Knowledge on Exercise Counselling and Physical Activity Promotion among Healthcare Professionals in Primary Care

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***Abstract: - Objective*. To find out the exercise prescription knowledge among healthcare professionals in Kakamega county, Kenya *Design.* The study design was a descriptive cross-sectional, that utilized quantitative methods *Setting.* The study was conducted in Public health facilities in Kakamega County, located in Western Kenya. These facilities were four (4) Sub-County hospitals, two (2) County hospitals and one (1) County referral hospital *Sample* Stratified random sampling was embraced to divide the population into homogeneous subgroups as per the professional cadres then simple random in proportion to their number in the population was done.Formulae that was used for calculating the sample size was Cochran) with an attrition rate of 10%, since the sample size was less than 10,000 people, the sample size was adjusted with the Finite population correction for proportions based on the populations of nurses, doctors and clinical officers (*n* = 221) *Analysis.* Data was analyzed through descriptive statistics. All assumption for conducting parametric tests were met before undertaking parametric tests. ANOVA was used to determine if healthcare providers differed with regards to knowledge of exercise prescription. In case of observing significant differences Hochberg's GT2 post-hoc test was used. Alpha level for all the computations was considered p <0.05. *Main outcome measures.* Exercise prescription knowledge among healthcare professionals *Results.* (43.4%, n=96) of the respondents agreed that they were aware of the WHO guidelines for physical activity. (42.5%, n=94) said that they are not sure about the ACSM guidelines. (41.2%, n=91) strongly agreed that aerobic and muscle strengthening physical activity are beneficial. (59.3%, n=131) were not sure that age predicted heart rate maximum can easily be determined by 220 minus age. majority of the healthcare professionals had good knowledge of exercise prescription (81%, n=179) scoring 28 or above and there were no significant differences (F (2, 218) = .675, p = .510, η_p^2= .01) in knowledge of exercise prescription amongst healthcare professionals *Conclusion*. A replication study on healthcare professionals with different characteristics should be conducted to increase the possibility for generalization of the findings.**

***Keywords:-* Physical activity, Evidence-based health promotion, Non-communicable diseases, Primary care**

I. BACKGROUND

The healthcare setting has been recognized as an appropriate and promising venue for counseling and prescribing physical activity to increase the activity index of the population (Matheson *et al*., 2011;Lobelo & de Quevedo, 2016; Lamming *et al*., 2017; Teferi, Kumar & Singh, 2017;Leemrijse, de Bakker, Ooms, & Veenhof, 2015). When done adequately, healthcare professionals initiated physical activity (PA) counseling is moderately effective, resulting in short-term (12 months) improvements in patients' physical activity (PA) levels (Orrow, Kinmonth, Sanderson & Sutton, 2012,). Exercise prescription from a healthcare professional will remind the patient that physical activity is part of their treatment plan and should be adhered to with the same diligence with which their medication is taken (Grandez *et al*., 2009).Almost two-thirds of patients (65%) would be more interested in exercise and physical activity (PA) to stay healthy if advised by their healthcare professional (Leemrijse *et al*., 2015), while 24% of patients will turn to fitness and health web sites for advice on exercise and PA but after consulting their doctor first (25%) (Derman, Patel, Nossel & Schellnus, 2008).Researchers have confirmed that majority of people cite their general practitioners as their primary source of information regarding healthy lifestyle decisionsespecially as far as diet and exercise are concerned(Lanhers *et al*., 2015; Leemrijse *et al*., 2015).

The Ministry of health (MoH) in Kenya has recognized exercise prescription as a viable method of increasing the activity index of people.One of the main objectives of the MoH is to create an enabling environment for patients with chronic diseases or conditions that require exercise counseling and education to get assistance from health care offices (Kenya Demographic and Health Survey [KDHS], 2014). In spite of these efforts, non-communicable diseases (NCDs) accounted for more than 50% of total hospital admissions and over 55% hospital deaths in Kenya (HMIS, 2012).A study showed that non-communicable diseases reducedlabor force participation by 61% (Machio, 2012)but with elimination of physical inactivity,life expectancy in Kenya was expected to increase by between 0.25-0.49 years(Lee *et al*., 2012). In other places like the United Kingdom and USA, there has been success stories of physical activity being effectively applied in practice for disease prevention and treatment in healthcare settings (Meyer *et al*., 2010; Grandes *et al*., 2009).

