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Coronary Heart Diseases: Impact of increasing awareness through educational & Fitness Programs

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ABSTRACT

The main objective of the investigation was to know the impact of increasing awareness through educational & Fitness Programs on the Coronary Heart Diseases. 120 students between 18-22 years were distributed into four groups. Group 1 was designated as educational awareness program (n= 30), Group 2 as a fitness awareness program, (n= 30), Group 3 as educational plus fitness awareness program (n= 30), and Group 4 as the control group (n= 30). The three investigational groups undertook their corresponding training program for a period of 8 weeks three times per week and 60 minutes per session. Pre- and post-test were conducted for height, BMI, waist rip ratio, waist circumference, hip circumferences, total cholesterol, HDL, LDL, and triglycerides. The mean, SD, t-test, and ANCOVA were the statistical tools used for the analysis of data and the significance level was 0.05. The results showed a significant improvement in the experimental groups in BMI (G1 to G3, $P < 0.05$) and in the waist to hip ratio (G2 & G3, $P < 0.05$). G1 did not show any accomplishment in the waist to hip ratio ($P>0.05$). All three experimental groups (G1 to G3) exhibited surges in coronary heart disease risk factors ($P > 0.05$). G4 did not display any change in all the study variables ($P< 0.05$). It was concluded that to reduce the risk factor of heart diseases both the education cum activity intervention programs will be highly beneficial.

Keywords: *Education, fitness, coronary heart diseases, globosity.*

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INTRODUCTION

World Health Organization (WHO) the world body to safeguard the health of people around the world has termed universal rampant overweight and obesity with an innovative term as Globosity". The addition in body mass is owing to abundant features like a harmful way of life, erroneous nutrition, shortage of workout, modification in the lifestyle, and hereditary influences [1, 2]. It has been proposed that the accrual of fat in the frame commences in infancy and fluctuates based on various factors like sex, age, and culture. The disorders associated with elevating adipose tissue are obesity, diabetes of type 2, bone loss, melancholy, and breast and colon cancer. There are various methods to quantify the magnitude of body fat, however; the utmost term utilized is the BMI (Body Mass Index) [3]. The BMI denotes whether an individual is obese when his/her body weight in kg is divided by his/her height in meters squared and the answer is +30 Kg/m^2 Investigators indicated that intake of nourishment and exercise play a significant part in the cure and avoidance of obesity as an expedient parameter to envisage CVD threat beyond adiposity and surging proof displayed the significance of cardiorespiratory aptness, and skeletal muscle quantity and power.

Consistent and regular exercise and suitable nutrition can assist in decreasing body fat as well as safeguard against protracted diseases linked with obesity. The WHO is employing its program of Health 2020 in almost every country in the world to promote an effective methodology to determine health diseases.

Obesity is rapidly metamorphosing as an epidemic in the present scenario [4-6]. Obesity universally is a complex ailment that advances from the interface between genotype and the environs [7]. It is a foremost civic health issue ensuing a severe social, physical, and psychological destruction [8]. The occurrence of obesity and overweight among teenagers is mounting to frightening stages in emerging countries [9, 10]. Fatality increases especially with amassed body mass. Individuals who are considered obese stand the dangers of getting afflicted with coronary heart disease four times more than overweight persons whose risk is doubled [11, 12]. It is a general belief that obesity is a therapeutic ailment resulting from surplus body fat that has been stored to the degree of causing an adverse effect on health, with a decreased life expectancy and/or augmented health complications. BMI is intently associated with the ratio of body fat and total body fat. This apart, it can also be known through assessing the fat distribution by means of the waist-hip ratio and total cardiovascular risk factors [13, 14]. In teenagers and youths, the meaning of obesity is not described analogically to a historical common group and that obesity is a BMI superior to the ninety-fifth percentile. The resource statistics that these percentiles are established are dated back to 1994 and hence have not been altered by the latest escalations in mass [15]. This clearly indicates that an individual should have to indulge in an exercise regime at a lesser zone of exertion and continue it for an extensive period. Unfortunately, a lot of people do not realize the importance of exercise and blame the work environment and lack of spare time. Such individuals can find a way to decrease the fat content quickly by an indirect method of allowing an increase in metabolic activity through anaerobic exercise [16]. The amalgamation of sedentariness, extreme energy ingestion, and a likely inherited tendency produce a substantial part in the development of obesity [17].

