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Implications for High-intensity Aerobic Exercises on Omani Cardiorespiratory Endurance and Blood Lipids and Lipoproteins

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ABSTRACT

Background: Regular exercise provides benefits that are beyond dispute, and promoting physical activity levels ought to be a primary focus at all levels of healthcare. Chronic exercise causes a variety of cellular and organismal changes that modify how the body processes all macronutrients, including lipids.

Purpose: The study investigates different types of aerobic exercise and their impact on both types of cholesterols—low-density-lipoprotein and high-density-lipoprotein cholesterol and recommends the best protocol for regulating cholesterol levels.

Design/Methodology/Approach: This mixed-method study analyzes survey questionnaires distributed among physicians from two different sites in Oman. A total of 60 randomly selected and complete samples were used for the analysis using the Chi-square test. The survey consists of demographic information and questions about the types of cholesterol and types of aerobic exercise and the effect of different kinds of aerobic exercise on cholesterol levels.

Finding: The study's findings demonstrate a statistically significant reduction of cholesterol levels through 20-30 minutes of aerobic exercise (walking, swimming, and running). The relationship between aerobic exercise and cholesterol levels vis-a-vis age and gender is not

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statistically significant. Furthermore, this study recommends the best protocol for regulating cholesterol levels.

Research implications: The study has wider implications for future studies in wellness rhetoric in the Arab Gulf States. The outcome is on the wellness discourse which has mass level impact. The rhetoric of wellness programs has a buy-in potential for the Arab Gulf States sitting on the cusp of lifestyle-based diseases, including blood pressure and diabetes.

Originality/value: With hardly any extant research in this field in Oman and some sporadic studies in Arab Gulf states, this study establishes its originality, exigency, and value addition in the repertoire of wellness programs in Oman and the Arab Gulf States.

Keywords: Physical exercise, Health; Coronary heart disease, Low density Lipoprotein, High density Lipoprotein, Oman

1. Introduction

Wellness rhetoric impacts the dominant norms around eating habits, body size, physical exercise and even heart health—body mass index, cholesterol, blood pressure and blood sugar (Kirkland 2014). High cholesterol leads to an increased risk of cardiovascular disease; lowering cholesterol levels statistically significantly reduces the risk of coronary heart disease (CHD). While drug treatment has its limitations, physical exercise demonstrably impacts positively on individuals with high cholesterol levels.

Cholesterol essentially is a fat, or a lipid, that flows through the body bloodstream in the form of protein-covered particles called lipoproteins (lipid + protein) that mix easily with blood (Mason et al., 1998). It is a major cause of death in the world that contributes annually to 2.6 million deaths worldwide and the latest statistics showed that globally Europe has the highest prevalence of high cholesterol (World Health Organization and Cardiovascular Resource Group, 2014). The physical activity and cholesterol percent of Omani population as reported in Oman World Health Survey (2008) demonstrated that 15.5% of Omani adults were physically inactive and 26.1% are not doing any physical activity and the total cholesterol percent average in all Oman Governorates is 37.0%.

Nafila et al. (2015) in a study observed lower mortality rates from CHD and higher levels of serum high-density lipoprotein cholesterol (HDL-C) in populations residing at high altitude. The researcher also observed that in two genetically similar Omani Arab populations, the levels of HDL-C were statistically significantly higher in the high-altitude group compared with the low-altitude group. American College of Cardiology recognizes Apo lipoprotein as the best currently available maker of the adequacy of lipid-lowering therapy. However, Al Riyami et al. (2015) conducted a study in 160 dyslipidemic patients in Oman and found that low-density lipoprotein cholesterol (LDL-C) goal achieved in only 43% of high-risk, 50% of moderate risk, and 90% of low-risk patients. The effect of LDL-C was shown by Al-Waili et al. (2014), that there is growing evidence of increased cardiovascular disease (CVD) residual risk in patients in Oman with low LDL-C but high Apo lipoprotein levels which suggests the limitations of using only LDL-C as a target for lipid-lowering therapy. A study by Al-Mamari (2009) showed that elevated high density lipoprotein (HDL) cholesterol levels and the reverse cholesterol transport involved in removing cholesterol from the atheroma are associated with protection against CHD. In addition to the fact that HDL has both anti-oxidative and anti-inflammatory activities.

