

Exercise prescription for non-communicable diseases: Knowledge and practice among healthcare providers

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EXERCISE PRESCRIPTION FOR NON-COMMUNICABLE DISEASES: KNOWLEDGE AND PRACTICE AMONG HEALTHCARE PROVIDERS

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Abstract

Background: Exercise prescription (EP) use as medicine is an effective. It is the cornerstone to prevent and manage NCDs. The main aim of the study was to investigate the knowledge and confidence, practice of HCPs towards NCDs pertaining to EP in West Gojjam Zone hospitals, Amhara region, Ethiopia.

Methods: The target population was 487 HCPs (medical doctors, nurses and midwiferies). Cross sectional research design was carried out in hospital setting from HCPs to collect data, Self-administered questionnaires were used from 7 governmental hospitals and 353 HCPs (Medical doctors=107, 30.3%, Nurses=157, 44.5% and Midwiferies=89, 25.2%) was selected through whole, strata and random sampling methods. The data was collected and analyzed from March, 2021- June, 2012. It was analyzed through descriptive (mean, frequency, percentage, cross tabulation and standard deviation) and inferential statistics (chi-square, Kruskal-Wallis test of analysis, Mann-Whitney U test to examine difference and Spearman's rank to examine correlation). All assumptions for conducting non-parametric tests were used before decided to use the type of statistical data.

Results: The HCPs reported that; majority of 80.6% respondents had poor EPP regarding to written prescription for their patients. 62.5% of HCPs were agreed they had not knowledge on WHO and ACSM recommendations to prescribe exercise for NCD patients. Male HCPs were had better exercise prescription practice ($\chi^2 = 228.756$, $df = 15$, $p = 0.000$). HCPs knowledge and confidence was had a significance difference regarding to profession (Medical doctors: Mean rank =198.71, Nurses: Mean rank =171.96 and Midwifery: Mean rank =159.78, $\chi^2 = 7.773$, $df = 2$, $p = 0.021$). Exercise prescription practice (EPP) was significantly and positively correlated with Knowledge and Confidence ($\rho = 0.292$, $p = 0.000$). EPP was had a positive and significant correlation with all main variables of the study.

Conclusion: Exercise prescriptions practice, knowledge and confidence of majority of HCPs regarding to prescribe exercise for NCDs were poor. The HCPs educational curriculums should include sufficiently about physical exercise as a strategy how to prevent and manage NCDs. Exercise is medicine Ethiopia (EIME) initiative should established and Exercise Prescription (EP) also established in organizational structure as a unit in healthcare setting. There should be a standardized recommendation guidelines, prepared at a national level to prescribe exercise used as a bench mark for healthcare providers for every healthcare settings. There will be also design a continuous training program for HCPs to be a role model or how to prescribe physical activity or exercise to prevent and manage NCD from their patients.

Key Words: Non-communicable diseases, exercise prescription, healthcare provider, knowledge and practice

Background

Exercise prescription (EP) use as medicine is an effective but neglected treatment for many non-communicable diseases and considered exercise like medicine [1]. Exercise prescription refers to the specific plan of fitness-related activities that are designed for a specified purpose [2, 3, and 4]. Physical activity (PA) and exercise are often used interchangeably, but these terms are not synonymous. Exercise (a structured, systematic subset of PA designed to maintain or improve one or more physical capacities, discipline and with the specific dimensions of intensity, duration and frequency). 'Prescribing physical activity' is probably a more appropriate description, but common usage has determined the term 'exercise on prescription'[5, 6, and 7].

Insufficient PA/Exercise has been identified as the fourth leading cause of NCDs [8]. Insufficient exercise /PI would cause 9% of premature death globally and it has a great economic impact [9] they are quickly becoming the 21st century's main public health challenge for all nations [8, 10].

Non-communicable diseases (NCDs) are now the greatest cause of morbidity and mortality even in developing countries [11] like Ethiopia, where they account for twice as many deaths as ADIS, tuberculosis, malaria, and all other infectious diseases combined [11,12] the prevalence of NCDs in African region is increased from year to year[13]. It has also a significant problem to Ethiopia's health and economic development. The economic costs of NCDs are estimated that at least 31.3 billion birr (US\$ 1.1 billion) per year [14, 15, 16, 17].

Non-communicable diseases (NCDs) are categorized under cardiovascular disease, cancer, chronic respiratory disease, and diabetes. Their main causes are related to lifestyle and physical inactivity [18]. WHO recommend urgent preventative action, and this action must include an increased emphasis on physical activity as a medical intervention[8]. People who are physical inactivity (PI) will increase their deaths rate by 20% to 30% of the risk of cause [19].

Health care providers (HCPs) are therefore being called upon to become more aggressive in implementing physical activity recommendations/prescription. Currently according to the report, using physical activity/exercise a prevention approach standard method is applicable throughout the world [11]. PA/Exercise is an appropriate treatment and protection mechanism than pharmacology due to; no environmental impact, it needs low budget consumption and reduce economic impact, a less side-effect, not expensive[20,21,22]. Exercise Prescription (EP) plays a great role for the management of NCDs in a hospital setting; it is an important vehicle/place to EP. Even if exercise has similar or better result compared with drugs for the management and prevention of NCDs, it is almost ignored to prescribe their responsibility by health care providers [23] to prescribe exercise for their client and advice to participate in regular activity is the role of HCPs and show as a role model for their clients [24,25,26,27].