In a study done by Hébert *et al.*, (2012) primary health care providers perceived that they lacked adequate knowledge on physical activity and health. This study was consistent with other studies done in the USA like a study done by Smith *et al*., (2015) among health care providers specializing in family medicine, internal medicine and Obstetrics and gynecology (n=219) that found the mean physical activity counseling

knowledge scores were low, with senior practitioners answering just over half of the items correctly, an indication that there was limited knowledge of the recommended obesity counseling guidelines.

In the United Kingdom (UK), Douglas *et al.*, (2006) found that UK nursesand healthcare professionals'knowledge of current PA recommendations was very low but were more likely to recommend physical activity (PA) to their patients than physician assistants. This pattern was also noted in Brazil where a cross-sectional study in a sample of professionals working in primary health care showed that knowledge on physical activity recommendations for health was generally poor, but when professionals had more interest in this area (in the case of nurses) or involved in more specific content such as assessing patients' level of physical activity (in the case of physicians), the frequency of counseling increased (Florindo *et al*., 2013).

In African countries the finding were not different either, a study done by (Roos, 2014) among south African doctors found out that the knowledge of exercise prescription was low and none of the general practitioners chose all the correct options in the questions checking for knowledge as per American College of sports Medicine (ACSM)guidelines. This results were however contradicting finding from a study done in Nigeria by Aweto *et al*(2013)that found out 63.6% of the health care professionals had high knowledgetowards promotion of physically active lifestyles in patient management.These findings are therefore inconclusive, hence the necessity for further research to have a more conclusive finding.

A review done by Lobelo & Quevedo (2016) found thatfor all studies reviewed, knowledge of current physical activity(PA) recommendations was low and ranged from 12% to 27% among physicians and from 7% to 9% among other HCPs. A few studies have assessed relationship between knowledge and practice.A study done by Aweto *et al.*,in 2013, found out that there was no significant association between the knowledge of healthcare professionals in physical activity promotion with their counselling practice to patients.There is paucity of literature regarding healthcare professionals training and knowledge of exercise prescription, creating a research gap that needs to be filled by this study. In Kenya data available is inconsistent and sparse,to date, little is known about the knowledge of physical activity counseling in Kenyan primary care settings and the factors associated with physical activity prescription in healthcare setting. Hence, this study was designed to find out the exercise prescription knowledge among healthcare professionals in Kakamega county, Kenya.

II. THEORETICAL FRAME WORK

This study was guided by Pender's Health Promotion Model (HPM) (2002). The theoryfocuseson the multidimensional nature of individuals, in whichthere are interpersonal and environmental interactions which contribute substantially to achieve a healthy behavior(Pender, Murdaugh & Parsons, 2002; Villar *et al.*, 2017).The model attempts to evaluate the behavior of individuals that leads to health promotionaccording to three basic components: 1) individual characteristics and experiences (previous behaviors and personal factors); 2) feelings and knowledge about the desired behavior (perception of benefits, barriers, self-efficacy, inter-personal influences); and 3) desirable health promotion behavior (commitment to the plan of action, demands and preferences). The model is based on social cognitive theory according to which cognitive-perceptual factors (perceived benefits, barriers, and self-efficacy) influence engagement in health-promoting behaviors. Modifying factors (demographic characteristics, interpersonal influences, and behavioral factors) are considered to interact with each other to influence cognitive perceptual processes (Khodaveisi, Omidi, Farokhi & Soltanian, 2016). Studies show that Pender's HPM can positively affect and improve behaviors(Khodaveisi, Omidi, Farokhi, & Reza, 2017).