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Al Busafi and Al-Sulaimi (2021) identified the effectiveness of teaching the athletics program for young children as well as the importance of considering a physical fitness program (Al Busafi, 2021). The studies including Sinha (2017a) and Sinha (2017b) insist on the appropriate usage of words, along with comprehension, and the use of a recent standard dictionary needs to be consulted in order to see the effectiveness of terms related to aerobic and resistance training. A study on differential effects of aerobic exercise resistance training and combined exercise modifications on cholesterol and lipid profile by Mann et al. (2013) found out that physical activity and exercise can be utilized to improve cholesterol levels and demonstrated the effect of physical activity on cholesterol levels. Furthermore, it demonstrated that regular physical activity increased HDL cholesterol while maintaining, and theoretically offsetting increases in LDL cholesterol and triglycerides. They also found a linear dose–response relationship between activity levels and HDL cholesterol levels and suggested more intense activity to elicit reductions in LDL cholesterol. Goff et al. (2014) and Toth et al. (2013) conducted studies on different racial and ethnic groups worldwide and revealed that HDL-C is a strong, consistent, and independent predictor of cardiovascular events. The type of training to increase the level of HDL-C was suggested by Tseng et al. (2013) as a short-term exercise program; either aerobic or resistance training but the improvements are greatest when combined with aerobic and resistance training. Exercise raises the internal body temperature, and water is therefore essential to tolerate and balance such thermal effects (Waly et al., 2013). Lewington et al. (2007) found that the increase in the concentration of LDL-C is associated with an increased risk of cardiovascular disease.

The risk of CHD can be reduced by lowering serum cholesterol as recent research (Mihaylova et al., 2012; Baigent et al., 2010) shows that statin therapy has been appropriately emphasized in the current US and European guidelines as the primary treatment for LDL-C reduction because of strong evidence of reduced safety, efficacy, and events. However, many people cannot tolerate statins so there is a need to find another non-statin to help more people better reduce LDL-C. One of these non-statins is aerobic exercise which is found to be easier to carry out and has fewer side effects; besides it improves the prognosis of cardiovascular disease (CVD). Even when the notion of plagiarism may be questioned, the idea of using aerobic exercise forms the basis of improving the general health of a person (Sinha and Sinha, 2014).

Wang and Xu (2017) concluded that the risk of mortality from cardiovascular disease is statistically significantly reduced when combined statin therapy with aerobic exercise compared to either method alone, and that aerobic exercise is required for individuals with high cholesterol levels. Ekelund et al. (2016) investigated the effects of exercise on cardiovascular mortality and found that for people who exercised a lot every day, increasing their sitting time did not increase their cardiovascular mortality. However, the (National Cholesterol Education Program 2002), recommended for CHD patients a certain amount of exercise per day in decreasing cardiovascular mortality; besides it is characterized by its low-cost, low-risk and non-drug intervention. The best time and interval for practicing exercise to reduce cholesterol levels was shown by Roffi et al. (2015) as ≥3 three or more times a week and at 30-45 minutes per session.

2. Methodology

The research involved a mixed methodology of qualitative and quantitative data analysis. A survey questionnaire was distributed to physicians in the College of Medicine, Sultan Qaboos

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University hospitals. A total of 60 complete samples were used for final data analysis. The survey included several questions on socio- demographic information. The two third of participants were males (78%) and one third were females (22%). Regarding the respondents profiles 48% of them were Assistant Professor, and Lecturer and 52% were Associate Professor and Professor. While 83% of the respondents had work experience between 1 and 10 years and 17% had above ten years work experience. Moreover, the survey included information about the effectiveness of aerobic exercise in adjusting cholesterol level to the normal.

Other variables of aerobic exercise were the type, number of times per week, duration, and intensity of aerobic exercise in adjusting cholesterol level to the normal. In addition, questions were asked about whether exercise was effective in increasing HDL-C or in decreasing LDL-C, and what was the advice for those with high cholesterol level and those with normal cholesterol level. Furthermore, it was also asked whether aerobic exercise for adjusting cholesterol level differs with respect to age and gender. Additional data were extracted from reports, about the percentage of total cholesterol and physical activity in all governorates of the Sultanate of Oman, especially from the Ministry of Health -- Oman National Non-Communicable Diseases and their Risk Factors Survey -- Omani World Health Survey (2008). Final analysis of the data was done using Chi-square test.