The healthcare providers (nurses, physicians, physiotherapist etc) have a vital function to prevent and manage NCDs, enhancing physical activity in a hospital setting [26]. Even though the previous study shows that they are not much to prescribe and council physical activity and not considered as their role and waste of time, this study is also supported by [23, 28]. There is inconsistency between healthcare providers' knowledge and practice towards exercise prescription [21, 25 29].

According to the study finding in Ethiopia, HCPs knowledge and confidence to prescribe specific exercise by healthcare providers (physician, nurses and physiotherapist) had poor knowledge to prescribe physical activity[21,31]. Other study was also investigated, there was a problem with the level of physician confidence in helping patients make a behavioral change [32]. Healthcare professionals asked their patients about their physical activity levels [33, 34] but other studies noted that majority of healthcare providers never asked their clients about their physical activity and other HCPs occasionally asked patients about their PAL [31, 35]. Evidence and information about healthcare providers (HCPs) towards exercise prescriptions (EPs) for NCDs for developing countries are lacking [29]. In Ethiopia this problem is highly shown, even unknown [36, 37]. Policy interventions that can bring about population wide change in physical activity participation have been instituted in many countries [38].

Therefore, currently many deaths are registered surrounding to us if we want to ask the cause, majority of it is whether cardiovascular, cancer, respiratory or diabetes [39]. So such worst situations and an alarming rate of increasing NCDs motivated the researchers to investigate the knowledge and confidence, and practice of EP among HCPs for NCDs in West Gojam Zone hospitals, Amhara region, Ethiopia. Because of HCPs and healthcare settings are the best, vital and a crucial venue to prevent and manage NCDs [21, 31].

Research Questions

1. Do healthcare providers have an appropriate self-perceived knowledge and confidence to prescribe exercise for NCDs?
2. What extent to the prevalence of Exercise Prescriptions Practice (EPP) for their patients among HCPs?
3. Is there a significant differences and relationship among HCPs' knowledge and confidence, practice, experience, age, profession, educational background and gender towards/to prescribe exercise?

Specific Objectives

1. To determine HCPs' self-perceived knowledge and confidence on EP for NCDs
2. To assess the prevalence of exercise prescriptions practice (EPP) for their patients among healthcare providers
3. To examine a significant differences and relationship among HCPs' knowledge and confidence, practice, experience, age, profession, educational background and gender towards/to prescribe exercise.

Methods

Study Participants, design and Recruitments

The aim of the research was to investigate the knowledge and confidence, and practice of exercise prescriptions among HCPs for NCDs in west Gojam Zone hospitals amhara region, Ethiopia. Thus, the study was conducted in one zonal referral hospital and in six primary public hospital settings of HCPs. The study design was a descriptive cross-sectional survey in order to answer the research questions and in order to achieve the research objectives. This type of design for this study is ideal [39] and also it used [23, 31, 33].

The target population of this study was the West Gojjam Zone hospitals' of healthcare providers (Physicians, Nurses and Midwiferies) that were worked in the year 2020/2021. The total number of hospitals were 7 under those hospitals there were 487 (Male 297 and Female 190) HCPs; 107 Medical doctors, 264 Nurses and 116 midwiferies. Hospitals and medical doctors selected through whole sampling technique and Nurses and midwiferies were selected first by using through the calculation formula,⁴¹ then strata to distribute for each hospital and gender and also then, simple random sampling technique was used to select participants.

Data collection Instrument

The study was used self-administered questionnaire as a data collection instrument. Questionnaires were constructed to answer the leading research question and Demographic characteristics. After checked on pilot study, 4 items (Cronbach's $\alpha = 0.777$) designed for practices of HCPs to prescribe exercise for NCDs; measurement questioner items were adopted [31], for this study used with some modification. The questionnaires were measured by using frequency (Never=1, Very Rarely=2, occasionally=3, frequently=4 and Very frequently=5), 10 items (Cronbach's $\alpha = 0.923$) were designed for knowledge and confidence of HCPs regarding on exercise prescription. The questioners from 1-9 were adopted from (29, 30, 31, 42) with some modification and question 10 by the researcher. Items were measured by using likert scale rang of (strongly disagree=1, disagree=2, undecided=3, agree=4 and strongly agree=5). The pilot study was conducted in Tibebe Gion specialized hospital, Addis Alem primary hospital and Gamby Medical Teaching hospital HCPs (medical doctors, nurses and midwifery). The actual data was collected and analyzed from March, 2021- June, 2021.

Eligibility Criteria of the participants

The study participants were selected through recently registered on the human resource case team as a healthcare provider (medical doctors, nurses and midwiferies), worked in a selected hospitals (in the year 2020/2021), and willingness to participate, recently working on prescriptions of drugs and/ exercise, healthcare settings were governmental.

Statistical analysis

Data obtained from the study participants were analyzed quantitatively; both descriptive and inferential statistics were used in data analysis and discussion by using the statistical program for social sciences (SPSS) version 24. Before to determine the types of SPSS method used and to know the data was parametric or non-parametric data; first checked the normality distribution assumptions of data by using Skewness and Kurtosis, normal Q-Q plot, Histogram, Kolmogorov-Smirnov and Shapiro-Wilk test of normality. According to those test of normality the data was not normality distributed (both Kolmogorov-Smirnov and Shapiro-Wilk p value = 0.000, assumption for normality distribution: $p > 0.05$), Skewness and Kurtosis value divided by with their Std.Error value, the result is not between ± 1.96 , assumption for normality: the value is between ± 1.96 , normal Q-Q plot and Histogram graph for each variable also were not shown normality distributed. Therefore, we should be used non-parametric tests for data

analysis method; inferential statistics (chi-square, Kruskal-Wallis test of analysis, Mann-Whitney U test to examine the variables group comparison and Spearman's rank correlation to examine relationships between variables among healthcare providers') and from simple descriptive statistics (mean, frequency, percentage, cross tabulation and standard deviation) for demographic characteristics as well as for main variables to answer research questions or to accomplish specific objectives. A two-tailed probability value of $p < 0.05$ for significance was used for association and difference between the study variables.

