Research article

Factors that influence the prescription of physical activity: a cross sectional survey

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Abstract: The study aims to assess the health professionals' knowledge, attitudes, and practices toward the evaluation and prescription of PA (physical activity) to develop public health measures to improve PA preventive interventions.; Methods: A cross - sectional study, using a confidential self - administered questionnaire applied to health practitioners involved in individual preventive services related to PA in Romania, was conducted. The internal consistency of the questionnaire was explored, and the data were analyzed with descriptive and inferential statistics; Results: A total number of 464 health professionals (community nurses, family doctors, and other professional categories) completed all questionnaire. We found differences in knowledge distribution, with the lowest level for nurses (p<0.001). Women have a positive attitude toward PA counselling compared to men (p=0.037).The patient's nutritional status (89.2%) and positive attitudes towards PA (42.0%) are the most mentioned factors that positively influence the PA prescription. Among barriers to prescribe PA, the most health professionals list: patient low compliance (65.3%) and lack of systematic training (63.8%); Conclusions: The participants have relatively good knowledge and positive attitudes toward the importance of PA. They feel self-confident and need public health support for systematic training, health-promoting resources, and national guidelines

Keywords: physical activity, prescription, attitudes, knowledge, barriers

1. Introduction

Physical activity (PA) represents a protective factor for health, with evidence showing a positive effect on healthy people and those with specific diseases. PA is a protective factor involved in the primary prevention of chronic diseases, such as breast cancer and colon cancer, type 2 diabetes, coronary heart disease, hypertension, stroke, ischemic heart disease, obesity, dyslipidemia, cognitive disorders, depression, osteoarthritis, osteoporosis, non-alcoholic fatty liver disease, sarcopenia. [1, 2, 3] In the case of patients with type 2 diabetes, structured physical training is associated with the reduction of HbA1c [4], and interventions by introducing physical activity in patients with Alzheimer's disease can improve cognitive function or slow down cognitive decline. [5, 6] To achieve significant health benefits in adults, the World Health Organization (WHO) recommends at least 150-300 minutes of moderate-intensity PA or at least 75-150 minutes of vigorous PA per week or an equivalent combination of moderate and vigorous intensity during a week. [7]

Solid evidence shows that behavioral interventions improve, in general, the food intake and the level of physical activity of the participants during the 6 to 12 months of follow-up but have modest effects on blood pressure, low-density lipoproteins, total cholesterol, and adipose tissue. The dose-response effect appears, and interventions with higher intensity resulting in better improvements. [8]

Behavioral interventions, including counseling to promote physical activity, are recommended. Thus, the U.S. The Preventive Services Task Force (USPSTF) emphasizes the need to guide adults at risk for cardiovascular diseases (CVD) towards behavioral counseling, to promote a healthy diet and physical activity as a primary preventive method of CVD, considering the intervention of counseling has real benefits (reduces the incidence of myocardial infarction and stroke, improves blood pressure and lipid profile). [9]

Taking into account the features of the Romanian population, where only 30% of the population reaches the sufficient physical activity threshold (one of the lowest in the European Union, according to Romania, physical activity factsheet 2021 [10] and having cardiovascular diseases and tumors as the leading two mortality causes [11], improving physical activity would lead to a lower burden on the healthcare system. Also, according to Institute for Health Metrics, GBD compare, the low level of physical activity is responsible for 6485 deaths, approximately 2.47% (1.22 -4.49%) of total deaths and 1.23% (0.64-2.2%) of total DALYs in Romania in 2019. [12, 13]

In Romania, a social health insurance financed system, the main primary care health providers are the family doctors (FD). Most of them are practicing in urban areas and the rural population, representing 46% of the total population, has low accessibility to family doctor services (0,69 family doctors per 1000 inhabitants in urban areas, and 0.49 in rural areas). [14] According to national legislation, insured people, from 18-39 years without signs and symptoms of the disease, benefit once every three years from two preventive consultations for the assessment of the individual risk regarding the behavioral factors that have an impact on the state of health (smoking, alcohol consumption, diet, physical activity, etc.). People with a higher risk benefit from one -two consultations/per year, and those over 40 years of one-three consultations annually (initial consultation, individual intervention consultation, and monitoring/control consultation. [15]

These services are part of the capitation-paid activities and they are not consistently well reported and documented. As these are time-consuming interventions the extent they are provided is relatively low, for example in 2017 there were reported by family doctors 1063379 preventive checks for insured adults, the number of insured adults being 7396653 according to the National Health Insurance House Report 2017. [16]

A broad range of professionals from physical education teachers to physiotherapists, nurses, and doctors are involved in physical activity evaluation and counseling. Also, in primary care, as a mechanism to increase the accessibility of vulnerable populations, community nurses are present in marginalized communities, to cover the needs of the most vulnerable population with medical services.