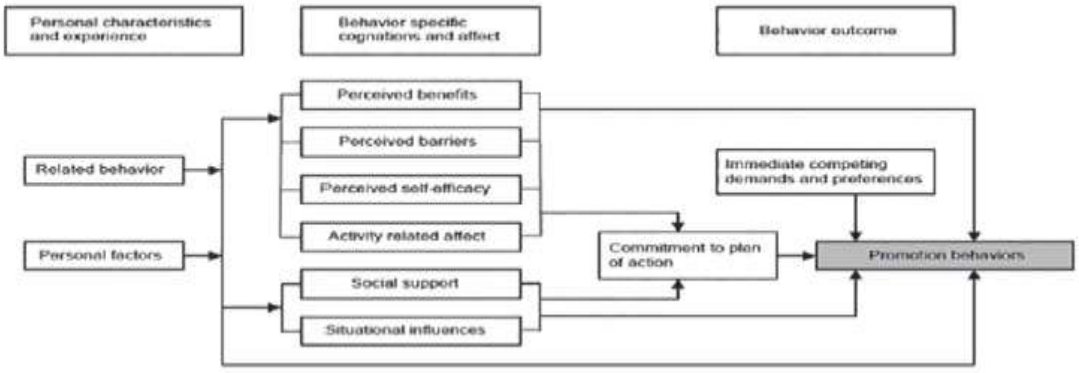


Figure 1. Diagrammatic representation of Pender's Health Promotion model (Pender, Murdaugh & Parsons, 2002).

III. METHODS

The study was conducted in Kakamega County and ethics approval was obtained from Masinde Muliro University of Science and Technology ethics board, National commission for science and technology, the Kakamega county commissioner and from Kakamega county referral hospital

(KCRH). No further approval was needed since the project didnot require access to patients or personal data.

IV. RESEARCH DESIGN

The study design was a descriptive cross-sectional, that utilized quantitative method. The design was chosen because the data to be collected on exercise counselling behavior was a product of temporal and spacial factors. This particular design was ideal since the research entailed collecting and comparing data from the phenomena at the same time of study. Kothari (2004) describes descriptive surveys as formalized and typically structured fact-finding enquiries, involving asking questions (often in the form of a questionnaire) to a group of individuals, adding that the major purpose is description of the current state of affairs as it exists at present and describe "what exists" with respect to variables or conditions in a situation.Therefore, the descriptive survey was deemed the best strategy to fulfill the objectives of this study. Several studies on exercise counselling behavior have found the design robust (Galaviz *et al.*, 2015; Teferi *et al*., 2017; Roos, 2014). The study was notexpected to measure changes in exercise counselling behavior at different points in time, further logistical and time issues also influenced the design choice.

V. STUDY SETTING

The study was conducted in Kakamega County, located in Western Kenya. Kakamega County has 132 government run health facilities ranging from a County Referral hospital to a dispensary distributed in twelve subcounties; Kakamega North (Malava), Kakamega Central (Lurambi), Kakamega South (Ikolomani), Kakamega East (Shinyalu) and Butere/Mumias. Numerous private and faith-based facilities also provide health care services to the population in this County. The choice of Kakamega County is based on the fact that it is the second most populous County in Kenya but with a nurse patient ratio of 86.37 per 100,000 people, which is 34.87 per 100,000 people higher than the national average of 51.5 per 100,000 people (Kenya Nursing Workforce Report[MoH], 2012); this means that health professionals in this county have an opportunity to meet many sedentary people from the population. Health care professionals (HCPs) working in seven (7) health facilities will be studied. These facilities were four (4) Sub-County hospitals, two (2) County hospitals and one (1) County referral hospital**.**The County referral hospital, two County hospitals and four Sub-County hospitals were purposively selected because these facilities have higher service availability and readiness assessment index (Government of Kenya[GoK], 2014).