Cardiovascular disease termed as (CVD) is the most devastating destroyer and the chief source of community health complications in the biosphere, leading to chronic diseases and death in diverse societies [18]. CVD advances by tapering of the arteries connected to the heart damaging the cardiac muscles due to lack of supply of oxygen, nourishment, and blood flow ultimately resulting in a heart attack. The heart ailment has dualistic features when matched with other body part illnesses. Primarily, it is veiled but progresses to a dynamic phase before the patient observes any signs. Furthermore, the extent of indications identified to coronary ailment is partial and it is akin to much-altered pathology by a concluding joint symptomatic route [19]. Lipid record plays an indispensable part in lipid installation in the artery wall and CVD expansion, by amassing the Low-Density Lipoprotein inside strata of the artery wall, with the exception of High-Density Lipoprotein. HDL with its valuable impact reduces lipid oxidation after settling in blood vessels, resulting in the delaying of CVD progression. The literature has pointed out that a reduction of 1-mg/dL of HDL in the plasma results in avoiding the risk of CVD by two to three percent [20]. It is well known that HDL is a "worthy cholesterol" due to its constructive part in blood vessels by countless mechanisms to thwart LDL from accumulating in blood arteries, whereas LDL is termed as "evil cholesterol" owing to its amassing in the arteries. The health complications linked with stoutness are harsh and frequently result in long-standing adverse health concerns as children grow into mature adults. It is reported that 60% of obese teenagers have a minimum of one supplementary CVD peril issue, and twenty-five percent have twofold or more. Health care is the priority of any nation to keep its citizens healthy. All developed countries in the globe record a high rate of CVD and an exhorbent amount of money is spent on its maintenance and treatment as hospitalization charges have augmented three folds [21]. It is acknowledged that CVD has its origin in infancy regardless of the circumstance and that clinical signs of the ailment do not exhibit until late in lifespan [22-24]. Numerous research studies have observed the dangers of CVD, which are primarily

associated with the particular lipids [25-27]. All these researchers indicated an association with the exercise and fatty acid profiles, causing a reduction in the threat for cardiovascular diseases particularly with aerobic exercise.

Most of the researchers have identified supplementary epidemiological procedures of obesity in the teenagers and youth that comprises of waist perimeter, thickness of the skinfold, and impedance using the bioelectrical scrutiny. These processes are based on an indirect method to detect the body fat that does not use body mass. However, waist circumference is also an indirect method but it has the benefit over the use of BMI since it offers a clear hint of the distribution of body fat [28].

Aerobic exercise significantly improves the utilization of free fatty acids. However, anaerobic exercise consequently mobilizes these free fatty acids substantially causing a reduction of body fat. The literature clearly points out that exercises can constructively modify the values of blood lipid that ultimately is associated with the capacity and force of physical activity [29]. Exercise causes a decrease in total cholesterol and LDL and on the other hand an augmentation of HDL. All the above vagaries collectively work in curtailing the risk of heart attack and brain strokes [30].

Triglyceride is the key component of plant oil and animal fats. They are made from a solitary particle of glycerol, joined with three fatty acids in conjugation with one of the OH groups, and generate maximum fats assimilated by individuals [31]. There were many misconceptions with regard to the risk factors associated with coronary heart diseases. It was earlier thought that LDL was the sole contributor to heart problems. But, the research on triglycerides has clearly indicated with generic testimony that it is an additional source for CHD. Advance investigations revealed that patients with customary heart problems are at threat for relapse of cardiac events with judicious to huge rises in triglyceride intensities. Hence, a reduction in the levels of triglycerides is essential to reduce the risk factors for CHD that can be attained through exercise interventions.

