

## Comparison of exercise prescriptions for Type 2 Diabetes Mellitus and hypertension in both hospitals and gymnasiums of Hawassa town, Ethiopia

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**Abstract:** Non-communicable diseases are silent killers and it is one of the four mortality rate from other conditions. Communities are striving to cease up the problem via engaging in physical exercise; and on the other continuum persons struggle to advance their life style. Thus, physical exercise should be accustomed by the individual if not prohibited by health conditions of the person; however the physiological and cognitive health is affected by non-communicable diseases; type 2 diabetes mellitus and hypertension. The intent of this paper was to compare the exercise prescriptions for type 2 diabetes mellitus and hypertension in Hawassa town Hospitals and gymnasiums. To manipulate the study, descriptive survey study design was employed by 2018/19; mainly quantitative research was entertained by the investigator. In this study comprehensive sampling was used on 60 physicians and 12 physical trainers found in Hawassa town. Two independent self made questionnaires were distributed for both groups of the study. Data were analyzed via frequency, percentage and chi-square, of non parametric test. The result on descriptive statistics was displayed tremendous factors which cannot be practiced by both groups: regarding frequency should be 4 times per week. Intensity was not determined by the physical trainers, some of them have said the time should be 60 minutes and aerobics can be the main form of activity in type 2 diabetes mellitus. In contrary unsatisfactory and incomplete respond was found from the physicians concerning type 2 diabetes mellitus. Regarding hypertension, both physicians and physical trainers have ordering different recommendation in prescribing exercise beside the incomplete respond of the study subject. However, the chi square results by physical trainers of exercise prescriptions for both type 2 diabetes mellitus and hypertension shown statistically significant difference. This infers that, Hawassa town physical trainers in the gymnasiums are prescribing equally for both types 2 diabetes mellitus and hypertension. On the other hand physicians found in the Hawassa hospitals are not statistically significant difference. It shown that, physicians are not prescribing exercise for both type 2 diabetes mellitus and hypertension. The study recommends that, both professionals and nearest expertise to non-communicable disease must found training concerning the variables on the format of exercise prescriptions.

**Key words:** type 2 diabetes mellitus, hypertension, exercise prescription

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### I. Background of the study

Health related quality of life (HRQL) is unlimited obsession of an individual to lead a wonderful life pattern; in this regard physical exercise has a role to possess the standard of wellness perspectives. Based on Moscatiello, Manini, Marzocchi & Marchesini (2007), study found that quality of life is a demand of the person from disease or physician centered approach to patient centered approach; manipulating the pattern of exercise per their pace. Physical exercise has a strong predictor for the quality of life, if it is performed safely and with a regular counseling. It gives us an evidence to potentially fight against metabolic and chronic diseases for the entire person's life. Greater level of physical exercise has also a strong association with the patients health functioning whom living with chronic problems over two years of exercise period (Stewart, Hays, Wells *et al.*, 1994).

Moreover, Pate, Pratt & Blair *et al.*, (1995) justified that physical exercise can be used as prevention and therapeutic measures for the non-communicable health conditions of the person. The same author argued that, physical exercise not only contributing for somatic problem rather it can project to mental health problems. There are a number of chronic or non communicable diseases are presenting, among this type 2 diabetes mellitus (T2DM) and hypertension are the most prevalent ones. A recent study from Centers for disease control and prevention displayed a remarkable prevalence of diabetes in U.S, 29 million people or 9.3% of the U.S. population. This is an alarming health condition how it can affect the mass population and limits once function. Both T2DM and hypertension have hazardous effect for mitochondrial impairment, gradually it can bring metabolic syndrome (Guescini *et al.*, 2007).

Merits of physical exercise are indisputable; but it should be articulated by the principles of exercise prescriptions (Ex p<sub>x</sub>) through the supervision of exercise professionals in the development of individually tailored Ex p<sub>x</sub>. In this study the principles of training, for instance Frequency (how often), intensity (how hard), time (duration or how long) and type of activity (mode or what kind) are examined (American College of Sport Medicine [ACSM], 2018). Though the new version of ACSM (2018) expanded two particular and important principles which should be incorporated in exercise prescriptions, they are volume and progression advancement. So that exercise prescriptions for type 2 diabetes mellitus (T2DM) and hypertension in Hospitals and gymnasiums of Hawassa are observed and compared with the standard of ACSM.

Having discussed this, controversy goes to ownership of exercise prescriptions with reference to non-communicable diseases have been a long standing history peculiar to Ethiopia; either it should be from health care professionals or from physical trainers in the gymnasium. Beside the unresolved conflict, many individuals are overwhelmed by non-communicable diseases, which is a dominant factor for mortality. To fight particularly T2DM and hypertension, there should be active physicians and trainers to treat the problem ahead. Therefore, the intent of this paper can present the comparative studies of exercise prescriptions for T2DM and hypertension in Hawassa town clinics and gymnasiums.