3. Results

Figure 1 shows that the total cholesterol level in the Omani population is 37.0% and insufficient physical activity is 15.5% and not doing any physical activity is 26.1%. A study conducted by Al Sinani et al. (2015) on outpatients of Sultan Qaboos University Hospital showed that 48% of the sample population had achieved serum LDL–C goal and 59% of males and 43% of females achieved serum HDL-C goal. However, Al Mandhari et al. (2009) in previous studies at primary care centers in the Sultanate of Oman found that only 15–24% of the patients achieved the LDL–C goal. Furthermore Kharal (2010) revealed that lipid management outcomes in patients attending SQUH were lower than those from tertiary centers in the Arabian Gulf States.

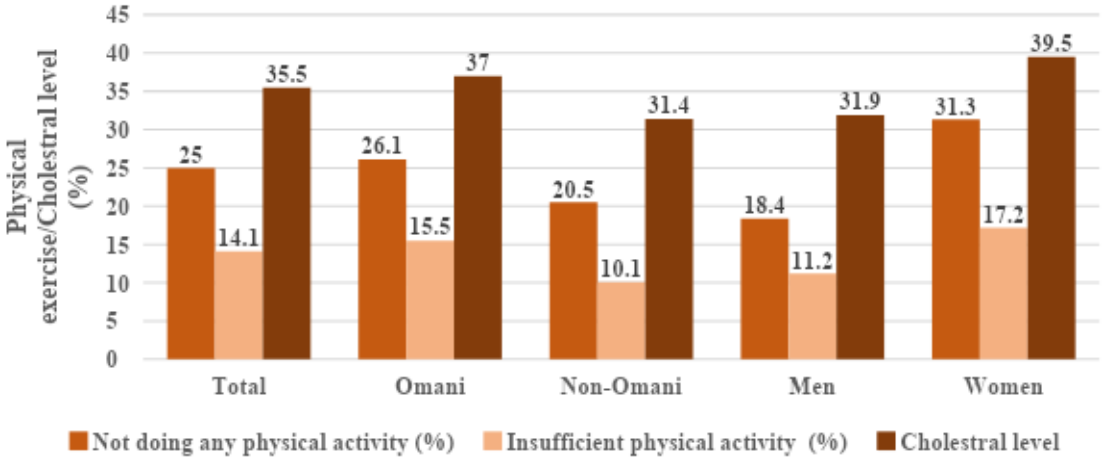

Fig 1.The total cholesterol and insufficient physical activity in Omani population (Source: Oman National Non-Communicable Diseases and their Risk Factors Survey- Oman World Health Survey-2008)

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Al-Riyamiet al. (2012) found that the prevalence of high cholesterol levels (≥5.2 mmol/L) among Omanis was 40.6%. They observed that almost one third of the Omani population suffered from high levels of LDL cholesterol (≥ 3.4 mmol/L) and thus were at higher risk of developing cardiovascular disease and it is worth noting that high percentage of Omani having high LDL-C was reported among those who were illiterate. However, the differences exist between regions as the percentage of Omanis with higher LDL was higher among respondents in the Q1 (Lowest) quintiles and lowest among the Q5 (Highest).

Table 1 shows the characteristics of respondents by gender, rank, and experience. All of the participants think that aerobic exercise is effective in adjusting cholesterol levels to the normal by increasing HDL/C level and decreasing LDL/C level. Similar results were observed by a study conducted by Abdul et al. (2005) that physical activity results in statistically significant increase in plasma HDL-C level. Also Gordon et al. (1998) found that habitual exercise training reduces the risk of CHD, through an increase in HDL-C. Moreover, Durstine and Moore (1997) have shown that regular exercise is beneficial, and it increases the HDL level and decreases total cholesterol and LDL levels. In addition, Kokkinos et al. (1998) observed that endurance trained athletes have much higher HDL-C values compared to the sedentary population.