METHOD

A total of 120 students whose age was 18-22 years were chosen as participants and distributed into four groups. Group 1 was designated as educational awareness program (n= 30), Group 2 as fitness awareness program, (n= 30), Group 3 as educational plus fitness awareness program (n= 30), and Group 4 as control group (n= 30). The three investigational groups undertook their corresponding training program for a period of 8 weeks three times per week and 60 minutes per session. The educational awareness program consisted of lifestyle lessons can increase the knowledge with regard to physical activity and nutrition, and improve awareness about the coronary heart. The fitness awareness program group took part in an aerobic activity like walking/jogging starting with 40% of their maximum load and increased by 5% every week, the fitness plus educational awareness program group did the same routine of aerobic training as Group 2 in the morning apart from attending the educational session in the evening of the same day. The control group restrained to take part in any program and they did their normal routine workouts. Pre and post-test were conducted for all the study variables like height, BMI, waist rip ratio, waist circumference, hip circumferences, total cholesterol, HDL, LDL, and triglycerides. BMI was recorded using the TANITA machine DC 430 MAP, Japan. Blood samples were taken from the subjects in the morning and tested in the pathological laboratory for total cholesterol, HDL, LDL, and triglycerides before and after the commencement of the training program. The mean, SD, t-test, and ANCOVA were the statistical tools used for the analysis of data and the significance level was 0.05.

RESULTS

Table 1: denoting the mean, standard deviation, and t-value of 4 groups for obesity (BMI & waist to hip ratio)

Component	Group	Pre-test M±SD	Post-test M±SD	Adjusted mean	t-value
BMI	Education	26.58±1.08	26.19±1.09	26.43	12.82*
	Fitness	29.45±0.83	25.76±0.81	26.13	23.12*
	Edu + fitness	26.88±1.11	25.94±1.06	25.91	19.78*
	control	27.38±1.39	27.40±1.38	26.87	0.40
Waist/Hip ratio	Education	0.86±0.01	0.86±0.01	0.87	1.35
	Fitness	0.88±0.02	0.86±0.02	0.86	8.56*
	Edu + fitness	0.88±0.01	0.84±0.02	0.85	10.98*
	control	0.88±0.02	0.88±0.02	0.88	2.80

*Significant at 0.05

Table 1 designates the values of obesity variables encompassing the BMI and waist to hip ratio for all four groups in the pre- and post-test. The mean ± standard deviation and t-test values of BMI pre- to post-test were 26.58±1.08, 26.19±1.09, 12.82 for G1; 29.45±0.83, 25.76±0.81, 23.12 for G2; 26.88±1.11, 25.94±1.06,19.78 for G3; and 27.38±1.39, 27.40±1.38, 0.40 for G 4; respectively. The waist to hip ratio readings of M±SD and t-value from pre- to post-test was 0.86±0.01, 0.86±0.01, 1.35 for G1; 0.88±0.02, 0.86±0.02, 8.56 for G 2; 0.88±0.01, 0.84±0.02, 10.98 for G3; and 0.88±0.02, 0.88±0.02, 2.80 for G4; respectively. The t-values of BMI with respect to G1, G2, G3 were significant ($P < 0.05$) and also waist to hip ratio for G2, G3 were significant ($P < 0.05$). The control did not yield any significant results in the above two variables ($P > 0.05$) whereas G1 did not show any significant result in the waist to hip ratio ($P > 0.05$).