Ethics and consent

Based on ethical considerations, asking consent from HCPs to be participated and their responses was kept as confidential.

Results

Total population of the study participants were 487 HCPs from 7 public hospitals of west Gojjam zone Amhara region, Ethiopia. Most responders were male (62.6 %, $n = 221$), Majority of 226 (64.0 %) of the total respondents were within the age range of 25–31 years and majority of them were degree (89.2 %, $n=315$) holders and half of ($n=178$, 51.1 %) HCPs were had (≤ 5 year of experience up to ≥ 21 , $n=2$, 0.6%) that were experienced in sample hospital setting. From those hospitals 353 HCPs (Medical doctors= 107, 30.3%, Nurses= 157, 44.5% and Midwiferies = 89, 25.2%) completed the questionnaire items (Table 1).

Regarding to Exercise Prescription Practice (EPP) for NCDs among HCPs (the results are presented in figure 1); Almost equal number of HCPs ($n = 349$, 100(28.7%) occasionally and 97(27.8 %) frequently were asked and discussed with patients about their physical activity level. One third of HCPs ($n = 349$, 117,108(33.5%, 30.9%) Occasionally and frequently gave verbal directions/prescriptions for their patients about physical exercise to manage and prevent NCDs respectively. Provide patients with written directions/prescriptions; nearest to half of HCPs ($n=351$,170(48.4%) never to prescribe exercise and 113(32.2%) were very rarely prescribed /gave direction to their patients participated in exercise by using written prescriptions. Most of ($n=350$,140(40.0%) were also never and 97(27.7%) occasionally to refer patients to exercise professionals for fitness assessment (see figure: 1).

Generally, to be summarized the measuring scale into three groups (presented in figure 2), those are; never + very rarely = poor practice, occasionally= good practice and frequently + very frequently= very good practice. According to this classification: about ask and discuss with patients; half of 176(50.45%) of HCPs had very good practice, 100(28.7%) of them had good and 73(20.9%) of HCPs had poor practice to ask and discuss with patients. About Provide patients with verbal directions/prescriptions 127, 117,105, and (36.3%, 33.5% and 30.1%, 33.5% and 36.3%) of HCPs had very good, good and poor EPP respectively. About written directions/prescriptions majority 283(80.6%) of respondents had poor EPP and 50, 18(14.2%, 5.1%) of respondents had good and very good EPP respectively. Lastly, refer patients to other professionals majority of 230(65.7%) of respondents were had poor practice and 97, 23 (27.7 %, 6.6%) of respondents had good and very good EPP respectively.

To examine exercise prescription practice among HCPs in relation to demographic characteristics of the sample respondents the following analysis used and result were investigated; Chi-square analysis was used to examine a significance difference between male and female HCPs towards EPP; the result shows that there was a significant difference between male and female healthcare providers towards EPP for their NCD patients ($\chi^2 = 228.756$, $df = 15$, $p = 0.000$). Since, male healthcare providers were had better to exercise prescription practice than female healthcare providers (male: $M = 2.663$, $SD=0.750$ and female: $M = 2.487$, $SD=0.671$). Kruskal-Wallis test also was used to determine differences among HCPs in relation to profession, educational background, age and year of experience. So, the researcher finding said that there was a significant difference among HCPs exercise prescription practice regarding to profession to prescribe exercise (Medical doctors: Mean rank =223.46, Nurses: Mean rank =175.57 and Midwiferies: Mean rank =123.67, $\chi^2 = 47.089$, $df = 2$, $p = 0.000$).

Regarding to educational background of HCPs towards exercise prescriptions there was also significance difference (post graduate: Mean rank= 271.95, Degree: Mean rank= 179.53 and Diploma: Mean rank =114.59, and, $\chi^2 = 19.563$, $df= 2$, $p= 0.000$) but regarding to age of HCPs were had not a significant difference(18-24: Mean Rank=157.95, 25-31: Mean Rank=176.04, 32-38: Mean Rank=186.48, 39-45: Mean Rank=226.17 and ≥ 45 : Mean Rank=43.00, $\chi^2=8.450$, $df = 4$, $p = 0.076$) and regarding to year of experience of HCPs towards exercise prescriptions there was no significance difference(≤ 5 : Mean Rank=175.14, 6-10: Mean Rank= 170.88, 11-15: Mean Rank= 200.58, 16-20: Mean Rank= 79.86 and ≥ 20 : Mean Rank= 177.75 , $\chi^2 = 9.029$, $df = 4$, $p = 0.060$,) as such $p=0.076$ and 0.060 value was not highly significance difference with $p<0.05$. Generally, medical doctors, nurses

and midwiferies had better EPP respectively, post graduate, degree and diploma that had educational background HCPs had also better respectively but age and year of experience of HCPs had not significance difference among healthcare providers towards exercise prescription practice for NCDs. This shows that age and experience are not the only determinant factor to practice but according to the P value they were had difference may not be significance effect.