Table 1: Cross-tabulation of characteristics of respondents by gender, rank, and experience

		A1		A2		A3	
		Female	**Male**	**APL**	**PAP**	**1T10**	**Above10**
B1	Yes	13	47	29	31	50	10
		21.70%	78.30%	48.30%	51.70%	83.30%	16.70%
B2	Others	0	2	0	2	1	1
		0.00%	100.00%	0.00%	100.00%	50.00%	50.00%
	Running	4	14	8	10	15	3
		22.20%	77.80%	44.40%	55.60%	83.30%	16.70%
	Swimming	5	15	11	9	17	3
		25.00%	75.00%	55.00%	45.00%	85.00%	15.00%
	Walking	4	16	10	10	17	3
		20.00%	80.00%	50.00%	50.00%	85.00%	15.00%
		Chi2=0.720; p=0.868		Chi2=2.358; p=0.501		Chi2=1.68; p=0.641	
B3	Thrice	8	34	17	25	33	9
		19.00%	81.00%	40.50%	59.50%	78.60%	21.40%
	Twice	5	13	12	6	17	1
		27.80%	72.20%	66.70%	33.30%	94.40%	5.60%

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		Chi2=0.566; p=0.452		Chi2=3.461; p=0.063		Chi2=2.286; p=0.131	
B4	20Mins	4	13	10	7	14	3
		23.50%	76.50%	58.80%	41.20%	82.40%	17.60%
	30Mins	9	34	19	24	36	7
		20.90%	79.10%	44.20%	55.80%	83.70%	16.30%
		Chi2=0.048; p=0.826		Chi2=1.045; p=0.307		Chi2=0.016; p=0.898	
B5	MedAero	12	45	28	29	48	9
		21.10%	78.90%	49.10%	50.90%	84.20%	15.80%
	Others	1	2	1	2	2	1
		33.30%	66.70%	33.30%	66.70%	66.70%	33.30%
		Chi2=0.255; p=0.615		Chi2=0.285; p=0.594		Chi2=0.632; p=0.427	
B6	HighMed	4	26	17	13	27	3
		13.30%	86.70%	56.70%	43.30%	90.00%	10.00%
	Low	9	21	12	18	23	7
		30.00%	70.00%	40.00%	60.00%	76.70%	23.30%
		Chi2=2.455; p=0.117		Chi2=1.669; p=0.196		Chi2=1.92; p=0.166	
B7	BothID	13	47	29	31	50	10
		21.70%	78.30%	48.30%	51.70%	83.30%	16.70%
B8	ALL	13	47	29	31	50	10
		21.70%	78.30%	48.30%	51.70%	83.30%	16.70%
B9	No	1	3	1	3	4	0
		25.00%	75.00%	25.00%	75.00%	100.00%	0.00%
	Yes	12	44	28	28	46	10
		21.40%	78.60%	50.00%	50.00%	82.10%	17.90%
		Chi2=0.028; p=0.867		Chi2=0.934; p=0.334		Chi2=0.857; p=0.355	
B10	No	11	39	26	24	42	8

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		22.00%	78.00%	52.00%	48.00%	84.00%	16.00%
	Yes	2	8	3	7	8	2
		20.00%	80.00%	30.00%	70.00%	80.00%	20.00%
		Chi2=0.020; p=0.889		Chi2=1.615; p=0.204		Chi2=0.096; p=0.757	

3.1. Effect of type of aerobic exercise on cholesterol level

As per the data collected, 22.20% females and 77.80% males think that running is the most effective for adjusting cholesterol levels to the normal. While 25.00% females and 75.00% males think that swimming is the most effective, 20.0% females and 80% males think that walking is the most effective for adjusting cholesterol levels to the normal. Only 2% reported considering other types of aerobic exercise. However, the result was not statistically significant with (chi2=0.720; p=0.868). With respect to the rank, 44.40% Assistant Professor and Lecturer and 55.60% Associate Professor and Professor think that running is the most effective. While 55.00% Assistant Professor and Lecturer and 45.00% Associate Professor and Professor think that swimming is the most effective, 50.00% Assistant Professor and Lecturer and 50.00% Associate Professor and Professor think that walking is the most effective. However, the result was not statistically significant with (chi2=2.358; p=0.501).

