

Effect of Nutrition Education in Reducing Risks and Incidences of Heart Failure in Mahendragarh District of Haryana, India

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ABSTRACT: This study was conducted on middle aged (minimum age 40 years) male and female population of Mahendragarh district, Haryana. All of the subjects n=160 had some type of cardiac health issue. The study population was equally divided into experimental and control group, n=80 in each category. Nutritional counseling was imparted at 0 day, 30th day and 60th day. There was observed a significant enhancement in the study subjects after the end of each counseling session. This study results support that informative nutritional counseling can be an effective tool in bringing health and heart related awareness among general population irrespective of their gender/age/class/educational status. And such tools can be an effective means to save millions of lives of people, eliminate burden on the health care system of the country, can make people actually wealthy (both financially – less expenditure on medical lab tests and surgical procedures carried out in case of heart blockage/attack; and physically- a healthy heart will lead to a healthy body). Overall, it can be said that it can add years of health and wellness in life of all (normally healthy, at risk, heart patients).

Keywords: Heart health, nutritional counseling, awareness, healthy lifestyle, knowledge gain.

INTRODUCTION

According to recent WHO report (2023), cardiovascular diseases have become one of the dominant cause of death in adults. This seems like the 2019 legacy of detrimental health issues is being carried forward wherein 2019 around 40 per cent from among 17 million premature fatalities (< 70 years) was attributed to CVDs (WHO, 2023). In the same year 2019 more than 75 percent heart-related casualties were reported from low-income and developing countries and 32% of all deaths worldwide were caused due to cardiac ailments.

People found to be smoking have always been on a higher risk for cardiovascular diseases (D'Agostino *et al.*, 2008) and in our paper both male and female were found to be smoking. Hypertension is another very common reason that leads to several incidences of cardiovascular risks even after successful attempt to control blood pressure (Liu *et al.*, 2015) and our study covers several cases of hypertension. Studies by Sniderman *et al.* (2016) followed by Zhang *et al.* (2019) have accessed that exposure of individuals in early life to low-density lipoprotein cholesterol (LDL) and non-high density lipoprotein cholesterol is directly associated with atherosclerotic cardiovascular diseases leading to heart failure and stroke with or without treatment expected beyond their life. Incidences of CVD before the age of 65 have been mushrooming (Sniderman *et al.*, 2016) particularly young adults and

women are more at risk (Arora *et al.*, 2019) and less exposed to receiving any guideline based care which is the motto of this paper. Recent studies like those by Whelton *et al.* (2018); Grundy *et al.* (2019) have suggested that therapy that can lead to LDL and blood pressure reducing should be essentially conducted on older adults and high risk patients in mid-life; which is also the motive of this paper (counseling therapy).

REVIEW OF LITERATURE

A most recent study from New Zealand reported that patients with identified cardiovascular diseases having history of smoking and high cholesterol levels are at higher risk of heart failure and heart diseases than those who practice healthy lifestyle habits and the same study also revealed that preventive therapy like nutritional counseling can significantly reduce risks of CVD among cardiac patients on a global level.

This latest study (Bafei *et al.*, 2023) from China reveals that cardiovascular diseases are a leading cause of death in many countries including China where 40% of death are attributed to heart issues alone and the burden of CVD on healthcare is increasing like a monster which emphasizes that preventive methods along with therapeutics are the need of hour where people need to be educated about the risk factors that be avoided; leading to a healthy heart and healthy life. The same study indicated that those CVD patients who were loved the couch-potato lifestyle and were used to smoking and alcohol abuse along with hypertension and

had high lipid level have all possible chances of increased chances of CVD related deaths.

The importance that nutritionist and healthcare providers can lead to improve the health of general masses is clearly revealed from the study conducted by He *et al.* (2023) who conducted an open-label, blinded and point cluster randomized trial where the age of participants was at least 40 years which corroborates with our present study and most of the patients had irregular blood pressure issues making them risk prone towards cardiovascular diseases. The study also delivered complementary or discounted anti-hypertensive medications along with the health coaching to more than 33,000 participants and it was observed that there was a significant reduction in both systolic and diastolic blood pressure of the participants which supports that counseling sessions and interventions provided by non-physician community people working in healthcare sector are capable enough in diminishing diseases and death caused due to cardiovascular ailments.

Study conducted in more than 10000 Iranian people revealed that people in their middle ages with high body mass index, incidence of high blood pressure, and hypercholesterolemia along with habits of smoking and risk of diabetes do not live their full life span; where male respondents having three or more risk factors were found to live about 24 years lesser than those counterparts who did not had any CVD and in the case of females the average life span reduced by 8 years. This study also supports that prevention strategies can be very effective in reducing life risk due to CVD when imparted in early years to the respondents who are both normal and at cardiovascular risk. And nutritional counseling awareness campaigns one of the effective means for such preventive strategy which can promote heart health and healthy life style in people.