VI. PARTICIPANTS

The study population (280) were nurses, doctors and clinical officers working in public hospitals in Kakamega County. Stratified random sampling was embraced to divide the population into homogeneous subgroups as per the professional cadres then simple random in proportion to their number in the population was done.Formulae that was used for calculating the sample size was Cochran (Singh & Masuku, 2014) with an attrition rate of 10%, since the sample size was less than 10,000 people, the sample size was adjusted with the Finite population correction for proportions based on the populations of nurses. There was limited data on the prevalence of exercise counselling and prescription in Kenya. Therefore, for estimation of prevalence the researcher conducted a pre-test study in Navakholo sub county hospital and found an estimated assumed prevalence of 50% on the outcome variable practice of exercise prescription. In addition, an a priori power analysis, using the software application G*Power 3.1 forWindows (Erdfelder, Faul, Buchner, & Lang, 2009), demonstrated that a sample size of 280 was sufficient in order to discover significant effect sizes.

$$n_o = \frac{z^2 pq}{e^2}$$

$$n_o = \frac{(1.96^2)(0.5)(0.5)}{0.05^2}$$

$$n_o = 384 + (10\%\ attrition) = 422$$

Finite Population Correction For Proportions

$$n = \frac{n_o}{1 + \frac{(n_o - 1)}{N}}$$

$$n(nurses) = \frac{422}{1 + \frac{(422-1)}{429}} = 211,$$

$$n(doctors) = \frac{422}{1 + \frac{(422-1)}{59}} = 53,$$

$$n(clinical\ officers) = \frac{422}{1 + \frac{(422-1)}{106}} = 84$$

Z*=1.96, *P*=0.5**(for maximum variability), ***e*=0.05**(5% margin of error), n_0=estimate population sample, ***N=actual population, *n*=desired sample size

VII. DATA COLLECTION INSTRUMENT

The data was collected using a pre-coded self-administered questionnaire. The physical activityprescription/counseling for patients were measured by using a scale employed questionnaire of physical activity in the National Family Physician Workforce Survey of Canada (NFWSC; 2010) and was also used by Teferi *et al*., 2017. Participants were not compensated for their willingness to participate.In section one, the information that was collected was demographics characteristics and included age, gender , years of experience, education level and professional cadre. In section two, questions sought to establish exercise prescription knowledge levels, exercise prescription knowledge score was computed from nine questions that were asked and measured on a on a 5-point likert scale with the lowest being never=1 to very frequently=4.Not sure was coded as zero.The researcher conducted a reliability analysis for the knowledge subscale of the questionnaire to asses consistency in response in this sub

scale. Cronbach's alpha for the 9-items knowledge scale was α = .701. Deleting select items would not increase the alpha. To increase the validity and reliability of the instruments, after adapting the questionnaires were evaluated by experts. Then based on the feedback the final questionnaire was prepared for pre-test. The pre-test study was conducted in Navakholo sub-county hospital.