To increase the competence for preventive intervention related to physical activity the National Center for Health Evaluation and Promotion, within the National Institute of Public Health has developed different guidelines and health promotion materials for promoting a healthy lifestyle some of them focusing on interventions for physical activity. The recommendation for family doctors is based on the "5 A's" intervention approach and they are not compulsory. [17]

Still, currently, there are no nationally approved, compulsory recommendations for physical activity and no systematic training for health professionals involved in physical activity promotion or prescription. An attempt, within a European-funded project, the European Physical Activity on Prescription model (EUPAP), is presently carried out aiming to transfer good practices regarding the prescription of physical activity. [18]

In this context, the current study aims to assess the health professionals' knowledge, attitudes, and practices related to the evaluation and prescription of physical activity to develop evidence-based course materials for the EUPAP implementation.

2. Results

Response rates

From the 582 healthcare practitioners invited to participate, 498 completed the questionnaire, consequently, the response rate was 85.6%. After removing the incomplete responses, 464 responses were finally validated. From the professional category of the respondents, most of the questionnaires were completed by the community nurses (CN) 263 (56.68%) followed by 153 family doctors (FD) (32.97%) and 48 persons (10,35%) belonging to other professional categories as physiotherapist, rheumatologists, doctors for medial recovery (PAP).

Sociodemographic characteristics

Most of the responders were women (n=417; 89.9%), the percentage being even higher within the group of community nurses. The mean age was of 46.4±10.4 years, with higher values among family doctors. (p<0.001). The majority of practitioners are working in primary care (99.2% of responding nurses) and in family doctor practices (87.6% of family doctors) (p<0.001).

The rural/urban place of practice shows that most of the community nurses, 83,3% are practicing in rural areas where the population coverage with doctors is low. On the opposite side, 67.3% of the responding family doctors are practicing in urban areas. An important share of doctors 38.1%, are overcrowded, most of them delivering services for more than 2000 patients, which creates time pressure on all current activities of the cabinets. (Table 1)

Table 1. Sociodemographic and professional characteristics of respondents

Characteristics	All (464)	Nurses (n=263)	GPs (n=153)	Others (n=48)	p value
Age years (mean±SD)	46.4±10.4	40.4±7.8	53.6±9.3	46.2 ±8.8	<0.001
Gender No (%)					<0.001
Male	47 (10.1)	11 (4.2)	25 (16.3)	11 (22.9)	
Female	417 (89.9)	252 (95.8)	128 (83.7)	37 (77.1)	
Patient covered / enroled population N (%)					<0.001
< 1000 persons	70 (15.1)	47 (17.9)	4 (2.6)	19 (39.6)	
1000-2000 persons	146 (31.5)	71 (27.0)	68 (44.4)	7 (14.7)	
2000-4000 persons	177 (38.1)	99 (37.6)	68 (44.4)	10 (20.8)	
>4000 persons	71 (15.3)	46 (17.5)	13 (8.5)	12 (25.0)	
Type of practice N (%)					<0.001
GP individual practice cabinet	138 (29.7)	2 (0.8)	134 (87.6)	2 (4.2)	
GP ambulatory/ grouped practice	23 (5.0)	0 (0.0)	17 (11.1)	6 (12.5)	
Community	275 (59.3)	261 (99.2)	2 (1.3)	12 (25.0)	
Ambulatory	28 (6.0)	0 (0.0)	0 (0.0)	28 (58.3)	
No of beneficiary /month	251.4±237.4	127.5±112.5	489.8±233.5	166.7±170.8	<0.001
No years of practice	14.9±11.7	8.7±7.6	24.8±11.2	16.7±8.6	<0.001
Type of community N (%)					<0.001
Urban	185 (39.9)	38 (14.4)	103 (67.3)	44 (91.7)	
Rural	264 (56.9)	219 (83.3)	43 (28.1)	2 (4.2)	
Both	15 (3.2)	6 (2.3)	7 (4.6)	2 (4.2)	
Self-rated attitudes on PA importance for health N (%)	430 (92.7)	243(92.4)	144 (94.1)	43 (89.6)	0.828
Attendance on PA informative events during last 5 years N (%)					
Training courses	295 (63.6)	217 (82.5)	63 (41.2)	15 (31.2)	<0.001
Punctual Projects	54 (11.6)	21 (8.0)	23 (15.0)	10 (20.8)	0.011
Scientific events	163 (35.1)	20 (7.6)	108 (70.6)	35 (72.9)	<0.001