Spearman's correlation was the method that was used to analyze correlation; Exercise prescription practice (EPP) was significantly and positively correlated (the result presented in Table 2) with confidence ($\rho=0.223$, $p=0.000$) and knowledge ($\rho=0.324$, $p=0.000$). This indicates that the HCPs who had better/more Knowledge and Confidence, they were had a greater EPPs to prescribe/counsel exercise to manage and prevent their patients from NCDs, or HCPs who had a better confidence and knowledge, they were also had a better EPP.

Regarding to knowledge and confidence of healthcare providers towards exercise prescription for NCDs (results are reported in table 3). For summarization the result of the analysis the investigators choices; strongly agree + Agree = Agree, strongly disagree + Disagree = Disagree and undecided.

Above half of HCPs ($n = 350$, 191(54.6%) agree that they know/ knowledge about PA intensities (light, moderate and vigorous), 125(35.7%) were disagreed and 34 (9.7%) of them were undecided. Half of HCPs ($n= 343$,172 (50.1%) disagreed that their awareness about to prescribe specific exercise program for the specific type of NCDs, 118(34.4%) of HCPs are agreed how to prescribe specific exercise program and 53 (15.5%) of HCPs were undecided. Majority of HCPs ($n= 352$, 220 (62.5%) disagreed that knowing about WHO and ACSM recommendations to prescribe exercise for NCDs, 95(27%), 37 (10.5%) of them are agreed and undecided about it respectively. Almost equal number of HCPs ($n=353$,155(43.9%) disagree and 152(42.9%) agree knowing about PA prescription components respectively (frequency, intensity and time) and 13.0% undecided.

Almost half ($n=350$,49.7%) of HCPs disagree towards the recommended duration for vigorous and moderate intensity exercises according to ACSM and American Heart Association (AHA) is 75 and 150 minutes respectively, 37.1% of HCPs were agreed and few of 46(13.1%) undecided. Majority of HCPs ($n=351$,225 (64.1%) were agree more involved in exercise themselves and role model HCPs are the more to prescribe exercise and 83(23.7%), 43(13.1%) of HCPs were agree and unable to decide respectively. Majority of ($n=353$,249(70.6%) and a few of 75(21.2%), 29(8.2%) HCPs were disagreed, agreed and undecided regarding that taken a sufficient course in curriculums or training programs how to prescribe exercise for NCDs respectively.

Regarding to confidence to prescribe exercise for NCDs: Half of ($n=352$, 50.8%) disagreed,33.2% of them agreed and 15.9% of HCPs were undecided on their own confidence to evaluate their patients fitness and prescribed exercise for NCDs patients according to their fitness level. Most of HCPs ($n=350$, 49.1%) were disagreed on confident to prescribe/counsel exercise for patients, 41.4% and 9.4% of were agreed and cannot decide on their own confidence to prescribe/counsel exercise respectively. Most of ($n=353$, 45.8%, 36.6% and 17.6%) of HCPs were had not confidence, agreed and undecided to their own confidence to ask about their patients PAL respectively (see table 3).

To examine the knowledge and confidence towards exercise prescription among HCPs in relation to demographic characteristics of the sample respondents the following analysis methods were used and results were investigated; According to the result from Mann-Whitney U test analysis there was not a significant difference between male and female HCPs on knowledge and confidence towards exercise prescription for NCDs (female: mean rank, 168.70 and male: mean rank, 181.95, Mann-Whitney U= 13491.000,Z=-1.181,P= 0.238).The researchers were also checked the significant difference between male and female of HCPs on knowledge and confidence towards exercise prescription; there was also no significance difference on both knowledge and confidence(female: mean rank;168.38, 169.77 and male: mean rank;182.15, 181.32,Mann-Whitney U=13448.000, 13632.000, Z= -1.228, -1.034, P= 0.219, 0.301) between male and female HCPs towards EP respectively.

To examine the significance differences among HCPs knowledge and confidence in relation to profession, educational background, year of experience and age towards exercise prescription for NCDs was used Kruskal-Wallis test of analysis. Therefore, the finding shown a significant difference among HCPs knowledge and confidence regarding to profession to prescribe exercise (Medical doctors: Mean rank =198.71, Nurses: Mean rank =171.96 and Midwiferies: Mean rank =159.78, $\chi^2 = 7.773$, $df = 2$, $p =0.021$).

Regarding to educational background of HCPs there was also significance difference (Diploma: Mean rank =52.86, Degree: Mean rank= 183.91 and post graduate: Mean rank=307.00, $x^2 = 59.185$, $df = 2$, $p = 0.000$), regarding to year of experience of HCPs there was no significance difference (≤ 5 : Mean Rank=168.54, 6-10: Mean Rank= 185.23, 11-15: Mean Rank= 169.37, 16-20: Mean Rank=156.57 and ≥ 20 : Mean Rank= 197.25, $x^2 = 2.459$, $df = 4$, $p = 0.652$) but age of HCPs were had significant difference (18-24: Mean Rank=112.14, 25-31: Mean Rank=187.47, 32-38: Mean Rank=181.64, 39-45: Mean Rank=190.33 and ≥ 45 : Mean Rank=117.25, $x^2 = 20.390$, $df = 4$, $p = 0.000$). Even if age and year of experience were significantly correlated to each other ($\rho = 0.585$, $p = 0.000$), experience was had not a significance difference with knowledge and confidence.

Generally, medical doctors, nurses and midwiferies had better knowledge and confidence to prescribe exercise respectively, post graduate, degree and diploma who had educational background of HCPs had also better respectively and their age increment also had a significant effect on knowledge and confidence but year of experience of HCPs had not significance difference among healthcare providers towards their knowledge and confidence to prescribe exercise for NCDs. It implies that when year of experience increased the knowledge and confidence of HCPs were not increased significantly.