3.2. Effect of duration of aerobic exercise on cholesterol levels

While studying the data from the point of view of the effect of duration of aerobic exercise on cholesterol levels, it was found out that 19.00% females and 81.00% males thought that practicing aerobic exercise thrice per week was the best for adjusting cholesterol level to the normal. While 27.80% females and 72.20% males thought that practicing aerobic exercise twice per week was the best for adjusting cholesterol level to the normal, the result was not statistically significant with (chi2=0.566;p=0.452). In terms of the rank, 40.50% respondents in the rank of Assistant Professor and 59.50% in the rank of Associate Professor and Professor think that practicing aerobic exercise thrice per week is the best for adjusting cholesterol level to the normal. While 66.70% in the rank of Assistant Professor and Lecturer and 33.30% in the rank of Associate Professor and Professor think that twice per week is enough to get the desired result. However, the result was not statistically significant with (chi2=3.461; p=0.036).

3.3. Effect of length of time of aerobic exercise on cholesterol levels

Duration of aerobic exercise on cholesterol levels is a major variable of the study. From that standpoint, the data suggest that 23.50% females and 76.50% males think that practicing aerobic exercise 20 minutes is the best for adjusting cholesterol level to the normal while 20.90% females and 79.10% males think that practicing aerobic exercise for thirty minutes is the best for adjusting cholesterol level to the normal. However, the result was not statistically significant with (chi2=0.048; p=0.826).In terms of rank, 58.80% in the rank of Assistant Professor and Lecturer and 41.20% in the rank of Associate Professor and Professor think that practicing aerobic exercise

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for 20 minutes is the best for adjusting cholesterol level to the normal while 44.20% in the rank of Assistant Professor and Lecturer and 55.80% in the rank of Associate Professor and Professor think that thirty minutes is the best. However, the result was not statistically significant with (chi2=1.045; p=0.307).

3.4. Effect of practicing aerobic exercise and taking medication on cholesterol levels

As far as effects of practicing aerobic exercise and taking medication on cholesterol levels are concerned, 21.10% females and 78.90% males reported that practicing aerobic exercise and taking medications were the best for adjusting cholesterol. Whereas 33.30% females and 66.70% males think of other factors However the result was not statistically significant with (chi2=0.255; p=0.615). It is worth noting that 49.10% Assistant Professors and Lecturer in addition to 50.90% Associate Professors and Professors think that practicing aerobic exercise and taking medications are the best for adjusting cholesterol levels. While 33.30% Assistant Professors and Lecturer in addition to 66.70% Associate Professors and Professors think of other factors. However, the result was not statistically significant with (chi2=0.285; p=0.594). Moreover 84.20% of those with work experience of one to ten years and 15.80% of those with work experience of ten years and above think that practicing aerobic exercise and taking medications are the best for adjusting cholesterol. Only 33.30% of Assistant Professors and Lecturer in addition to 66.70% in the rank of Associate Professors and Professors think of other factors. However, the result was not statistically significant with (chi2=0.632; p=0.427).

3.5. Effect of intensity and length of time on cholesterol levels

The effect of intensity and length of time on cholesterol levels is a very important variable of this study. Our findings suggest that the high intensity- short time and medium intensity- medium time were considered by 13.30% females and 86.70% males whereas low intensity –long time was considered by 30.00% females and 70.00% males. However, the result was not statistically significant with (chi2=2.455; p=0.117). Moreover, 56.70% assistant Professors and Lecturer, 43.30% associate Professors and Professors, considered high intensity- short time and medium intensity- medium time while 40.00% assistant Professors and Lecturer, 60.00% associate Professors and Professors, considered low intensity- long time. However the result was not statistically significant with (chi2=1.669; p=0.196),

3.6. Effect of aerobic exercise on the level of HDL-C and LDL-C

All participants think that aerobic exercise is more effective in increasing HDL/C and in decreasing LDL/C. They also advise those having normal cholesterol levels to avoid eating fatty food, practice physical activity and check the cholesterol regularly.