Attitudes on the importance of physical activity for health

The overall appreciation of the importance of physical activity for health was evaluated as important or very important by 92.7% of respondents, without differences for the type of professionals.

Regarding the type of activities where information on physical activities was presented during the last years, significant differences were observed among professionals: 82.5% of nurses attended workshops and training on preventive interventions, and 70.6% of FD participated in scientific congresses. (Table 1)

Knowledge of physical activity

Questions on knowledge related to the recommended amount of time by type of physical activity (moderate or vigorous) received a correct answer for more than 60% of respondents, with a maximum of 66,7% for FD. No significant differences were noticed among the professionals' categories. (Table 2)

Table 2. PA related knowledge

Knowledge items	All (464) N (%)	Nurses (n=263) N (%)	GPs (n=153) N (%)	Others (n=48) N (%)	p value
Minimum recommended amount of time for moderate PA /week (CORECT 150)	297 (64.0)	166 (63.1)	102 (66.7)	29 (60.4)	0.887
Minimum recommended amount of time for vigorous PA /week (CORECT 75)	300 (64.7)	170 (64.6)	96 (62.7)	34 (70.8)	0.441
PA beneficial effects based on solid evidences					
Improving bone and muscle resistance	401 (86.4)	227 (86.3)	133 (86.9)	41 (85.4)	0.962
Help to control weight	422 (90.9)	242 (92.0)	136 (88.9)	44 (91.7)	0.554
Improve mental health	440 (94.8)	253 (96.2)	142 (92.8)	45 (93.8)	0.303
Reduce risk of death by cardiovascular disease	328 (70.7)	182 (69.2)	113 (73.9)	33 (68.8)	0.574
Reduce hypertension risk	350 (75.4)	196 (74.5)	118 (77.1)	36 (75.0)	0.836
Reduce diabetes risk	326 (70.3)	171 (65.0)	119 (77.8)	36 (75.0)	0.017
Reduce Alzheimer disease risk	237 (51.1)	133 (50.6)	78 (51.0)	26 (54.2)	00.900
Aerobic PA refers to					
Walking (normal rhythm)	216 (46.6)	142 (54.0)	63 (41.2)	11 (22.9)	<0.001
Brisk walking	223 (48.1)	86 (32.7)	101 (66.0)	36 (75.0)	<0.001
Jogging	224 (48.3)	95 (36.1)	89 (58.2)	40 (83.3)	<0.001
Cycling	241 (51.9)	104 (39.5)	105 (68.6)	32 (66.7)	<0.001
Lifting weights	48 (10.3)	24 (9.1)	12 (7.8)	12 (25.0)	0.002
Household tasks)	112 (24.1)	57 (21.7)	42 (27.5)	13 (27.1)	0.365
Gym exercise (la sala)	196 (42.2)	94 (35.7)	75 (49.0)	27 (56.2)	0.004
Ergonomic Bike	240 (51.7)	95 (36.1)	109 (71.2)	36 (75.0)	<0.001
Stepper	199 (42.9)	75 (28.5)	94 (61.4)	30 (62.5)	<0.001
Stairs climbing	189 (40.7)	73 (27.8)	84 (54.9)	32 (66.7)	<0.001
Anaerobe physical activity refers to					
Pushups	313 (67.5)	162 (61.6)	113 (73.9)	38 (79.2)	0.007
Pull upps	259 (55.8)	122 (46.4)	101 (66.0)	36 (75.0)	<0.001
Lifting weights	307 (66.2)	158 (60.1)	107 (69.9)	42 (87.5)	0.001
Cycling	272 (58.6)	118 (44.9)	88 (57.5)	21 (43.8)	0.034
Ergonomic bike	231 (49.8)	149 (56.7)	96 (62.7)	27 (56.2)	0.449