Spearman's correlation was also the method that was used to analyze association between variables (presented in Table 4). Knowledge and Confidence was significantly and positively correlated with Exercise prescription practice (EPP) ($\rho = 0.296$, $p = 0.000$) and also knowledge with EPP ($\rho = 0.324$, $P = 0.000$), and confidence with EPP ($\rho = 0.223$, $P = 0.000$), confidence and knowledge one to the other ($\rho = 0.782$, $P = 0.000$), had a significance and positive correlation. This indicates that, the better who had a greater and better Knowledge and Confidence towards exercise prescription, they also had a better or greater exercise prescription practice to manage and prevent NCDs.

Discussions

Regarding to exercise prescription practice (EPP) among HCPs;

The specific objective of this study was to assess the prevalence of exercise prescriptions practice (EPP) for their patients among healthcare providers (figure 1 and figure 2, their responses are listed) in West Gojjam Zone hospitals Amhara region, Ethiopia. As the previous studies that was conducted on Practices of Healthcare Professionals in Hospital Setting, Ethiopia the majority 34.8 %, of healthcare professionals occasionally ask about their PAL [26]. The study on Mexican health care setting was said that almost half of healthcare professionals always asked their patients about their physical activity levels [33]. In another study also conducted on Practices of Healthcare Professionals in Hospital Setting, Kenya shows that majority ($n = 105$, 47.5%) occasionally asked patients about their physical activity levels [35]. The study conducted in south India on exercise counseling practice: One-fourth of the doctors (25.3%) 'Always asked and advised' their patients regarding PA [43]. In line to this the present study also shows that majority of HCPs ($n = 349$, 100(28.7%) occasionally asked and discussed with patients about their physical activity level.

The present study regarding to provide verbal directions, one third of HCPs ($n = 349$, 117(33.5%) Occasionally prescribed verbal directions for their patients about physical exercise to manage and prevent NCDs. This finding is supported by the study, majority ($n = 78$, 35.3%) said that they occasionally provided patients with verbal directions for a physical activity program and (33) 33% provide verbal physical activity prescription [35]. Contrary to those studies the other finding said that 36.2% of HCPs never prescribe PA verbally [26]. Regarding to providing written prescriptions; the result of this study, nearest to half of HCPs ($n = 351$, 170(48.4%) never to prescribe exercise, the result also consistent with the study, respondents of 387, more than half (60.2 %) of healthcare professionals reported that, they never provide written prescription of PA to their patients [26]. This is also highly supported by the study that was conducted in Kenya healthcare setting majority ($n = 73$, 33%) said that they very rarely provided patients with written directions for a physical activity program and only 6% provide written physical activity prescription [33, 35]. But surprisingly, the study the majority of physicians 85% provided a written prescription for exercise and the study that was conducted in South Africa result also shows that 79.9% of healthcare professionals prescribed exercise to their patients [23, 27].

Lastly regarding to refer patients to other professionals; this study result shows that majority of ($n = 350$, 140(40.0%) healthcare providers were never to refer patients to other professionals for fitness assessment. The result is almost similar with the study that was 38.6% make refers very rarely [26]. Only 8% of that always refer patients to other

fitness professionals [33]. But other studies, majority (n=75, 33.9%) said that they occasionally referred patients to other professionals for fitness assessment and the study of on promotion of PA; result shows that 36.5% of general practitioners refer their patients to another specific local activity or sports club [35, 44].

The result reported that according to chi-square analysis there was a significance difference ($\chi^2 = 228.756$, $df = 15$, $p = 0.000$) between male and female HCPs towards exercise prescription practice (EPP) towards their NCD patients. Since, male healthcare providers mean were had better to exercise prescription practice than female healthcare providers mean (male: $M = 2.663$, $SD=0.750$ and female: $M = 2.487$, $SD=0.671$).The study is in line with, Significant difference were found between male (n = 177) and female (n=210) healthcare professionals regarding to practices of physical activity prescription/counseling ($t = 6.03$, $df = 385$, $p = 0.000$). Interestingly, male healthcare professionals significantly more frequently prescribed/counseled physical activity to their patients than female healthcare professionals ($MD = .42$) [26]. Regarding to professions among HCPs towards exercise prescriptions; the present study result is according to Kruskal-Wallis test of analysis said that there was a significant difference among HCPs exercise prescription practice regarding to profession to prescribe exercise (Medical doctors: Mean rank =223.46, Nurses: Mean rank =175.57 and Midwiferies: Mean rank =123.67, $\chi^2 = 47.089$, $df = 2$, $p = 0.000$), medical doctors, nurses and midwiferies hade better EPP for their NCD patients respectively. Similar to this investigation a study that was investigated in Ethiopia, Addis Abeba by using Kruskal-Wallis Test, it indicates that there were a significant difference among the three groups of healthcare professionals ($\chi^2 = 147.85$, $df = 2$, $p = 0.000$). Physiotherapist, Doctors and nurse were had the highest physical activity prescription/counseling scores respectively. The mean rank score of the three groups were physiotherapists (mean rank = 364.31), physicians (mean rank = 236.58) and nurses (mean rank =141.07) [26].

But the study investigated in Kenya the medical officers group was associated with the numerically smallest mean of exercise prescription practice ($M=29.0$ $SD=5.3$ $CI=25.4-32.6$) and nurses group was associated with the numerically highest mean of exercise prescription practice ($M=29.2$ $SD= 7.3$ $CI=28.1-30.22$) [35].