MATERIALS AND METHOD

The study was carried out in Mahendragarh district of Haryana, India. Initially 400 patients were screened. Random selection of 160 people both male and female was done on the basis of secondary data and health status history was gathered from both private and government hospitals of Mahendragarh. After selection all the subjects they were divided in two categories i.e. experimental and control. NC (nutritional counseling) was given only to experimental group. The entire study was done in two phases *viz.* intervention and experimental phase. During the experimental phase 3 counseling sessions were held i.e. at 0 day, 30th day and 60th day. On each of this day readings were conducted for two times each day i.e. before NC and after NC. Data collection was done both with the help of pre designed interview schedule. On chosen days two data entries were recorded first before the NC session, second after NC. During NC both audio-visual methods (video clips, leaflets, nutritional counseling) were applied to impart nutritional knowledge. All NC's

ended on a sweet-happy note accompanied by healthy refreshment for all the volunteers.

Evaluation of knowledge. After NC (nutritional counseling) sessions knowledge level (pre and post) was compared to extract the efficacy of NC. The knowledge enrichment and enhancement was measured (before and after) utilizing a structured tool. The tool aimed to justify knowledge of subjects related to cardiovascular health and nutrition. The questionnaire covered an array range of diverse topics, including dietary choices, salt intake and awareness, substance abuse (alcohol and smoking), daily-rigorous physical activity status and other topics concerning about heart health.

Observations. During the entire study period on the day chosen for counseling there were two set of observations taken i.e. initially just meeting the respondents and after the exchange of warm-up/seasonal greetings observations were noted down; this was followed by counseling session tailed by a small refreshment (consisting of herbal tea/juice, eatables home-made with seasonal/local ingredients particularly the ones which were less popular like oats, quinoa, etc) again after which on the same day after counseling session next observation for the day was noted down. The same process was repeated on 30th and 60th day of counseling. It was a pleasure to note down that 100 percent of the respondents reported on successive chosen days for counseling mainly because they were fascinated by the study objectives that it will render magnificent health benefits for them; mesmerized by the way of teaching /talking and explaining by the researcher; and not to weigh down the healthful-nutritious/out of the box refreshment that followed each NC session.

RESULT AND DISCUSSION

The results obtained on general information of cardiac patients which included their age, educational status, marital status, work status and family income have been shown in Table 1.

Table 1 depicted that the selected patients were in the age group of 40–53, 54–67 and 68–79 years. In which, 66.87 % patients (63.75% males, 70 % females) were in the age group of 40–53 years, followed by 19.37 percent patients (17.5% males, 21.25% females) were in the age group of 54-67 years and in the category 68-79 years, 13.75 percent patients in which 18.75 percent males and 8.75 percent females.

Educational status-The data in Table 1 revealed that 26.87 percent patients (41.25% males, 12.5% females) had completed their college and 3.75 percent (5% males and 2.5% females) were post graduated, 21.87 percent patients (35.00% males, 8.75% females) were educated upto high school, 20 percent patients (15.00% males, 25.00% females) were educated upto secondary school, 14.37 percent patients were educated upto primary school level, similarly, 9.37 percent patients were seen to be below primary school level. While, 3.75 percent patients were under the category of no schooling.

Table 1: General information of 160 selected cardiac patients for intervention.

Variables	Male (n=80)	Female (n=80)	Total (n=160)
Age groups (yrs)			
40-53	51(63.75)	56(70)	107(66.87)
54-67	14(17.5)	17(21.25)	31(19.37)
68-79	15(18.75)	7(8.75)	22(13.75)
Educational status			
No schooling	-	6 (7.5)	6 (3.75)
Less than primary	-	15(18.75)	15 (9.37)
Primary school	3 (3.75)	20 (25)	23(14.37)
Secondary school	12 (15)	20 (25)	32 (20)
High school	28 (35)	7(8.75)	35(21.87)
College completed	33(41.25)	10(12.5)	43(26.87)
Post graduate degree	4 (5)	2 (2.5)	6 (3.75)
Marital status			
Never married	1 (1.25)	-	1 (0.62)
Married	76 (95)	74 (92.5)	150 (93.75)
Widowed	3 (3.75)	6 (7.5)	9 (5.62)
Work status			
Government employee	23(28.75)	7(8.75)	30 (18.75)
Non-government employee	17(21.25)	3(3.75)	20 (12.5)
Self- employed	23(28.75)	-	23 (14.375)
Homemaker	-	69(86.25)	69(43.12)
Retired	17(21.25)	1(1.25)	18 (11.25)
Family income/ monthly (in Rs)			
15000- 40000	7(8.75)	12(15)	19(11.875)
41000- 65000	23(28.75)	28(35)	51(31.875)
66000- 90000	50(62.5)	40(50)	90(56.25)