Table 2: denoting mean, standard deviation, and t-values of 4 groups for coronary heart disease factors

Component	Group	Pre-test M±SD	Post-test M±SD	Adjusted mean	t-value
Total cholesterol	Education	181.15±5.86	176.98 ±5.26	174.93	6.28*
	Fitness	176.19±10.22	169.89 ±9.99	172.30	20.23*
	Edu + fitness	179.45±7.91	170. ±9.99	169.93	21.66*
	control	178.65±9.36	178.85±8.92	179.03	0.59
HDL	Education	35.25 ±1.19	36.55 ±1.13	36.95	6.96*
	Fitness	36.18±1.71	38.68 ±1.72	38.30	17.62*
	Edu + fitness	35.51±1.40	39.57 ±1.40	39.98	23.0*
	control	35.96±1.43	35.9±1.56	35.80	0.21
LDL	Education	125.55±5.64	120.79 ±4.71	118.74	7.13*
	Fitness	120.95 ±10.19	113.39 ±9.67	115.42	21.52*
	Edu + fitness	124.35 ±7.36	112.76 ±6.54	111.77	32.73*
	control	122.15±9.78	122.33±9.20	123.31	0.61
Triglycerides	Education	101.35 ±9.61	98.19±9.51	96.15	6.15*
	Fitness	94.98 ±11.84	89.66 ±12.05	93.59	9.61*
	Edu + fitness	97.91 ±12.85	89.35 ±11.75	90.53	24.61*
	control	102.45±7.60	102.72±7.00	99.65	1.07

*Significant at 0.05

Table 2 describes the measurements with regard to the coronary heart diseases that covers the total cholesterol, HDL, LDL, and triglycerides. The mean, SD and t-values for the pre and post-tests for total cholesterol for G1 was 181.15±5.86, 176.98 ±5.26 & 6.28; for G2, 176.19±10.22, 169.89 ±9.99 & 20.23; for G3, 179.45±7.91, 170. ±9.99 & 21.66; and G4, 178.65±9.36, 178.85±8.92 & 0.59, respectively. The mean, SD and t-values for the pre and post-tests for HDL for G1 was 35.25 ±1.19, 36.55 ±1.13 & 6.96; for G2, 36.18±1.71, 38.68 ±1.72 & 17.62; for G3, 35.51±1.40, 39.57 ±1.40 & 23.0, and G4, 35.96±1.43, 35.9±1.56 & 0.21,

respectively. The mean, SD and t-values of LDL for the pre- and post-tests for G1 was 125.55±5.64, 120.79 ±4.71, & 47.13; for G2, 120.95 ±10.19, 113.39 ±9.67, & 21.52; for G3, 124.35±7.36, 112.76±6.54, & 32.73 and for G4, 122.15±9.78, 122.33±9.20, & 0.61, respectively. The mean, SD and t-values of triglycerides for the pre and post-tests for G1 was 101.35 ±9.61, 98.19±9.51 & 6.15; for G 2, 94.98 ±11.84, 89.66 ±12.05 & 9.61; for G3, 97.91 ±12.85, 89.35 ±11.75 & 24.61, and for G4, 102.45±7.60, 102.72±7.00 & 1.07, respectively. The t-test values of the study components for G1, G2, and G3 showed noteworthy changes (P< 0.05) while the G4 did not show any notable change in any variables (P > 0.05).

Table 3 - Pairwise Scheffe's post hoc comparisons for obesity variables

Component	Edu. Versus Fitness	Edu. Versus Edu. Plus Fitness	Edu. Versus Control	Fitness Versus Edu. Plus Fitness	Fitness Versus Control	Edu. Plus Fitness Versus Control	C.I. Value
BMI	0.30*	0.52*	0.43	0.21*	0.74*	0.96*	0.15
Waist-Hip ratio	0.01	0.02*	0.01	0.01	0.03*	0.03*	0.01

CI value- confidence Interval of Scheffe's post hoc test
* Significant at 0.05

The analysis of data with ANCOVA for four groups in the dependent variables pointed out noteworthy differences between these groups. To find out which group had the differences the pairwise post hoc was utilized, which is presented in Table 3 for the obesity variables and Table 4 for the coronary heart diseases.