### **Objectives of the study**

The objective of the study was to:

- Describe the exercise prescriptions of both physicians and physical trainers in T2DM of Hawassa town Hospitals and gymnasiums.
- Identify the exercise prescriptions of both physicians and physical trainers in hypertensive customers of Hawassa town Hospitals and gymnasiums.
- Explain the consistency of exercise prescriptions for diabetes mellitus II and hypertension among physicians and gymnasiums of Hawassa.
- Determine the significance difference in prescribing exercise between physicians and trainers of Hawassa town Hospitals and gymnasiums.

## **II. Research Methods**

### **Study design**

The study was preferred descriptive survey to employ the comparison of T2DM and hypertension by 2018/19 in Hawassa town gymnasiums and hospitals of Ethiopia.

### **Population of the study**

The study population was physical trainers and physicians of Hawassa town gymnasiums and hospitals of Ethiopia. There are four gymnasiums are giving service for the community, namely Rori international Hotel, Central Hotel, Haile resort and Dagim Gymnasium. And also three government hospitals have been included, namely Adare Hospital, Hawassa referral and Hawella tula, those actively working as physicians are incorporated.

### **Sample size and sampling techniques**

From the study population twelve and sixty, as physical trainers and physicians are selected via comprehensive sampling technique.

### **Method of data collection**

Questionnaires were prepared for physical trainer and physicians, pertaining the principles of exercise applied for type 2 diabetes mellitus and hypertension.

### **Method of data analysis**

The data were analyzed by the following statistics: namely, frequency, percentage and chi square test.

## **III. Result and Discussion**

In this study, the following participants of the study were included, they are sixty physicians from Hawassa town hospitals and twelve physical trainers from Hawassa town fitness centers were included in the research. In the period of data collection, all distributed questionnaires were returned.

### **Description of exercise prescription for T2DM with reference to principles of training**

Based the data found, concerning the frequency of T2DM of gymnasium trainers replied that, 2 weeks, 2-3 days/week, 3 times/week, 4 times a week and unknown but it is offering, 1,1,1, 2 and 1; respectively. This means that, 33.33% of gymnasium trainers prescribed that T2DM should be done 4 times per week. In contrary, frequency of T2DM prescribed from the physician found in Hawassa town, 150 minutes/weeks, 2 days/week, 2 times/week, 3 times/week, 3-5 days/week, Daily and Not prescribed; 1,1,1,2,2,1 and 22; respectively. This replies that, majority of the physicians have not prescribed and among from those prescribed inconsistent respond was found towards the problem.

Regarding the intensity of T2DM data were found from the gymnasium and physicians in Hawassa town Gymnasium and Hospitals. Firstly, Trainers were replied as follows: 180 bpm, based on their health problem and unknown but it is offering; 1,1,1 and 4, respectively. This indicates that, customers have not identified intensity level since majority of the trainers have not prescribed the exercise. Secondly, data were gathered from Hawassa town physicians as follows: 110-120 bpm, 60 bpm, 60-100 bpm, 60-108 bpm, 72 bpm, 90-110 bpm and not prescribed; 1,1,1,1,2,1 & 23; respectively. This replied that, majority of the physicians have not determining the intensity level of customers in Hawassa town fitness centers and Hospitals.

The same study goes to identify the time allotment for T2DM by fitness trainers and physicians in Hawassa town gymnasiums and Hospitals. On the first hand, fitness trainers were responded as follows: 30-45 minutes, 60 minutes, morning and afternoon and unknown but it is offering; 1,2,1,2; 16.67%, 33.33%, 16.67% & 33.33%; respectively. This means that, majority of the fitness trainers have replied, 60 minutes and Unknown but it is offering for the clients in Hawassa town gymnasium trainers. On the second hand, physicians found in Hawassa town Hospitals replied that, 12:oclock, 30 min/day, 30 minutes, 30-1 hr, 40 minutes, Morning and Not prescribed; 1,1,2,1,2,2 & 21; 3.33, 3.33, 6.66, 3.33, 6.66, 6.66 and 70%; respectively. The data found from the physicians have not prescribing for the clients coming to be examined in Hawassa town Hospitals.

Simultaneously, the data were gathered from fitness trainers and physicians from Hawassa town gymnasiums and Hospitals in prescribing type of physical activity. In the first scene from fitness trainers responded in the following manner. Aerobics, Aerobics and running, Based on their health problem, Unexplained and Unknown but it is offering; 2,1,1,1 and 1; 33.33, 16.67, 16.67 16.67 and 16.67, respectively. This means that, majority of fitness trainers are offering aerobics for the customers in Hawassa town. While physicians found in Hawassa Hospitals have replied that, Physical activity, Aerobics, Mild running, Not prescribed, Physical activity, Regular activity, Running, push up and Simple exercise; respectively. As the data shown that, majority of the physicians found in Hawassa town Hospitals are not prescribing exercise for the type of activity.