Figures in parenthesis indicate percentage

Marital status. The data in table 1showcased that 93.75% patients (95% males, 92.5% females) were married, 5.62% Patients (3.75% males and 7.5% females) were in widowed category.

Work status. Forty percent were in the category of homemaker, 18.75 percent patients were government employee, and 12.5 percent patients were non-government employee, 14.37 percent patients were in the category of self-employee, while 11.25 percent patients were retired.

Family income. Majority of patients 56.25 percent had monthly income more than Rs. 66000 followed by 31.87 percent patients had family income between Rs 41000- 65000. Only 11.87 cardiac patients had family monthly income between Rs.15000- 40000.

Risk profile and family history of cardiac patients-It indicated the risk profile of patients related to smoking, alcoholism, hyperlipidemia, ailments in lipid metabolism, elevated blood pressure/hypertension, family history of diabetes and cardiac irregularities.

Table 2: Knowledge level of selected 160 cardiac patients before and after nutrition counseling at 0 days.

Score	Experimental group (n=80)		Control group (n=80)	
	Before NC	After NC	Before NC	After NC
Low (30-40)	66 (82.5)	53(66.3)	69 (86.3)	71 (88.7)
Average (41-50)	11 (13.8)	22(27.5)	11 (13.7)	7(8.8)
High (51-60)	3(3.7)	5(6.2)	0 (0)	2 (2.5)

Figures in parentheses indicate percentage

Table 2 illustrated the knowledge levels of selected cardiac patients before and after nutrition counseling at day 0. Before Nutrition Counseling, in the experimental group, the majority of participants (82.5%) initially had a low knowledge level, while 13.8% had an average knowledge level, and 3.7% had a high knowledge level. In the control group, a similar pattern was observed, with 86.3% having a low knowledge level, 13.7% average knowledge level, and none having a high knowledge level. After nutrition counseling, there was a

noticeable improvement in knowledge levels in both groups. In the experimental group, the percentage of participants with a low knowledge level decreased to 66.3%, while those with an average knowledge level increased to 27.5%, and those with a high knowledge level increased to 6.2 percent. In the control group, the percentage of participants with a low knowledge level decreased to 88.7%, those with an average knowledge level decreased to 8.8%, and those with a high knowledge level increased to 2.5 percent.

Table 3: Knowledge level of selected 160 cardiac patients before and after nutrition counseling at 30 days.

Score	Experimental group (n=80)		Control group (n=80)	
	Before NC	After NC	Before NC	After NC
Low (30-40)	57 (71.3)	15(18.7)	72 (90)	67 (83.6)
Average (41-50)	19 (23.7)	38(47.5)	6(7.5)	9 (11.3)
High (51-60)	4 (5)	27(33.8)	2 (2.5)	4 (5)

Figures in parentheses indicate percentage

Table 3 represented the knowledge level of 160 cardiac patients, divided into an experimental group (n=80) who received nutrition counseling and a control group (n=80) who did not, both measured before and after the counseling at a 30-day interval. Before the nutrition counseling, the experimental group exhibited diverse knowledge levels: 71.3% of patients had a low knowledge score (30-40), 23.7% had an average score (41-50), and 5% had a high score (51-60). In contrast, the control group had 90% of patients with a low score, 7.5% with an average score, and only 2.5% with a high score. The percentage of patients with a low score

decreased dramatically to 18.7%, while those with an average score increased substantially to 47.5%. Furthermore, patients with a high score surged to 33.8%, indicating a notable positive impact on knowledge levels post-counseling. On the other hand, in the control group, there was a comparatively minor change in knowledge levels after 30 days without counseling. While there was a slight decrease in the percentage of patients with a low score to 83.6%, the average and high score percentages increased marginally to 11.3% and 5%, respectively.

Table 4: Knowledge level of the selected Cardiac patients before and after nutrition counseling at 60 days.