In Table 3 for the BMI, G3 with an adjusted mean of 25.91 considerably outclassed G1 and G2 (26.43; 26.13, respectively) with an adjusted mean difference of 0.30 and 0.21 (CI = 0.15), respectively. Nevertheless, there were noteworthy variations among G1 and G2 with an adjusted mean of 0.30 (CI = 15). Besides, all the three groups G1, G2, & G3 (adjusted means – 0.43, 0.74, 0.96) meaningfully outplaced the G4 (adjusted mean 26.87; CI =0.15). With regard to the waist-hip ratio G3 (Adj. mean = 0.85) considerably exceeded G1 & G2 (Adj. means; 0.87, 0.86) with adjusted mean differences of 0.02 & 0.01 (CI= 0.01), respectively. However, there were no significant differences between G1 & G2 with an adjusted mean difference of 0.01 & 0.01 (CI = 0.01). This apart, G1 & G3 exceedingly outstripped G4 (Adj. mean- 0.88) with an adjusted mean difference of 0.02 and 0.03, respectively (CI =0.01).

Table 4 - Pairwise Scheffe's post hoc comparisons for coronary heart diseases variables

Component	Edu. Versus Fitness	Edu. Versus Edu. Plus Fitness	Edu. Versus Control	Fitness Versus Edu. Plus Fitness	Fitness Versus Control	Edu. Plus Fitness Versus Control	C.I. Value
Total Cholesterol	2.63*	5.00*	4.10*	2.37*	6.73*	9.10*	1.72
HDL	1.36*	4.04*	1.14*	2.68*	2.50*	5.18*	0.76
LDL	3.32*	6.97*	4.55*	3.65*	7.87*	11.52*	1.62
Triglycerides	2.56*	5.61*	3.50*	3.05*	6.06*	9.11*	1.68

CI value- confidence Interval of Scheffe's post hoc test
* Significant at 0.05

In Table 4, for the component of total cholesterol, G3 (Adj. mean- 169.93) meaningfully surpassed G1 & G2 (Adj. mean 174.93 & 172.30) with adjusted mean differences of 2.63 and 2.37 (CI = 1.72). Notable differences were observed between the G1 and G2 with an adjusted mean difference of 2.63 (CI=1.72). In addition, G1, G2, & G3 meaningfully outperformed G4 (Adj. mean - 179.05) with adjusted mean differences of 4.10, 6.73, and 9.10 (CI=1.72). In the second variable of HDL in the coronary heart diseases, G3 (Adj. mean =41.00) had enhanced performance than G1 and G2 (Adj. mean = 36.96 & 38.32) with adjusted mean

differences of 1.36 and 2.68 (CI=0.76), respectively. G1 and G2 had significant differences with an adjusted mean difference of 1.36 (CI = 0.76). G1, G2, and G3 showed remarkable changes when compared to G4 (Adj. mean = 35.82) with adjusted mean differences of 1.14, 2.50, and 5.18 (CI=0.76). G3 had given very encouraging performance with regard to the LDL (Adj. mean- 111.79) with G1 and G2 (Adj. mean- 118.76 & 115.44) with adjusted mean differences of 3.32 & 3.65 (CI = 1.62). There were also differences between G1 and G2 with an adjusted mean difference of 3.32 (CI = 1.62). G1, G2, and G3 had meaningful alterations with G4 (Adj. mean- 123.31) with an adjusted mean difference of 4.55, 7.87, and 11.52 (CI = 1.62). In the last of the coronary heart diseases of triglycerides G3 (Adj. mean -90.55) did well when equated with G1 and G2 (Adj. means of 96.16 & 93.60) with an adjusted mean difference of 2.56 and 3.05 (CI = 1.68), respectively. G1 and G2 also showed important changes with an adjusted mean difference of 2.56 (CI = 1.68). further, G1, G2, and G3 significantly did exceptionally good than G4 (Adj. mean – 99.66) with an adjusted mean difference of 3.50, 6.06, and 9.11 (CI = 1.68).