#### **Description of exercise prescription for hypertension with reference to principles of training**

Based on the result found that, concerning the frequency of hypertension of gymnasium trainers replied that, 2 days/week, 2-3 days/week, 3 times/week and unknown but it is offering, 1,1,1 and 3; 16.67%, 16.67%, 16.67% and 50%; respectively. This means that, 50% of gymnasium trainers not prescribed for hypertension along with inconsistent exercise prescriptions among trainers in Hawassa town.

In contrary, frequency of hypertension prescribed from the physician found in Hawassa town, 150 minutes/weeks, 2 days/week, 2-3 times/week, 3 times/week, 3-5 days/week, Daily, daily morning and night and Not prescribed; 1,2,1,1,2,1 and 21; 3.33%, 6.66%, 3.33%, 3.33%, 6.66%, 3.33% and 70%; respectively. This replies that, majority of the physicians have not prescribed and among from those prescribed inconsistent respond towards the problem.

Regarding the intensity of hypertension data were found from the gymnasium and physicians in Hawassa town Gymnasium and Hospitals. Firstly, Trainers were replied as follows: 160 bpm, based on their health problem and unknown but it is offering; 1,1,1 and 4, 16.7%, 16.7% and 66.67%, respectively. This indicates that, customers have not identified intensity level since majority of the trainers have not prescribed the exercise. Secondly, data were gathered from Hawassa town physicians as follows: 100-110 bpm, 60-100 bpm, 72 bpm, 90 bpm, > 100 bpm, and not prescribed; 1,1,1,1,1,1 & 24; 3.33%, 3.33%, 3.33%, 3.33%, 3.33% & 70%, respectively. This replied that, majority of the physicians have not determining the intensity level of customers in Hawassa town fitness centers and Hospitals.

The same study goes to identify the time allotment for T2DM by fitness trainers and physicians in Hawassa town gymnasiums and Hospitals. On the first hand, fitness trainers were responded as follows: 30 minutes, 30-45 minutes, 60 minutes, based on their health problem and unknown but it is offering; 1,1,1,1,1,2; 16.67%, 16.67%, 16.67%, 16.67% & 33.33%; respectively. This means that, majority of the fitness trainers have replied, 60 minutes and Unknown but it is offering for the clients in Hawassa town gymnasium trainers. On the second hand, physicians found in Hawassa town Hospitals replied that, 12:oclock, 30 min/day, 30-40 minutes, 30-60 hr, evening and morning, morning and Not prescribed; 1,1,2,1,2,2 & 21; 3.33%, 3.33, 6.66, 3.33, 3.33, 6.66, 3.33% and 73.33%; respectively. The data found from the physicians have not prescribing for the clients coming to be examined in Hawassa town Hospitals.

Simultaneously, the data were gathered from fitness trainers and physicians from Hawassa town gymnasiums and Hospitals in prescribing type of physical activity. In the first scene from fitness trainers responded in the following manner. Aerobics, Aerobics and walking, Cycling, Fitness, and Unknown but it is offering; 1,1,1,1 and 2; 16.67, 16.67, 16.67 and 33.33%, respectively. This means that, majority of fitness trainers are offering aerobics for the customers in Hawassa town. While physicians found in Hawassa Hospitals have replied that, aerobics, jogging, mild-moderate, physical activity, regular activity, running, push up and playing football, walking rapidly, simple exercise and not prescribed, 1,1,1,1,1,1,1, 21, 3.33%,

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3.33%,3.33%,3.33%,3.33%, 3.33%, 3.33%, 3.33% and 70%; respectively. As the data shown that, majority of the physicians found in Hawassa town Hospitals are not prescribing exercise for the type of activity.

**Comparison of exercise prescriptions for T2DM and hypertension**

To test whether proportions of physical trainers in exercise prescriptions were different in each diabetes mellitus II and hypertension, we used  $\chi^2$  test of independence with alpha equal to .05 as criterion for significance. When customers are coming to the gymnasium with their health concerns, physical trainers were prescribing diabetes mellitus II and hypertension (n=6) equally.

Exercise prescription by physical trainer * Health conditions Cross tabulation						
		Health conditions			Total	
		diabetes Mellitus II	Hypertension			
Exercise prescription by trainer	yes	Count	6 <sub>a</sub>	0 <sub>b</sub>	6	
		Expected Count	3.0	3.0	6.0	
	no	Count	0 <sub>a</sub>	6 <sub>b</sub>	6	
		Expected Count	3.0	3.0	6.0	
Total		Count	6	6	12	
		Expected Count	6.0	6.0	12.0	

Each subscript letter denotes a subset of trainer prescription categories whose column proportions do not differ significantly from each other at the .05 level.