Regarding to knowledge and confidence among HCPs towards exercise prescriptions (table 3 the results are reported);

The respondents were asked if they had knowledge on the World health organization (WHO) and American college of sport medicine guidelines and recommendations to advise/prescribe patients with NCD. Majority of HCPs of the 352 respondents, 62.5%) disagree (disagree +strongly disagree) that knowledge on WHO and ACSM recommendations to prescribe exercise for NCDs, 95 (27%) of HCPs agree (agree + strongly disagree) and 10.5% of them are cannot decide about it (see table 3, their responses are listed). The result is supported by the study which was investigated on Burundi Doctors showed that 92.38% (n = 97) do not know any more the international recommendation on physical exercise practice [3]. Similar to this a study on UK medical students, the studies noted that, health professionals did not know the PA guidelines as well as other health promotion guidelines [45].

Other finding was also said that only having good knowledge were (19.8% =good + very good knowledge) on current physical activity recommendations [21]. The result also somewhat nearest to the study investigated in England similar to this item, but on medical doctors (n = 198 20%) were broadly or very familiar with the national PA guidelines, whereas 30% (n = 301) had not heard of the guidelines, and 51% (n = 514) said that they had heard of them but were broadly unfamiliar or very unfamiliar with their content [46]. Contrary to this study, the finding was shows that of the 221 HCPs, 96 (43.4%) agreed that they were aware of the WHO guidelines for physical activity and 45 (20%) disagreed on the same but 42.5% and 20.4% of respondents were not sure and disagree on American College of Sport medicine (ACSM) guide line respectively [29].

The questions regarding to recommended duration/quantity/ of PA; the previous study of reported that of the 221 HCPs, 125(56.6%) were not sure that the recommended quantity of physical activity was 150 minutes per week and 14.9% of them respond that they agreed [39]. The result of this study also reported that almost half (n=350,49.7%) of HCPs disagree towards the recommended duration for vigorous and moderate intensity exercises according to ACSM and American Heart Association (AHA) is 75 and 150 minutes respectively and 37.1% of HCPs were agree.

In relation to awareness towards components of PA prescription (frequency, intensity, duration and type of activity) to design exercise for their NCD patients; Previous studies have noted that, primary health care professionals perceived that they lacked adequate knowledge on physical activity and health [23, 47, 48]. The present study investigation says that almost equal number of HCPs (n=353, 155(43.9%) disagree and 152(42.9%) agree on their awareness about PA prescription components respectively (frequency, intensity and time).

Knowledge about PA intensities (light, moderate and vigorous); the previous study result was showed that only 22.6%) of HCPs about different PA intensities (light, moderate & vigorous) had knowledge but the finding of this study shows above half of HCPs (n = 350, 191(54.6%) agree that they know/ knowledge about PA intensities (light, moderate and vigorous) and 125 (35.7%) were disagreed [21]. Healthcare professionals had relatively least perceived knowledge on prescribed specific physical activity to patients (n=384, 13.4% =good + very good knowledge) and half and above (52.2%) of HCPs were had poor knowledge [21]. This study finding is consistent with those finding. Half of HCPs (n= 343,172 (50.1%) disagree and 53 (15.5%) were undecided that their awareness about to prescribe specific exercise program for the type of NCDs and 118(34.4%) of HCPs are agreed how to prescribe specific exercise program for NCDs for their patients.

About the more HCPs who are involved in exercise themselves and role model, the more they prescribe exercise: The present finding report is majority of HCPs (n=351, 225 (64.1%) were agree more involved in exercise themselves and role model HCPs are the more to prescribe exercise and 83(23.7%), 43(13.1%) of HCPs were agree and unable to decide respectively. In line to the current finding previous studies was also supported the study in Kenya found that 44.3% of the respondents strongly agreed that HCPs should be physically active to act as role models for their patients [29]. The study that was investigated in Ethiopia, Addis Abeba, was also supported that, majority of HCPs (n = 385, 90.1%) agree to good physical activity habits of HCPs can encourage their patients to exercise and maintain good health [36].

Regarding, taken a sufficient course in curriculums or training program; this finding result shows that majority of (n=353,249 (70.6%) and a few of 75(21.2%), 29(8.2%) HCPs were disagreed, agreed and undecided towards taken a sufficient course in curriculums or training program how to prescribe exercise for NCDs respectively. Contrary to the present study: the study that was done in south India said that 26% doctors had taken training about how to prescribe PA for their patients. 24.7% of them also responded that they had taken a course /in curriculum/ when they were in medical college about physical activity [43]. Butthe present finding is supported that, nurses and physicians agreed (69.2%) that their curriculum had limited or no preparation for health promotion by using PA [49].

Knowedege of HCPs towards exercise prescripitons across profession; the present studies Kruskal-Wallis test of analysis result shows that there was a significant difference among HCPs knowledge and confidence regarding to profession to prescribe exercise (Medical doctors: Mean rank =198.71, Nurses: Mean rank =171.96 and Midwiferies: Mean rank =159.78, $\chi^2 = 7.773$, df = 2, p =0.021), medical doctors, nurses and midwiferies were had better knowledge and confidence but the previous studies reported that nurses (M =30.1, SD=4.6 CI=29.4-30.8), medical officers and clinical officers (M=29.0 SD=6.2 CI=26.3-31.7) were had numerically highest mean of exercise prescription knowledge respectively.²⁹ Even if there was numerically different but there was no significant differences in knowledge of exercise prescription among healthcare professionals.