DISCUSSION

The main objective of the investigation was to know the impact of increasing awareness through educational & Fitness Programs on the Coronary Heart Diseases.

Obesity, which is a global health problem, is linked with many risk factors of well-being especially with stroke, high blood pressure, myocardial contravention, diabetes mellitus, wired lipedema, and various co-morbidities of medical nature resulting in an augmented danger of death [32, 33]. One of the main health hazards of obese persons is that they usually exhibit symptoms of vascular diseases due to deterioration of endothelium. The situation gets associated with atherosclerosis and various other defects in the circulatory system [34-36]. The literature on obese individuals has opened up many avenues to counteract the global menace. Numerous procedures and methods have been utilized to solve this problem. Some of these measures to get rid of obesity passively is medicament and surgeries of different nature [37]. But the most commonly used method is a loss of body mass through intervention programs like restriction in nutrition, exercise, and exercise plus diet restrictions [38].

It is observed the most inert rampant program of weight loss is diet [39], but many studies confirmed that diet alone will be an unproductive approach for controlling body mass over an extended period of time [40, 41]. Even though there will be some beneficial effects at the beginning, later within four to six months, the individual will regain weight [42, 43]. The explanations cited for the ineptness of nutritional strategy is from the functional viewpoint like the reduction of lean body tissue resulting in decrease of BMR (basal metabolic rate) [44]. This apart, the anticipated presence of a hereditarily encoded set-point for body weight that the body drift down back to after periods of weight management [41]. However, diet involvements are largely fruitful in a small period of time [45-47].

Numerous research studies have indicated that exercise alone can be a significant approach for long-term weight loss as it is competent of decreasing a person's body mass, preserving and even elevating RMR (resting metabolic rate), safeguarding and boosting lean muscle quantity [48-51]. Almost all the studies have confirmed that exercise is the best medicine not only for weight reduction through enhanced energy expenditure but also for multiple health gains that can directly ease the dangers of existing co-morbidities [46, 49, 52].

The literature on obesity has observed that apart from the nutritional and exercise alone program for reducing the body fat, the most suitable and commendable intervention for the loss of lean body mass is the combination of diet plus exercise [53-55]. In one such investigation caloric restriction in combination with exercise had resulted in a typical discrete loss to a tune of 13.1 ± 0.7kg, in body mass while participants undergoing only exercise reduced on average 5.6 ± 0.6kg each [56]. It is reported that even if such approaches do not decline the body weight they have revealed to affect a substantial cutbacks in overall fat, visceral fat, and skeletal muscle fat accrual in obese persons [57, 58].

Kristen et al (2019) in their review of health guidance and education administered to obese persons by principal care surgeons and nurses

had contradictory outcomes [59]. Clune et al. (2010) in their study observed that 70% of the overweight subjects could follow the weight loss criteria of receiving advice by health care specialists [60]. They also reported that the study had the drawback of using self-reported data that may have steered on memory bias. ter Bogt et al. (2011) established that obese persons getting weight addition avoidance approaches rendered by nurses failed to acquire improved outcomes [61]. Likewise, Noordman et al. (2012) observed that a single principal upkeep certified person does not appear to be superior to the other [62]. At the end of the day, it is found that even though the education given to the obese person has an effect but it may not be as beneficial as with the combination of exercise. Hence, all the above results are in line with the outcome of this study.

Taking a cue from the literature and from the observation of this investigation, it is clear that the three experimental groups had a significant effect on the reduction of body fat and also lipid profile. However, the group that had the intervention program of education plus the fitness regime had noteworthy progress in BMI, waist to hip ratio, total cholesterol, HDL, and reduction in the LDL and the triglycerides. All the stated studies have supported the outcomes of our study.

CONCLUSION

The outcome of this study clearly states that a methodically and scientifically planned education plus fitness exercise regime has to be acknowledged and executed suitably in the upkeep of the health of all the obese individuals globally.

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