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	12.000 <sup>a</sup>	1	.001		
Continuity Correction <sup>b</sup>	8.333	1	.004		
Likelihood Ratio	16.636	1	.000		
Fisher's Exact Test				.002	.001
Linear-by-Linear Association	11.000	1	.001		
N of Valid Cases	12				

a. 4 cells (100.0%) have expected count less than 5. The minimum expected count is 3.00.

b. Computed only for a 2x2 table

According to the  $\chi^2$  test of independence, this difference was statistically significant,  $\chi^2(1, N=12) = 12, p = .002$ , so we can infer that Hawassa town gymnasium physical fitness trainers are more likely prescribing exercise to diabetes mellitus II and hypertension equally.

**Comparison of exercise prescription for T2DM and hypertension in Hawassa town Physicians**

To test whether proportions of physical trainers in exercise prescriptions were different in each type 2 diabetes mellitus and hypertension, we used  $\chi^2$  test of independence with alpha equal to .05 as criterion for significance. When customers are coming to the Hawassa town Hospitals with their health concerns, physicians were prescribing diabetes mellitus II and hypertension (n=60) differently.

Health Conditions * Prescription by physicians Cross tabulation						
		Prescription by physicians			Total	
			yes	no		
Health Conditions	Diabetes Mellitus II	Count	3	27	30	
		Expected Count	1.5	28.5	30.0	
	Hypertension	Count	0	30	30	
		Expected Count	1.5	28.5	30.0	
Total		Count	3	57	60	
		Expected Count	3.0	57.0	60.0	

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.158 <sup>a</sup>	1	.076		
Continuity Correction <sup>b</sup>	1.404	1	.236		
Likelihood Ratio	4.317	1	.038		
Fisher's Exact Test				.237	.119
Linear-by-Linear Association	3.105	1	.078		
N of Valid Cases	60				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 1.50.

b. Computed only for a 2x2 table

According to the  $\chi^2$  test of independence, this difference was no statistically significant,  $\chi^2(1, N=60) = 3.2, p = .24$ , so we can infer that Hawassa town hospital physical physicians are more unfortunately prescribing exercise to T2DM and hypertension.

#### **IV. Discussion**

The study justified that, the proportion of exercise prescription is no significantly different in both physicians and trainers in Hawassa clinics and gymnasium centers. Even if they are treating the same health conditions but the exercise which is prescribing by both physicians and trainers are not interrelated. The exercise prescription for type 2 Diabetes Mellitus conducted by Hawassa town hospitals physicians concerning the following key variables, for instance, frequency, intensity, time and type of activity. Up on the given parameters to treat type 2 Diabetes Mellitus, physicians are prescribing inconsistently. There is difference from one to another physician among their order, which can severely affect the recovery of the problem. The same characteristics go to physical trainers of Hawassa town gymnasium centers in terms of exercise prescription within themselves.

The data which manifested from the descriptive statistics are inconsistent with in the physical trainers, though they have prescribing for the two health concerns, type 2 diabetes mellitus and hypertension. The same practice was found, physicians from the hospitals are not prescribing for the health concerns.

Up on the data from the non parametric test of chi square from the physical trainers manifested, the data was found statistically significant difference. It infers that, physical trainers are treating via prescribing exercise prescription for type 2 diabetes mellitus and hypertension. Unfortunately physicians from the Hawassa town hospitals are not prescribing exercise for the above health concerns. Owing to the paucity of literature conducted in the study, it was unable to show the similarity and difference result with the other conducted work.

#### **V. Conclusion and Recommendation**

The study has concluded that, there is no written exercise prescriptions and custom by the physicians and physical trainers of Hawassa town hospitals and gymnasiums concerning type 2 diabetes mellitus and hypertension. However, there is a paradox result between descriptive and inferential stat. Because in the former case the data displayed inconsistent and incomplete prescription performed; but in the later case the statistics shown the physical trainer were prescribing exercise; but the investigator was not found written exercise prescription format.

Having registered the result, the following recommendations were proposed:

- ❖ Awareness concerning exercise prescription may be given by the amalgamation of health sector and sport sector, in the form of written exercise prescription format.
- ❖ If the training was given so far concerning exercise prescription, then the refreshment course may be given by health sector and sport sector.
- ❖ There must be a nexus where sport and health to fight the non-communicable diseases particularly in the circumstance of hospitals and gymnasiums.

#### **Limitation and strength of the study**

The study has not made comparison with the standard principle of training for exercise prescriptions under the given health condition; but it brings the paradox over the ownership of exercise prescription. And it can also initiate institutions to give special emphasis on to preparing exercise prescriptions for the non-communicable disease because of the high mortality rate in the globe.

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