The previous study result regarding to gender difference in terms of knowledge about EP was; Male healthcare professionals had statistically greater knowledge about physical activity prescription/ counseling.²¹ The result was generalized as: male healthcare professionals were had more knowledge than female healthcare professionals to prescribe/counseling PA [21]. But the result of this study was inconsistent with the previous study. The finding is shows that: according to the result from Mann-Whitney U test analysis there was not a significant difference between male and female HCPs on knowledge and confidence towards exercise prescription for NCDs, even if numerically mean rank of males were better than female (but not significance) (female: mean rank, 168.70 and male: mean rank, 181.95, Mann-Whitney U= 13491.000, Z= -1.181, P= 0.238).

Conclusion

Exercise prescriptions practice, knowledge and confidence of majority of HCPs regarding to prescribe exercise for NCDs were poor. Majority of respondents had poor written prescription and refer patients to other professionals. Medical doctors and nurses were had better EPP, knowledge and confidence respectively. Majority of HCPs were hadn't awareness about WHO and ACSM recommendations, to prescribe specific exercise program, PA prescription components (frequency, intensity and time), not taken a sufficient course in curriculums or training program how to prescribe exercise for NCDs. Half of HCPs were hadn't confidence to prescribe exercise. HCPs that had better knowledge on EP, they also had better confidence to prescribe exercise. The education curriculum of the HCPs should revised and the course include about PA/EP sufficiently, EIME initiative and establishment also should be practiced and EP also better to be established as a one unit in healthcare settings. Continuous trainings on PA/exercise prescription to prevent and manage NCDs for HCPs are very important. Standardized recommendation guide line for every healthcare setting, HCPs to use it as a bench mark during exercise prescription should be design at a national level.

Abbreviation

EIME: Exercise Is Medicine Ethiopia, EP: Exercise Prescription, EPP: Exercise prescription Practice, HCPs: Healthcare Providers

Declarations

Ethics approval and consent to participate

We confirm that informed consent was obtained from all subjects and all methods were carried out in accordance with relevant guidelines and regulations. This study and the consent form were approved by department of sports science, DebreMarkos University, research committee. Signed written informed consent was obtained from all participants and keep the rights of the respondents introduced the nature and the purpose of the study and their response was kept confidential.

Consent for publication

Not Applicable' in this section

Availability of data and materials

The data used and analyzed for this study are available from the authors on reasonable request

Competing interests

We know of no conflict of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome

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Authors Contribution

All authors substantially contributed to the conception and design of this study. DE contributed to identifying the problem, writing the proposal, data collection, analyzing and interpreting data under the supervision of corresponding author. GT contributed to lead the project, study supervision, statistical analysis, a major contributor in writing and processing the manuscript. All authors read and approved the final manuscript.

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Tables Title

Table 1: Sample Characteristics

Table 2: Correlation results between EPP with Knowledge and confidence

Table 3: Results of knowledge and confidence among HCPs towards exercise prescription

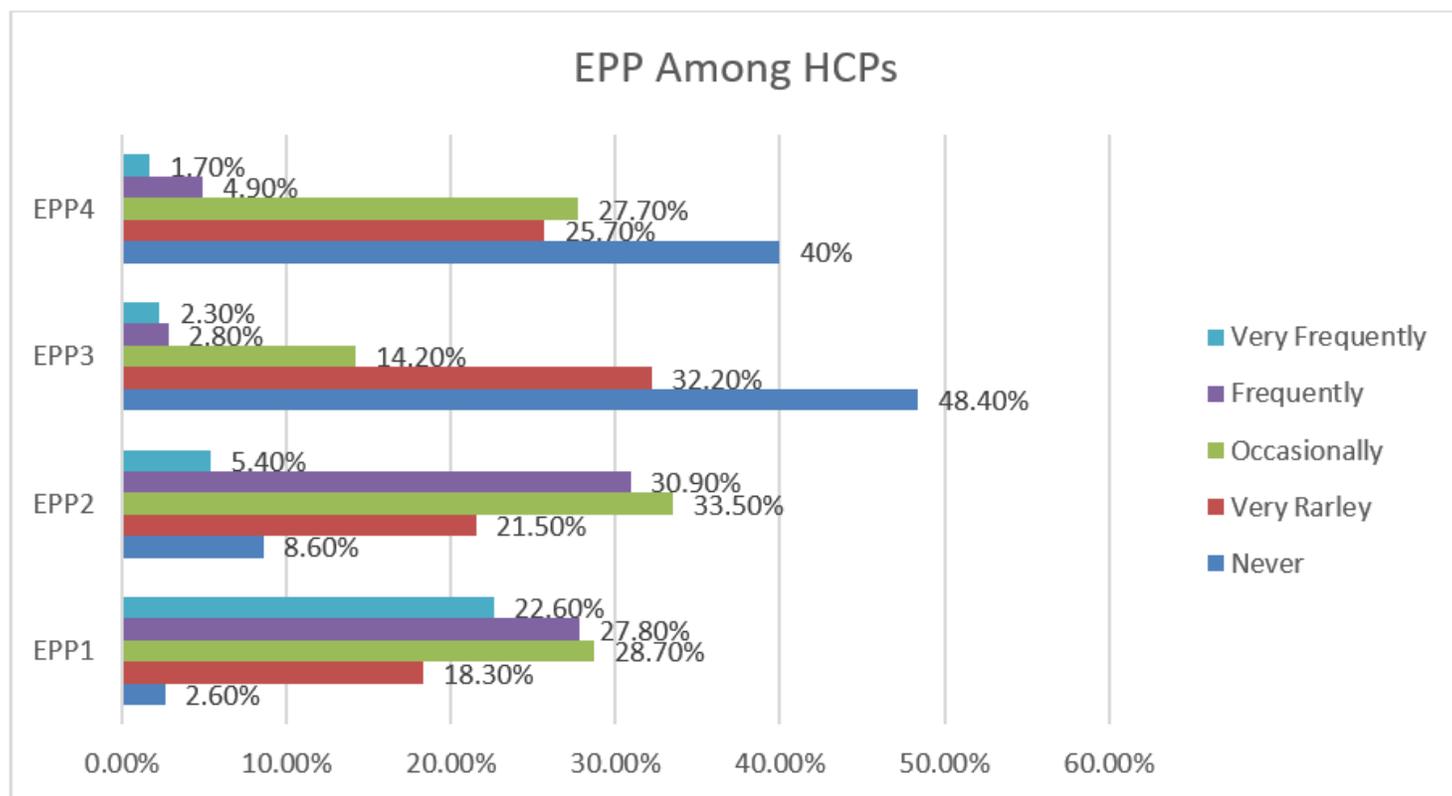
Table4: Correlation between confidences, Knowledge and EPP of HCPs’