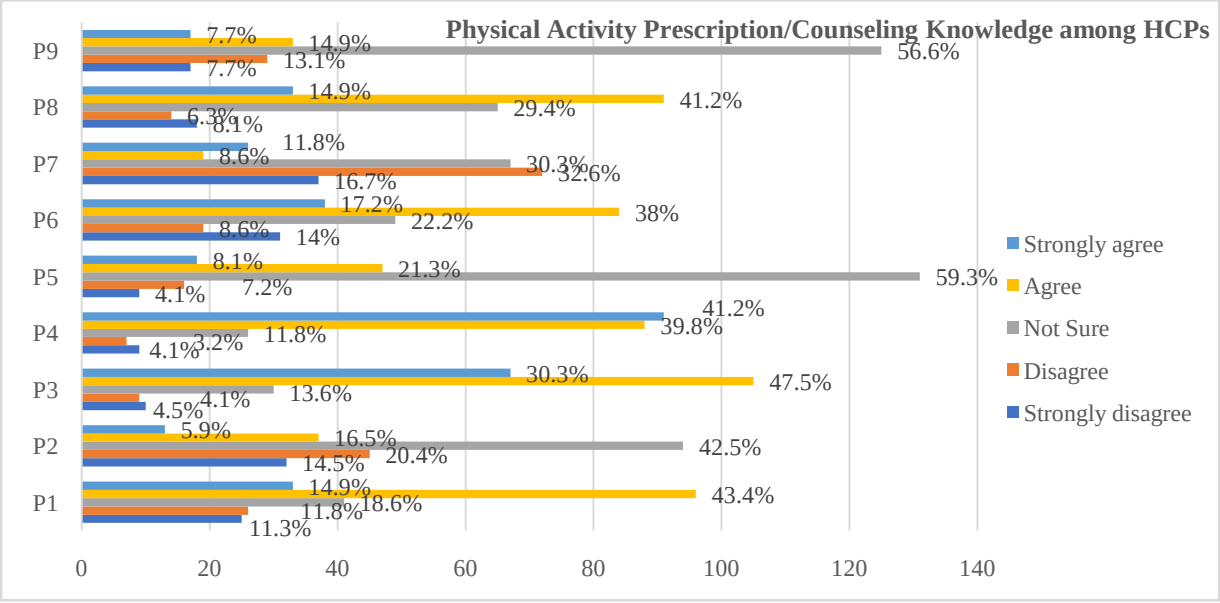
VIII. DATA ANALYSIS

Data analysis was done using the statistical program for social sciences (SPSS) version 22. Inferential and descriptive statistics were used to analyze data. Descriptive analysis of data was done using the mean, frequencies and percentages. In this study association between the study variables were assessed by a two-tailed probability value of $p<0.05$ for significance. Schlomer *et al*. (2010) outlined guidelines for best practices regarding the handling and reporting of missing data within research. Visual inspection of the data illustrated that missing data appeared to be missing at random. After visual inspection, in order to further examine the pattern of missing data, the researcher evaluated whether the data was missing completely at random (MCAR). The researcher utilized Little's MCAR test (Schlomer *et al*., 2010) which employs a chi-square statistical analysis and assumes the null hypothesis, that missing data is missing completely due to randomness. In this case, failing to reject the null hypothesis indicates that the data was most likely not missing in a random way.For this study, Little's MCAR test results showed that knowledge($\chi^2[103] = 73.572$, $p = .170$), was not significant indicating that the variables were missing completely at random, the researcher proceeded to address the missing data. To avoid reducing the variances of the scores by replacing missing items using subscale means, the missing data items were instead imputed using the Expectation-Maximization (EM) algorithm within SPSS 23; EM is considered a superior method for conducting missing data imputation when one has MCAR data (Schlomer *et al.*, 2010). Their guidelines were considered when reviewing the missing data for the current research study. The data was tested for assumptions of normality using the Shapiro Wilk test, Skewness and Kurtosis were also checked. Homogeneity of variance was checked using the Levene test. All assumption for conducting the above parametric tests were met before undertaking the test.ANOVA was used to determine if healthcare providers differed with regards to knowledge of exercise prescription. In case of observing significant differences Hochberg's GT2 post-hoc test was used. Alpha level for all the computations was considered at $p <0.05$.

IX. RESULTS

The research question of the study was to find out if healthcare professionals in public health institutions in Kakamega County had the basic knowledge needed to compile a safe and effective exercise prescription. Firstly, the respondents were asked if they had knowledge on the World health organization (WHO) guidelines for physical activity in healthy adults. Their responses are illustrated in figure 4.2. Of the 221 HCPs, 96 (43.4%) agreed that they were aware of the WHO guidelines for physical activityand 45 (20%) disagreed on the same.105(47.5%) HCPs agreed that additional benefits occur as the amount of physical activity increases through higher intensity, greater frequency and longer duration.The results also showed that 91(41.2%) strongly agreed that aerobic and muscle strengthening physical activity are beneficial.The results showed that 131(59.3%) were not sure that age predicted heart rate maximum can be easily be determined by 220 mis age. 84(38.0%) HCPs agreed regular exercise causes decreased myocardial oxygen cost. Of the 221 HCPs, 125(56.6%) were not sure that the recommended quantity of physical activity was 150 minutes per week.