Knowledge of the health benefits of physical activity receives a correct answer for most of the conditions, bone strength, hypertension, and cardiovascular disease risk reduction receiving more than 90% correct answers for all professionals. Surprisingly the role in reducing type II diabetes was correctly identified by fewer participants, between 65% of nurses to 77% of FD (p=0.017). (Table 2)

More deep information on aerobe/anaerobe type of activities receives less than half of the correct answers from nonprofessionals and about 75% correct answers from the PAP professionals, with significant differences among professionals. (Table 2)

Attitudes about PA interventions

Barriers to PA prescription

Three types of factors acting as barriers were evaluated: factors related to health professionals, such as lack of time, lack of knowledge, lack of instruments and materials, factors related to patient characteristics, and factors related to organizational aspects.

Lack of time was identified as the main barrier by all respondents 58,4%. The worst situation is for the FD (71%). The other categories, such as nurses or physiotherapists give significantly lower importance to that factor. Lack of knowledge is the second main determinant for 44,2% of all respondents. The lowest rate was for the FD, with only 34%, and the highest for nurses, with 49,8%. (Figure 1)

From the patient characteristics point of view, noncompliance in following the medical advice (65%), and poor state health of the patient (59,3%) were identified as the main barriers by all categories of professionals. (Figure 1)

The system features were perceived as important barriers, with about 50% for all 3 conditions. The most important was the lack of systematic training programs on PA interventions 63,8% with very similar figures for all categories. That grades this factor as the main barrier to PA intervention. (Figure 1))

Lack of resources and instruments specific for PA evaluation and counseling were mentioned for about 50% of all professionals, without significant differences. Additionally, the scarcity of premises where patients can practice physical activity in proximity receives 48% of responses. (Figure 1))

Figure 1. This is a figure. Schemes follow the same formatting.
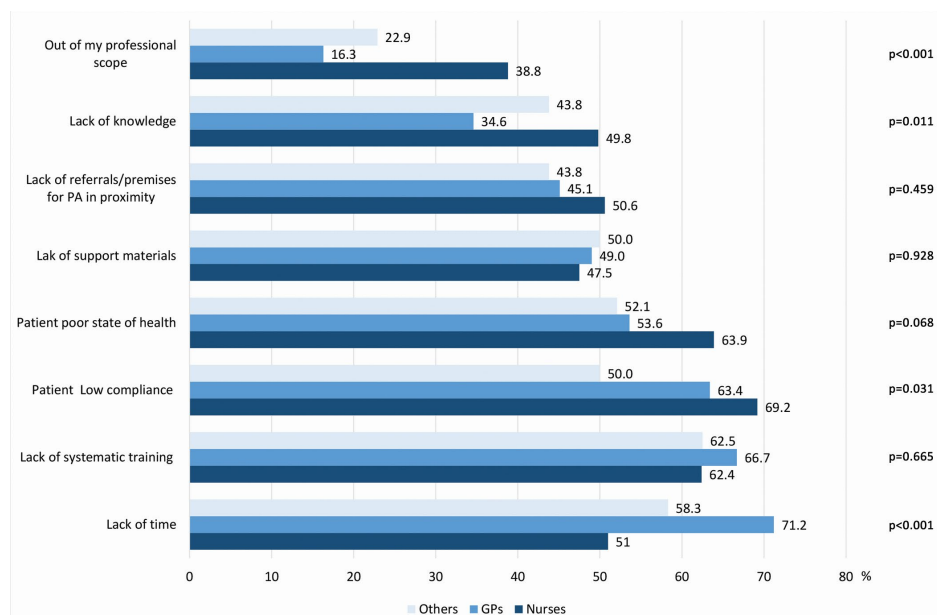
Perception of enablers for PA interventions

Overall perception on the measures that could contribute to improving the physical activity interventions situate, with 97% the development of green spaces with PA equipment on the first place of desirable measures, for all professional categories.

The second most supported measure, with 91,2% of answers stresses the need for scientifically approved guidelines, at the national level.

