of significance having values as \( \chi^2 = 14.56 \), df=4 and \( \chi^2 = 22.59 \), df=4 respectively.

6. Cholesterol level was found normal among unemployed individuals (80.2%) followed by self-employed respondents (74.8%). High levels of cholesterol were found only among professional (17.1%) and retired (12.5%) individuals.

7. Other associations between employment and lipid profile (LDL and cholesterol) were not statistically significant.

5.6 Relationship Between socio-demographic characteristics with CVD associated variables

1. The nature of diet and type of oil consumed was found to be significantly associated with age at p<.10 level of significance (\( \chi^2 = 19.99 \), df=9 and \( \chi^2 = 37.33 \), df=27) respectively.

2. In our study the timing of meals and type of salt consumed was found to be highly significant at p<.01 level of significance (\( \chi^2 = 24.108 \), df=4 and \( \chi^2 = 18.33 \), df=3) respectively.

3. Age was found to be highly statistically significant with addiction pattern at p<.01 level of significance (\( \chi^2 = 70.83 \), df=15).
4. Gender was found to be statistically significant with both Nature of diet and addiction ($\chi^2=35.93$, df=3 and $\chi^2=25.27$, df=5) respectively at $p<.01$ level of significance.

5. Our study revealed a statistically significant relationship of marital status with timing of meal, type of salt consumption and addiction pattern at $p<.01$ level of significance ($\chi^2=23.156$, df=2, $\chi^2=18.806$, df=2 and $\chi^2=89.182$, df=10) respectively.

6. Type of salt consumption was found to be significant at $p<.10$ level of significance ($\chi^2=8.074$, df=4) with employment, also it was significantly associated with both nature of diet and timing of meals at $p<.05$ level of significance ($\chi^2=32.830$, df=12 and $\chi^2=16.638$, df=4) respectively.

7. Addiction was found to be highly significant at $p<.01$ level of significance ($\chi^2=69.49$, df=20).

5.7 Pre-Intervention evaluation of KAP with socio-demographic variables

1. Age category had a statistically significant relationship with KPA category ($\chi^2=16.082$, df=6, $p<.10$) and attitude category ($\chi^2=12.095$, df=6, $p<.10$).

2. Gender had a statistically significant relationship with KPA category ($\chi^2=9.202$, df=2, $p<.10$) and attitude category ($\chi^2=5.532$, df=2, $p<.10$).

3. Age had a statistically significant relationship with KPA category ($\chi^2=11.053$, df=4, $p<.10$) and attitude category ($\chi^2=11.821$, df=4, $p<.10$).

4. Monthly income also revealed a statistically significant relationship with Kother category ($\chi^2=12.88$, df=4, $p<.10$) and attitude category ($\chi^2=13.064$, df=4, $p<.10$).

5. Employment had a statistically significant relationship with KPA category ($\chi^2=21.314$, df=8, $p<.05$), Kother category ($\chi^2=17.312$, df=8, $p<.10$), attitude category ($\chi^2=16.949$, df=8, $p<.10$) and Practice category score ($\chi^2=9.903$, df=4, $p<.10$).

Phase III-Post-Intervention Phase

5.8 Mean ± SD of pre and post intervention variables
1. Level of awareness change from pre to post-intervention in the context of knowledge was observed as (Low- 45%, average-50%, High- 5%) during pre intervention having a total Mean ±SD: 8.41±2.94, which subsequently changed to (Low- 10%, average-39%, High- 51%) with a total Mean ±SD of 15.69±3.27.

2. People’s attitude before intervention was observed quite low with the percentage values as Low- 62%, average-32%, High- 8% improving to Low-5%, average-36%, High- 59% after intervention.

3. The practice approach improved from Low- 62%, average-36%, High- 2% to Low- 15%, average-41%, High- 44%.

4. After intervention, these scores ranged from 3.14±1.09 (knowledge) to 15.69±3.27 (total evaluation), following intervention a mean increase ranging from 1.37±0.01 (knowledge) to 7.28±0.33 (total evaluation) was observed.

5. For the entire individual variable (Knowledge, attitude, practice and toil evaluation) mean change in awareness scores was significant statistically (p<0.001).

6. The maximum change was observed in the age group of 30-35 years (92.55%) having Mean ±SD value as 13.92±4.17, with the least being observed from 25-30 years of age (79.25%). The total change as observed in the study after intervention was 86.56% (15.69±3.27).

7. Percentage wise gender change of KAP regarding CVD after intervention was seen maximum among male respondents with a percentage of 89.23% (15.5682±2.66) from 8.2273±2.92 before intervention.

8. In our study the major change was observed among married individuals (90.20%) (15.7297±3.89) as compared to singles (84.49) (15.6667±2.88).

9. it was observed that individuals who suffered from no morbidity state accepted the change most (89.18 %, 15.76±3.21) in contrast to those who suffered from some ailment like diabetes (77.46 %, 15.75±5.52).

10. Mostly self-employed individual adapted the habits through the interventional process (95.00%, 15±3.6), total being 86.56%, of which housewife were the least to acquire any change in their behaviour (67.31%, 14.5±3.9).
11. Majority of the individuals belonging to HIG (93.33%, 16.57±2.99) were observed to adapt the changes through the intervention, however the least was seen among the LIG participants (8.86%, 15.43±3.75).

12. The total change according to the type of family was (86.56%, 15.69±3.27), of which Joint families (97.09%, 14.12±3.88) had the most positive approach towards behavioural change, followed by single parenting (89.58%, 15.16±1.32), grandparents family (86.56%, 15.69±3.27) and Nuclear family (79.01%, 15.89±3.22).

13. Individuals who did not had a patriarchal disease running in the family accepted the interventional change (92.25%, 15.69±2.95), followed by those who were not sure (78.57%, 16.66±3.08) and the ones who had few cases running in the family (73.56%, 15.1±4.31).