Figure 2: Knowledge of exercise counselling by Healthcare professionals



Key

P1-I know the WHO guidelines for physical activity in healthy adults
P2-I know the current American college of sports medicine guidelines for physical activity in individuals with chronic disease
P3-I know that additional benefits occur as the amount of physical activity increases through higher intensity, greater frequency
P4-I know that both aerobic(endurance) and muscle strengthening (resistance) physical activity are beneficial
P5-I know that age predicted heart rate maximum can easily be determined by 220 minus age
P6-I know that regular exercise causes decreased myocardial oxygen cost
P7-I know that regular exercise causes increased insulin needs
P8-I know that exercise intensity may be estimated using heart rate reserve
P9-I know that the recommended quantity of PA according to ACSM and AHA is 150 minutes

Respondents answered a total of nine closed ended questions. Each response was given a mark based on the level on the 5-point likert scale with the anchors being strongly disagree=1 to strongly agree=4 and vice versa for questions that were reverse coded. Not sure was coded as zero. Scale scores were computed by adding responses to the nine questions resulting in a minimum possible score of 9 and a maximum of 36. The score varied from 9 - 36 points and was classified into 2 levels according to the Blooms' (1956) cut off point as follows:

- High Knowledge (above 60%) 28 or more score.
- Poor Knowledge (below 60%) 27 or less score.

From the results, majority of the healthcare professionals had good knowledge of exercise prescription 179 (81%) scoring 28 or above, while only 42(19%) were categorized as having poor knowledge of exercise prescription because of scoring 27 or less out of the total 45. (Figure 4.11)

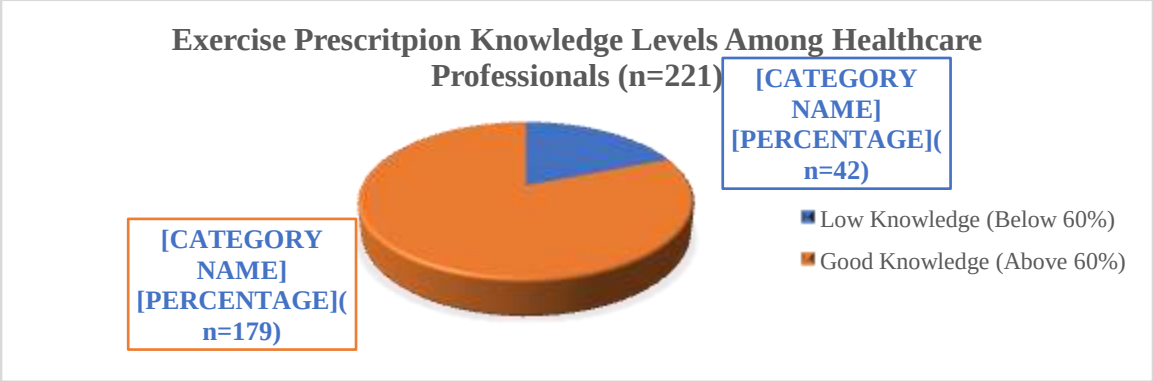


Figure 3. Knowledge of exercise prescription among Healthcare Professionals

The descriptive statistics associated with knowledge of exercise prescription across the three health professionals' groups are reported in Table 4.6. It was seen that the clinical officers' group was associated with the numerically smallest mean of exercise prescription knowledge (M=29.0 SD=6.2 CI=26.3-31.7) and nurses' group was associated with the numerically highest mean of exercise prescription knowledge (M=30.1 SD= 4.6 CI=29.4-30.8). In order to test the hypothesis that the professional cadre (nurses, clinical officers and medical officers) had an effect on exercise prescription knowledge, a between- groups ANOVA was performed.

Prior to conducting the ANOVA, the assumption of normality was evaluated and determined to be satisfied as the three groups distributions were associated with skew and kurtosis less than |-1.0| and |1.0| respectively (Howel, 2006; see table 4.6). Furthermore, the assumption of homogeneity of variances was tested and satisfied based on Levene's F test, F test (2, 218) = 2.67, p= .72.

The independent between- group ANOVA yielded a non-statistically significantly effect, F (2, 218) = .675, p = .510, η_p^2= .01. Statistical power was not adequate and was equal to .16. Thus, the null hypothesis of no significant differences in knowledge of exercise prescription in health professionals at public health facilities in Kakamega was accepted, and only 1% of variance in knowledge was accounted for by group membership.