More than 80% of measures such as the development of PA facilities in medical units, financial support for PA in other private PA facilities, improved PA education in children and youth or a network of professionals were supported by all respondents. (Table 3)

Also, the proposed measure to develop a systematic training program for professionals receives important support with 83,4% of answers. Additional, distinct payments for this specific intervention receive an important support, 84%, for all categories of professionals. (Table 3)

Self-confidence in performing PA interventions

While 65,7% of respondents are confident that they could contribute to the improvement of PA levels in their patients, the FD with the lowest level and PA specialists with the highest levels. (Table 3)

Behind this, the overall self-rated level of knowledge for performing PA intervention is relatively high with 59,7 of positive answers. The lowest confidence is registered for family doctors, only 47.1%, and the highest value for nurses 67,7% with significant differences among different professionals' categories (p<0.001). In compensation, the need for further improvement of knowledge was registered at 84.1% of respondents, lower in the FD group with only 77.8% compared with nurses at 87.1% and PA professionals at 87.5%. (Table 3)

Table 3. Attitudes related to physical activity

Attitudes	All (464)	Nurses (n=263)	GPs (n=153)	Others (n=48)	p value
Barriers for PA interventions					
Lack of time	271 (58.4)	134 (51.0)	109 (71.2)	28 (58.3)	<0.001
Lak of support materials	224 (48.3)	125 (47.5)	75 (49.0)	24 (50.0)	0.928
Lack of knowledge	205 (44.2)	131 (49.8)	53 (34.6)	21 (43.8)	0.011
Lack of systematic training	296 (63.8)	164 (62.4)	102 (66.7)	30 (62.5)	0.665
Out of my professional scope	138 (29.7)	102 (38.8)	25 (16.3)	11 (22.9)	<0.001
Lack of referrals/premises for PA in proximity	223 (48.1)	133 (50.6)	69 (45.1)	21 (43.8)	0.459
Patient poor state of health	275 (59.3)	168 (63.9)	82 (53.6)	25 (52.1)	0.068
Patient low compliance	303 (65.3)	182 (69.2)	97 (63.4)	24 (50.0)	0.031
Enabling factors for PA					
Developing of training programs	387 (83.4)	218 (82.9)	130 (85.0)	39 (81.2)	0.786
Developing of Pa facilities in relation with health	368 (79.3)	216 (82.1)	113 (73.9)	39 (81.2)	0.125
Financial support for PA in private facilities	344 (74.1)	202 (76.8)	105 (68.6)	37 (77.1)	0.164
Increasing number of free services in medical facilities	390 (84.1)	223 (84.8)	124 (81.0)	43 (89.6)	0.327
Increasing number of medical PA facilities	398 (85.8)	225 (85.6)	137 (89.5)	36 (75.0)	0.042
Creating professional networks for PA	400 (86.2)	228 (86.7)	133 (86.9)	39 (81.2)	0.574
Increasing green spaces with PA equipment	408 (87.9)	227 (86.3)	140 (91.5)	41 (85.4)	0.250
Population education for PA	450 (97.0)	253 (96.2)	150 (98.0)	47 (97.9)	0.527
Developing and adoption of compulsory national guidelines	423 (91.2)	235 (89.4)	145 (94.8)	43 (89.6)	0.158
Distinct payment for PA intervention	394 (84.9)	222 (84.4)	133 (86.9)	39 (81.2)	0.595
Self confidence in personal abilities to perform PA interventions					
Capacity to improuve PA in my patients	305 (65.7)	185 (70.3)	87 (56.9)	33 (68.8)	0.018
Presently sufficient knowledge for PA counselling	277 (59.7)	178 (67.7)	72 (47.1)	27 (56.2)	<0.001
Necessary future competition of knowledge on PA	390 (84.1)	229 (87.1)	119 (77.8)	42 (87.5)	0.035

Practice characteristics

Characteristics of current practice among the three categories of healthcare personnel were assessed about five types of factors: type of interventions, instruments and methods, influence factors, health conditions, and informational resources used.