Figures Title

Figure 1: Exercise Prescription Practice (EPP) for NCDs results among HCPs

Figure 2: Summary for Exercise Prescription Practice among HCPs towards NCDs

Figures



Key

EPP= Exercise Prescription Practice

EPP1= Ask and discuss with patients about their physical activity levels

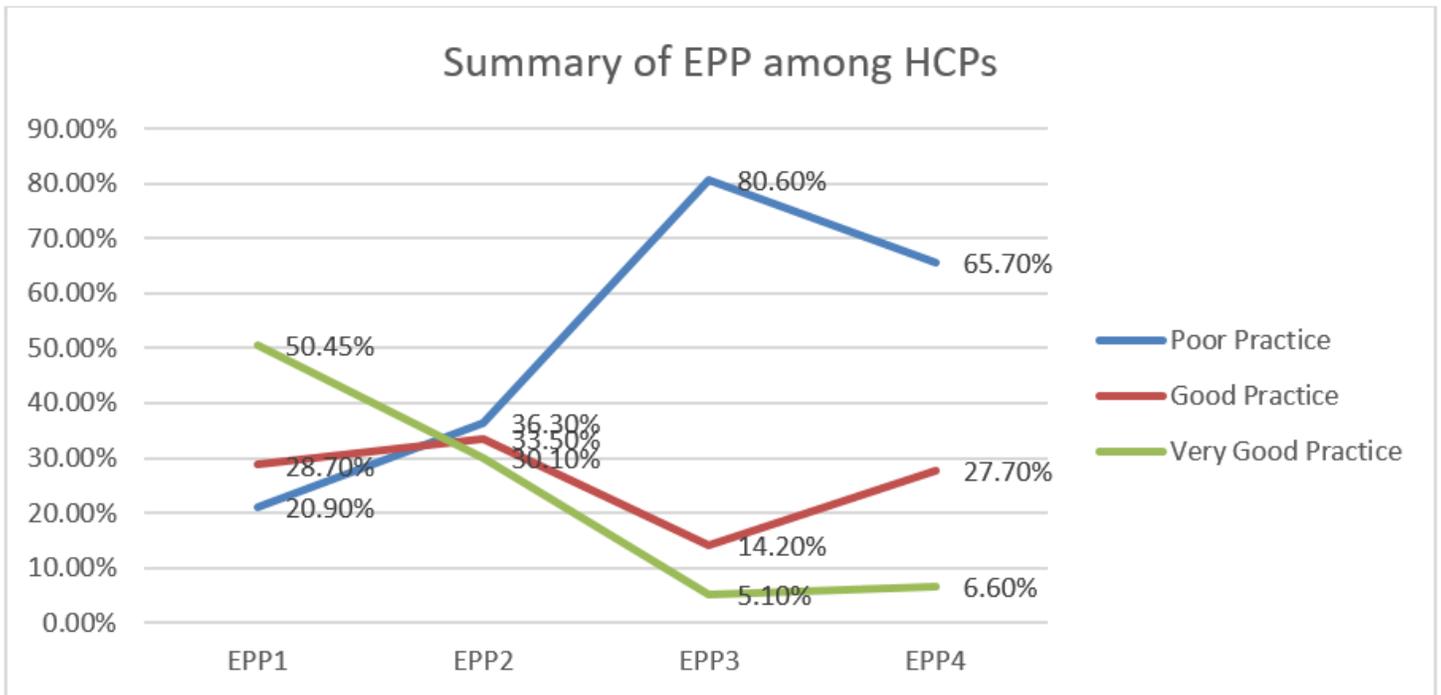
EPP2= Provide patients with verbal prescription for exercise/PA training program

EPP3= Provide patients with written prescriptions for exercise/PA training program

EPP4= Refer patients to exercise professionals for fitness assessment

Figure 1

Exercise Prescription Practice (EPP) for NCDs results among HCPs



Key

EPP= Exercise Prescription Practice

EPP1= Ask and discuss with patients about their physical activity levels

EPP2= Provide patients with verbal prescription for exercise/PA training program

EPP3= Provide patients with written prescriptions for exercise/PA training program

EPP4= Refer patients to exercise professionals for fitness assessment

Figure 2

Summary for Exercise Prescription Practice among HCPs towards NCDs