Table 1. *Descriptive statistics for knowledge scores across professional cadre*

Professional cadre	n	M	SD	CI 95%	Skewness	Kurtosis
nurse	187	30.1	4.6	29.5-30.8	-.516	.976
medical officer	11	29.2	2.9	27.3-31.2	-.733	.627
clinical officer	23	29.0	6.2	26.3-31.7	-.912	.589

***Note*. M= mean; SD = standard deviation; CI = confidence interval**

The first null hypothesis was accepted ($p > 0.05$) leading to the conclusion that there exist no significant differences in knowledge of exercise prescription amongst healthcare professionals in Kakamega County, Kenya. Figure 4.12 below shows the box and whisker plots for the three health professionals. From the figure, the medians were not significantly different, and nurses had the highest score on knowledge followed by clinical officers then medical officers.

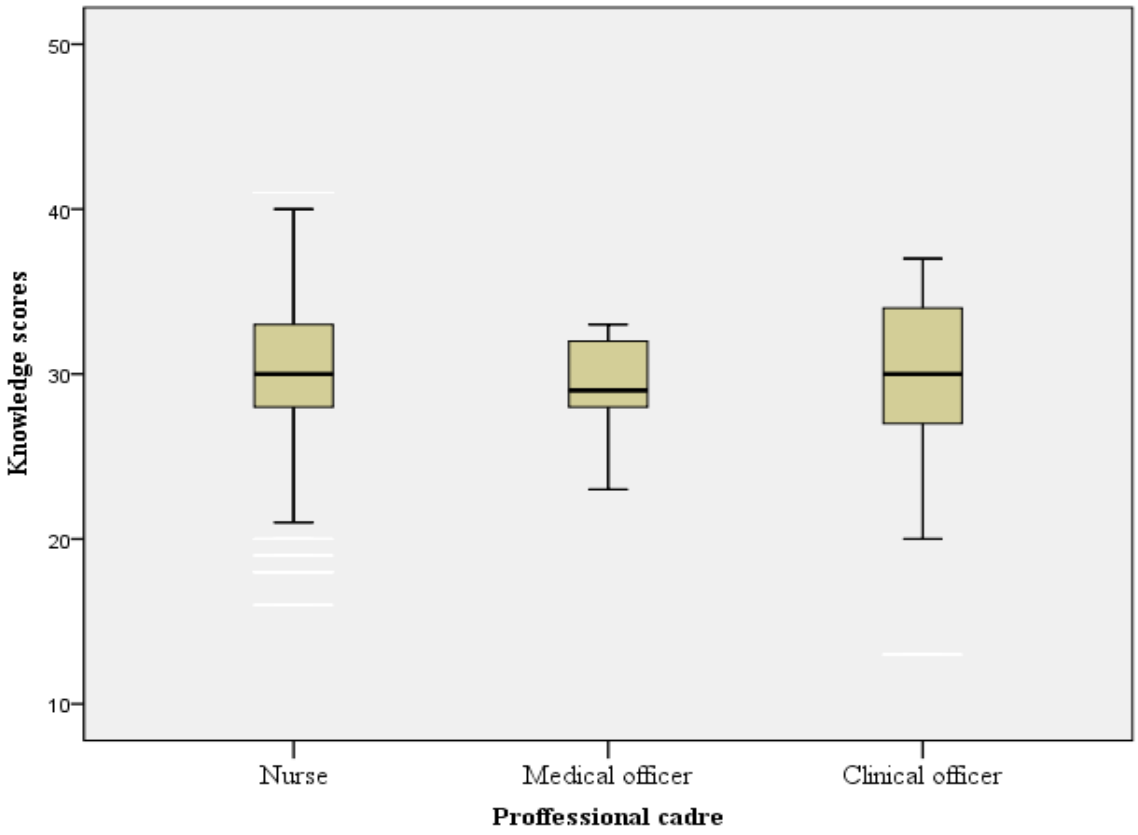


Figure 4. Box and whisker plot of distribution of knowledge scores across the professional cadre