The PA types of interventions carried out in current activity by the health professionals were investigated by a battery of nine questions, based on the 5 A approach, form assessment of all unhealthy behavior, counseling, information on benefits of PA, PA recommendation, and referral to a specialist. The overall positive answers were over 70% with a lower percentage for PA assessment of only 63,4%.   (Table 4)

Table 4. Health behaviors and physical activity performed practices

Practices	All (464)	Nurses (n=263)	GPs (n=153)	Others (n=48)	p value
Frequency of PA intervention during a regular consultation					
All risky behaviors evaluation	365 (78.7)	216 (82.1)	109 (71.2)	40 (83.3)	0.023
PA assessment	294 (63.4)	183 (69.6)	81 (52.9)	30 (62.5)	0.003
PA counselling	332 (71.6)	209 (79.5)	91 (59.5)	32 (66.7)	<0.001
PA Motivational interview	360 (77.6)	230 (87.5)	97 (63.4)	33 (68.8)	<0.001
Information on health benefit of PA	347 (74.8)	213 (81.0)	99 (64.7)	35 (72.9)	0.001
Referral for medical PA services appointment	390 (84.1)	233 (88.6)	121 (79.1)	36 (75.0)	0.007
Recommendation for brisk walking	405 (87.3)	232 (88.2)	130 (85.0)	43 (89.6)	0.556
Recommendation for specific type of PA (bone strengthening, mobility)	368 (79.3)	221 (84.0)	110 (71.9)	37 (77.1)	0.012
Instruments used for assessment of PA level					
Unstandardized questions on PA	363 (78.2)	214 (81.4)	115 (75.2)	34 (70.8)	0.142
Unstandardized Questions on time for sedentary activities	329 (70.9)	204 (77.6)	98 (64.1)	27 (56.2)	0.001
Unstandardized Questions on type, frequency, intensity, frequency of PA	304 (65.5)	192 (73.0)	83 (55.0)	29 (60.4)	0.001
Standardized questionnaires	120 (25.9)	94 (35.7)	20 (13.1)	6 (12.5)	<0.001
GPPAQ	92 (19.8)	51 (22.3)	34 (25.4)	7 (15.9)	
IPAQ	28 (6.0)	5 (2.2)	15 (11.2)	8 (18.2)	
LEAP	112 (24.1)	83 (36.2)	20 (14.9)	9 (20.5)	
Patient related enablers for PA recommendation					
Patient overweight/obesity	414 (89.2)	226 (85.9)	144 (94.1)	44 (91.7)	0.029
Patient positive attitude for PA	195 (42.0)	81 (30.8)	85 (55.6)	29 (60.4)	<0.001
Knowledge and abilities to use information on PA	91 (19.6)	39 (14.8)	41 (26.8)	11 (22.9)	0.010
Belonging to a social group practicing PA	55 (11.9)	16 (6.1)	31 (20.3)	8 (16.7)	<0.001
Diseases where PA is recommended					
HTA	243 (52.4)	124 (47.1)	98 (64.1)	21 (43.8)	0.002
Diabetes	318 (68.5)	162 (61.6)	122 (79.7)	34 (70.8)	0.001
Osteoporosis	254 (54.7)	125 (47.5)	103 (67.3)	26 (54.2)	<0.001
Overweight/obesity	438 (94.4)	247 (93.9)	147 (96.1)	44 (91.7)	0.447
Anxiety	354 (76.3)	210 (79.8)	110 (71.9)	34 (70.8)	0.119
Depression	356 (76.7)	210 (79.8)	110 (71.9)	36 (75.0)	0.173
Cáncer	159 (34.3)	97 (36.9)	47 (30.7)	15 (31.2)	0.397
Surce of information on PA					
NIPH 2016 guidelines for preventive interventions for family doctors	146 (31.5)	83 (31.6)	60 (39.2)	3 (6.2)	<0.001
NIPH 2016 for nutrition and PA in schools and kindergarten	119 (25.6)	100 (38.0)	13 (8.5)	6 (12.5)	<0.001
EUPAP manual	14 (3.0)	7 (2.7)	5 (3.3)	2 (4.2)	0.834
WHO PA guidelines 2010	68 (14.7)	47 (17.9)	14 (9.2)	7 (14.6)	0.053
WHO PA guidelines 2020	94 (20.3)	52 (19.8)	27 (17.6)	15 (31.2)	0.118

Answers if they recommend physical activity receive the highest percentage 87,3%, the highest for the PA professionals. Community nurses are performing with a higher percentage in almost all activities. For counseling 79,5% and motivational interview 87,5% the differences are significant compared with other categories. The family doctors are on the opposite side, with the lowest percentage for almost all activities.