3.7. Effect of aerobic exercise and cholesterol on age

The issue of age and the effect of aerobic exercise and cholesterol on age is of vital importance. 21.10% females and 78.60% males think that age is dependent while 25.00% females and 75.00% males think that age is not dependent. However, the result was not statistically significant with (

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chi2=0.028;p=0.867). In terms of rank, 50.00% in the rank of Assistant Professors and Lecturer in addition to 50.00% in the rank of Associate Professors and Professors think that age is dependent while 25.00% in the rank of Assistant Professors and Lecturer in addition to 75.00% in the rank of Associate Professors and Professors, think that age is not dependent However the result was not statistically significant with (chi2=0.934;p=0.334). Moreover, 82.10% of those with work experience of one to then years and 17.90% of those with work experience of ten years and above think that age is dependent while 100.00% in the rank of Assistant Professors and Lecturer and 00.00% of Associate Professors and Professors, think that age is not dependent. However, the result was not statistically significant with (chi2=0.857; p=0.355).

3.8. Effect of aerobic exercise and cholesterol on gender

In terms of gender, 20.00% females and 80.00% males think that gender is dependent while 22.00% females and 78.00% males think that gender is not dependent. However, the result was not statistically significant (chi2=0.020; p=0.889). 30.00% in the rank of Assistant Professors and Lecturer in addition to 70.00% in the rank of Associate Professors and Professors think that gender is a dependent variable while 52.00% in the rank of Assistant Professors and Lecturer in addition to 48.00% in the rank of Associate Professors and Professors think that gender is not dependent. However, the result was not statistically significant (chi2=1.615; p=0.204). Moreover, 80.00% of those with work experience of one to ten years and 20.0% of those with work experience of ten years and above think that gender is dependent on adjusting cholesterol levels to the normal, while 84.0% of those with work experience of one to ten years and 16.0% of those with work experience of ten years and above think that gender is not dependent on adjusting cholesterol levels to the normal, However, the results are not statistically significant (chi2=0.096; p=0.757). Anish et al. (2013) found that LDL level was statistically significantly lower in women. However, Allender et al. (2012) revealed that urbanization is associated with lower physical activity among women.

4. Discussion

4.1. Effect of type of aerobic exercise on cholesterol level

With respect to the year of experience, 83.30% of those working from 1 to 10 years and 16.70% of those working for more than ten years think that running is the best. While 85.0% of those who work from 1 to 10 years and 15.0% of those who have been working for more than ten years think that swimming is the best, 85.00% of those working from 1 to 10 years and 15.0% of those working for more than ten years think that walking is the best. However, the result was not statistically significant (chi2=1.68; p=0.641). Similar results were observed by Wooten et al. (2009) that exercise like swimming and jogging which causes the total energy intake of 300 kcal per exercise reduces 1 mg dl triglycerides and increases 5 mg dl blood HDL-C. Besides, the results of a study by Sharma (1990) revealed that populations living at higher altitudes have higher levels of serum HDL-C and this may be related to daily activities representing greater exercise effort than those at lower altitude. Fighting the stress through psychological training can be seen in the sports paradigm (Alexe et al., 2017). However, the results of another study conducted by Mitsuru and

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Higucki (2001) show how that was contrary to the study findings where they found that the effects of swimming exercise on aerobic capacity and the volume of plasma lipids and lipoproteins in postmenopausal women do not show any changes in the concentrations of total cholesterol, HDL-C, LDL-C and TG in the exercise group. Sharifi (2007) observed similar results that aerobic exercise (walking in water) showed statistically significant rise for HDL/C.

4.2. Effect of duration of aerobic exercise on cholesterol levels

With respect to the work experience of the sample population, 78.60% of those with work experience of one to ten years and 21.40% of those with work experience of more than ten years think that exercise should be thrice per week. 94.40% of those with experience from one to 10 years and 5.60% of those with experience above 10 years think that exercising twice per week is the best. However, the result was not statistically significant (chi2=2.286; p=0.131). Ekelund et al. (2016) investigated the effects of exercise on cardiovascular mortality and found that for people who exercised a lot every day, increasing their sitting time did not increase their cardiovascular mortality and concluded that a certain amount of exercise per day seemed to be effective in decreasing cardiovascular mortality. Moreover, it is low-cost, low-risk and non-drug intervention. Therefore, it is recommended for CHD patients (National Cholesterol Education Program 2002). However, Roffi et al. (2015) recommended regular exercise training ≥3 three or more times a week and the exercise should last at least 30-45 minutes per session. A similar study in a different context by Roche et al. (2016) indicates developing an understanding of the relationship between the drill, in terms of word recognition skill, and the performance in ELF contexts.