X. DISCUSSION

The objective was to determine exercise prescription knowledge levels amongst healthcare professionals in Kakamega county. As previous studies noted, health professionals did not know the PA guidelines as well as other health promotion guidelines (Dunlop & Murray, 2013). In another study, 65.05% of health professionals were unable to adequately define physical fitness. The current study noted that 43% of HCP's were aware of the WHO guidelines for PA, however 43% were not sure about the American college of sports medicine guidelines. This explains why 56.6% were not sure that the recommended quantity of physical activity is 150 minutes per week. These results are consistent but are slightly lowered from previous study findings but not statistically different. As noted by (Oberg, 2007) exercise prescription is not a case of one size fits all. The prescription must be individually tailored to the needs and goals of each patient. To effectively prescribe exercise to patients the exercise dose or FITT (frequency, intensity, type and time) needs to be quantified.

Previous studies have also noted, primary health care professionals perceived that they lacked adequate knowledge on physical activity and health (Hébert *et al.*, 2012; Smith *et al*., 2015; Roos, 2014), a study in Brazil showed that knowledge on physical activity recommendations for health was generally poor, but when professionals had more interest in this area (in the case of nurses) or involved in more specific content such as assessing patients' level of physical activity (in the case of physicians), the frequency of counseling increased (Florindo *et al*., 2013). The current study found that 81% of the health care professionals had good knowledge of exercise prescription scoring 28 or above out of a possible 45. These results are inconsistent from previous literature done, however they were consistent with the results from a study done in Nigeria by (Aweto *et al.*, 2013) that found out 63.6% of the health care professionals had high knowledge. Grimstvedt (2011) also reported an overall score for nurses' confidence in exercise counselling to be high at 3.7 on a scale of 5. The possible reason for inconsistency could be that majority of the respondents in the study (38.9%) were confident that they were trained to design an exercise program for individuals living with medical conditions. More studies need to be done to monitor consistency of the high knowledge of prescription

because a study done among Australian general practitioners (GPs) found that the proportion of healthcare professionals with high knowledge and confidence in giving physical activity advice had failed to increase over the last seven years (Buffart *et al*., 2009).

Also, it is important to note that the current study noted there was no significant differences in knowledge of exercise prescription among healthcare professionals. This doesn't make sense, as medical officers have extended time in school and training. These participants would have potentially had more time to read current research on the benefits of exercise on health, and simply have more experience in the field. In Nigeria Aweto *et al.*, (2013) found out that there was no significant association between the knowledge of healthcare professionals in physical activity promotion with their counselling practice to patients. This sheds some light to the study's theoretical model. Pender's health promotion model showed that an individual's behavior that leads to health promotion was influenced by the individual's knowledge about the desired behavior.

XI. CONCLUSION & RECOMMENDATION

The research question in the study was to find out if HCPs in Kakamega had the basic knowledge needed to counsel or compile a safe and effective exercise prescriptionWithin the limitations of this research, it was concluded that a greater proportion of health care professionals had good knowledge of exercise prescription.A large proportion of health professionals were aware of the WHO/ACSM/AHA guidelines for PA in healthy adults, however, a vast majority were not sure that the recommended quantity of PA according to the guidelines was 150 per week. This gives a reflection that they were not conversant with the content of the WHO/ACSM/AHA guidelines despite knowing they exist. In addition to not being sure about the recommended PA for healthy adults, results also showed many were not sure about the guidelines for PA in individuals with chronic disease. The fact that most of the HCPs were not sure that age predicted heart rate maximum can be easily be determined by 220 minus age and that regular exercise does not cause increased insulin needs implies that the HCPs are unlikely to prescribe adequate volumes of exercise which is in line with the ACSM/WHO/AHA recommendations for physical activity. This indicates that the HCPs prescribe exercise without any insight into the contents of their exercise prescription, which raises further questions whether their exercise prescriptions or advice actually include any guidelines reaching beyond a simple instruction or casual advice to their patients that they should exercise.As inadequate exercise volumes limit the health benefits associated with PA, it is recommended that further research investigate the contents of their exercise prescriptions to draw conclusions on the efficacy of the exercise prescriptions of Kenyan HCPs. It is also recommended that the HCPs should take personal initiative to attend trainings to improve their knowledge of exercise prescription for the patients' sake.

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