As related to the type of physical activity recommended, walking was the most frequent answer for all categories of professionals. The specific types of exercise for mobility or bone strengthening are less frequently recommended.

Questions on the instruments used for assessing the PA level reveal a worrying low utilization of standardized questionnaires, only 25,9% for all professionals. There are some differences among professionals, nurses reporting a higher utilization of those instruments 35,7% statistically significantly different from other specialists ($p<0.001$).

Among factors that positively influence the PA recommendation the most frequently mentioned are overweight /obesity (89.2%) positive attitudes towards PA 42.0% or a series of diseases or conditions such as overweight /obesity (94.4%), depression (76.7%), anxiety (76.3%) and diabetes (68.5%). Family doctors recommend PA more often than other professionals for diabetes ($p=0.001$), osteoporosis ($p<0.001$), and HTA ($p=0.002$).

Regarding the use of available guidelines and information, the figures are quite worrying. Still, the NIPH guide for family doctors (17) is the most used with 31,5% answers. Family doctors are using this instrument in a higher proportion, 39,2%, nurses in 31,6%, while the AF professionals in only 6,2%, differences being statistically significant ($p<0.001$). Another useful resource, used mostly by nurses is the guideline for nutrition and physical activity in schools, used by 38% of nurses and a lower percentage by the other professional groups. (Table 4)

In terms of the overall of the evaluated items, the summary for knowledge, attitudes, and practices, we found significant differences in knowledge distribution, with the lowest level for nurses, and the highest for PAP professionals. On attitudes on contrary, nurses are the most confident and positive category of professionals. Also, nurses are leading among all categories at very close figures on practices. (Table 5)

Table 5. Differences in knowledge, attitudes and practices and respondent characteristics

Participant characteristics	Knowledge			Attitudes		Practices	
	N	mean±SD	p	mean±SD	p	mean±SD	p
Gender							
Female	417	18.7±6.4	0.132	14.9±4.2	0.037	17.7±5.1	0.070
Male	47	20.2±5.9		13.6±4.4		16.2±5.8	
Professions							
Nurses	263	17.2±6.2	<0.001	15.1±4.4	0.162	17.7±4.7	0.794
GPs	153	20.9±5.8		14.4±3.9		17.4±5.8	
Others	48	21.3±6.5		14.3±4.5		17.2±6.1	

3. Discussion

The study reveals a positive attitude in all categories of respondents toward the importance and benefits of physical activity as an important determinant of health.

Secondly, another positive aspect is related to the fact that an important percentage, almost 80% (78,7%) of all respondents in the current practice are currently assessing all the main unhealthy behaviors. Along the same line, more than 75% of professionals are offering information, presenting health benefits, and assisting patients in reaching specialized services. The direct recommendation for practicing physical activity for the majority of responders is limited to the brisk walking recommendation. More complex, specific groups of exercise for mobility and bone strengthening are less often recommended.

As support for those practices, we found that about 60% of all respondents from our study have accurate knowledge of the recommended amount of physical activity and its

benefits for health, according to the WHO recommendation. [7]. Even if these are not high figures, this seems to be a better picture than in similar studies performed in the UK, and East Midlands region where only 45% of respondents gave the correct answer. [22]

Similarly, a study carried out in Ireland on 4692 general practitioners identified deficiencies in knowledge, attitudes, and practices related to PA counseling. [24]

But the situation can be worse, as another study, carried out in Brasil, also on three groups of health workers (nurses, doctors, and other categories) identified important gaps in all categories related to adequate knowledge of PA. [25]

Another important factor supporting PA interventions is the self-confidence to prescribe physical activity. This factor receives positive answers from 65,7% of all responders. Surprisingly, significant differences exist among professionals, nurses were more confident and more convinced of their satisfactory knowledge.

Even surprisingly these results are similar to those from the UK primary care study, where more than 77% of nurses and 62% of GPs are very trustful in their capacity and knowledge for recommending physical activity to their patients. [21] [25]

In concordance with the findings from the literature, the health professional's behavior is influenced by patients' compliance and expectation. [26,27,28]

Similar in our study patient compliance and positive attitude toward physical activity are considered enablers for physical activity intervention for more than 78% of respondents.

Related to barriers, the lack of systematic training programs for professionals in primary care was perceived as the main factor in not recommending physical activity for patients, by all categories of respondents, confirmed by 63,8% of all respondents.