4.3. Effect of length of time of aerobic exercise on cholesterol levels

With respect to work experience, 82.40% of those with work experience of one to ten years and 17.60% of those with experience of more than ten years think that exercise should be for 20 minutes. While 83.70% of those with experience of one to 10 years and 16.30% of those with experience above 10 years think that thirty minutes is the best. However the result was not statistically significant (chi2=0.016; p=0.898). The best time and interval for practicing exercise to reduce cholesterol levels was shown by (Roffi et al., 2015) as ≥3 three or more times a week and at 30-45 min per session.

4.4. Effect of practicing aerobic exercise and taking medication on cholesterol levels

The risk of CHD can be reduced by lowering serum cholesterol and as some research studies demonstrated that Statin therapy has been appropriately emphasized in the current US and European guidelines as the primary treatment for LDL-C reduction because of strong evidence of reduced safety, efficacy and events. However, many people cannot tolerate statins so there is a need to find another non-statin to help a greater number of people better reduce LDL-C. One of these non-statins is aerobic exercise which is found to be easier to carry out and has fewer side effects. Besides, it improves the prognosis of cardiovascular disease (CVD).

4.5. Effect of intensity and length of time on cholesterol levels

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Moreover, 90.00% of those with work experience of one to ten years, 10.0% of those with work experience of ten years and above considered high intensity- short time and medium intensity- medium time while 76.70% Assistant Professors and Lecturer, 23.30% Associate Professors and Professors, considered low intensity- long time. However, the result was not statistically significant (chi2=1.92; p=0.166). Prabhakaran et al. (1999) reported that high intensity resistance training has improved body composition and strength. Furthermore, Gordon et al. (1998) observed an increase in HDL-C after shorter exercise in moderately trained men.

4.6. Effect of aerobic exercise on the level of HDL-C and LDL-C

Similar results were observed by Mann et al. (2013) that regular physical activity increases HDL cholesterol while maintaining, and theoretically offsetting increases in LDL cholesterol and triglycerides.

4.7. Effect of aerobic exercise and cholesterol on age

Mann et al. (2013) observed that total cholesterol and LDL cholesterol levels tend to decrease with age in young or middle-aged adults while HDL cholesterol levels do not vary with age. Similar results were reported by Ferrara et al. (1997) that total cholesterol and LDL-C and HDL-C decrease with age in older men and women at the age of 50 – 64 years and the age of 65 – 74 years.

4.8. Effect of aerobic exercise and cholesterol on gender

Anish et al. (2013) found that LDL level was statistically significantly lower in women. However, Allender et al. (2012) revealed that urbanization is associated with lower physical activity among women.

5. Conclusion

Cholesterol is a complex disease that requires treatment of multiple processes such as lifestyle modification, altering dietary habits and increasing physical activity. Aerobic exercise can be a method for reducing LDL-C, increasing HDL-C and consequently controlling cardiovascular disease. The best type of aerobic exercise is walking, swimming, and running for 20 to 30 minutes, 2 to 3 times per week, with low intensity for a long time or moderate intensity for moderate time. Aerobic exercise for adjusting cholesterol level to the normal with respect to both age and gender is not statistically significant.

The findings of this study also suggest that there are several statistically significant background factors like failures, attrition, other challenges (Roche et al., 2015; Sinha et al., 2018; Al-Busafi, 2012) that may affect the eventual outcome of a process. These include gender, literacy levels etc. and accordingly, suitable talent identification methods applicable to Oman (Al-Busafi et al., 2013). In a recent study, social support has recently been measured among adolescents of Oman (Zayed et al., 2019).

Practicing aerobic exercise regularly, taking medication and reducing intake of fatty food, is the best way to help in controlling the level of cholesterol to normal. Self-esteem, perceived stress etc. have often been linked to performance, academic or otherwise (Zayed et al., 2016) and aerobic exercise must be linked to the individual's performance and self-esteem. This also underscores the

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urgent need to introduce the sports management major (Al-Qaidi et al., 2022) to inculcate the right spirit of exercise among younger generations.

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