Score	Experimental group (n=80)		Control group (n=80)	
	Before NC	After NC	Before NC	After NC
Low (30-40)	19 (23.7)	10 (12.5)	68 (85)	73(91.3)
Average (41-50)	37(46.3)	27(33.8)	8(10)	4(5)
High (51-60)	24(30)	43(53.8)	4(5)	3(3.7)

Figures in parentheses indicate percentage

Data in Table 4 illustrated the knowledge levels of 160 cardiac patients, divided into an experimental group (n=80) who underwent nutrition counseling and a control group (n=80) who did not, both measured before and after counseling at a 60-day interval. Before nutrition counseling, the experimental group displayed varying knowledge levels: 23.7% of patients had a low knowledge score (30-40), 46.3% had an average score (41-50), and 30% had a high score (51-60). Conversely, the control group showed a different distribution, with 85% of patients having a low score, 10% with an average score, and 5% with a high score. In the

experimental group, the percentage of patients with a low score decreased to 12.5%, while those with an average score slightly decreased to 33.8%. The most significant change was seen in patients with a high score, surging to 53.8%, demonstrating a substantial positive impact on knowledge levels after 60 days of counseling. In the control group, similar trends were noticed with fewer patients in the low knowledge category, decreasing to 91.3%, and a small decrease in the average score category to 5%. The percentage of patients with a high score also decreased slightly to 3.7%.

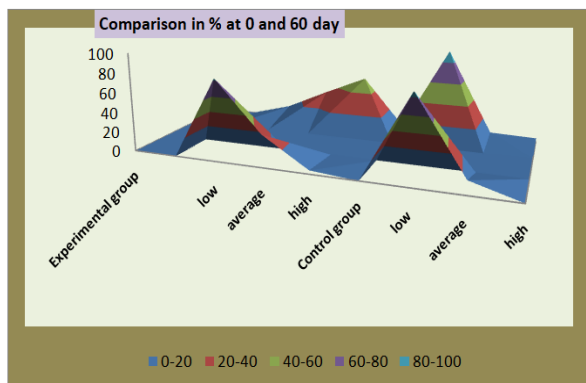
Table 5: Knowledge level of the selected Cardiac patients before and after nutrition counseling at 0 and 60 days.

Score	Experimental group (n=80)		Control group (n=80)	
	Before NC (0 days)	After NC (60 days)	Before NC (0 days)	After NC (60 days)
Low (30-40)	66 (82.5)	10 (12.5)	69 (86.3)	73(91.3)
Average (41-50)	11 (13.8)	27(33.8)	11 (13.7)	4(5)
High (51-60)	3(3.7)	43(53.8)	0 (0)	3(3.7)

Figures in parentheses indicate percentage

The data in Table 5 and Graph 1 depicted the comparative knowledge levels of 160 cardiac patients, divided into an experimental group (n=80) who received nutrition counseling and a control group (n=80) who did not. The knowledge levels were measured before counseling (at 0 days) and after counseling (at 60 days). Before nutrition counseling, the distribution of knowledge levels in the experimental group was as follows: 82.5% of patients had a low knowledge score (30-40), 13.8% had an average score (41-50), and 3.7% had a high score (51-60). In contrast, the control group had 86.3% of patients with a low score, 13.7% with an average score, and none with a high score. Post 60 days of nutrition counseling, the experimental group exhibited substantial improvements in knowledge levels.

The percentage of patients with a low score dramatically decreased to 12.5%, while those with an average score increased notably to 33.8%. The most significant change was observed in patients with a high score, surging to 53.8%, indicating a substantial positive impact on knowledge levels after the counseling period. On the other hand, in the control group, there were fewer changes in knowledge levels after 60 days without counseling. The percentage of patients with a low score decreased slightly to 91.3%, while those with an average score decreased marginally to 5%. The percentage of patients with a high score remained the same at 3.7%.



Graph 1. Comparison of enhancement of knowledge level of all subjects (experimental and control) at 0 and 60th day of NC.

CONCLUSIONS

It can be concluded from the findings from the study that nutrition counseling can have a significant and beneficial effect on the knowledge levels of the experimental group, demonstrating a substantial increase across all knowledge periodic sessions. In contrast, the control group's knowledge levels remained relatively stagnant over the same period, highlighting the positive impact of nutrition counseling on enhancing knowledge among cardiac patients. On the contrary, in control group negligible changes were observed in knowledge levels over the same period, although to a lesser degree compared to the phase when the study began. The comparative results further validated research findings where in experimental group substantial augmentation was witnessed at all stages. In contrast, the control group exhibited minor changes in knowledge levels over the same period, which definitely raises an alarm indicating the importance of nutrition education about healthy eating/active lifestyle/deleterious effects of substance-liquor use among general masses of India including people in rural-remote area and those at the grass-root level.

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Conflict of Interest. None.

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