Lack of training was found as a reason to not recommend exercise by other health care professionals. In a study, Ünsal Delialioğlu S et al. [29] found that lack of training and lack of knowledge related to what type of exercise to recommend was among the three reasons for oncology care providers to not recommend exercise for their patients. In a multi-national cross-sectional survey, Barton C J and al. [30] indicate that almost half of the international physiotherapist respondents have perceived they lack the competence to promote physical activity for people with musculoskeletal pain.

This is even more important as the expected lack of time, confirmed by most of the existing studies, that was the main negative driver for the family doctors, 71% and less important for the community nurses with only 51%, difference significantly statistic (p< 0,001). The results are consistent with those of similar studies. There are evidences that including the training for counselling on physical activity in the medical curriculum might be effective to improve the medical practice towards r improving chronic disease management. [31, 32]

As enablers for improvement of physical activity interventions respondents identified as main positive drivers, with more than 90% of all answers, confirming the previous answers related to barriers: the development of systematic training and approved, generally recognized national guidelines.   Also, free equipment for practicing sports and physical exercises in parks receive 97% positive answers. The development of educational programs for patients and a culture of physical activity are graded more than supplementary payment for that activity.

Our study has some strengths and some limitation. On the strengths the high response rate and the national coverage, due to the distribution by the Public health directorates staff. On the limitation side, the convenient sample, and the relatively small number of responders from the family doctors can be mentioned.

4. Materials and Methods

Study design and setting

A cross-sectional study was conducted among healthcare professionals involved in individual preventive services related to physical activity, between July and August 2020, in Romania. Informed consent was obtained from all subjects involved in the study. No

patients are involved in this research. The study was undertaken as part of a need assessment for developing a public health intervention related with PA. The methodology of the needs assesment has obtained the approval no 68868/ 10. 12.2019 by Ministry of Health.

Study population and sampling

The study sample was selected from the healthcare professionals involved in physical activity interventions in primary care at the national level.

To establish the Public health intervention for healthcare practitioners the pretested questionnaire was distributed through Google Forms to the public health directorate network, and then the link was distributed to a convenient sample of family doctors and community nurses. With the support of those specialists, the link was distributed further to ambulatory specialists working on physical activity prescription (medical recovery doctors, rheumatologists, physiotherapists, further abbreviated as PA professionals (PAP). From 582 healthcare practitioners invited to participate in our study, 498 accepted and completed the online questionnaire (response rate = 85.6%). After removing the incomplete responses, 464 responses were finally obtained.

Tool and data collection

A self-administered questionnaire was used for this study, based on a documentation stage from the existing literature and similar studies which assessed primary care practitioners' knowledge, attitudes, self-reported practice), and the WHO guidelines. [19] [20, 21] [22, 23] [7] The draft questionnaire was reviewed by a group of 5 experts, and it was piloted by sending it to 10 primary healthcare practitioners. Their feedback was used to identify the clarity and ambiguities of the questions and the time to complete the questionnaire. To explore the internal consistency of the questionnaire, Cronbach's alpha coefficient was used with an overall value of 0.81.

KAP questionnaire was designed to assess: (1) the sociodemographic, training, and health care practice characteristics; (2) their knowledge of PA, its benefits and characteristics of PA required to maintain the health status; (3) self-reported attitudes towards PA, and (4) practices and behaviors about PA interventions. The questionnaires were completed anonymously.

Data analysis

Knowledge questions were evaluated based on false/true selection and attitudes and practices on a five-grade Likert scale.

To assesses the results, the following scores were established: (1) Knowledge score- one point was allotted for each correct answer and 0 for incorrect one, (2) Attitudes and practices were evaluated using a Likert scale with 5 levels, where 1 correspond to strongly disagree/very rare and 5 corresponding to strongly agree/very frequent.

Data were collected into an Excel spreadsheet and data analysis was performed using IBM SPSS 23.0 version. The categorical variables were presented as frequencies and percentages for each professional category and participant, and the chi-square test was used to assess the statistical difference across different professions of respondents. The normality of continuous data was analyzed by Shapiro-Wilk tests, and they were shown as mean±standard deviation, and t-test and One-Way ANOVA test were used to study the level of significance of variables among genders and different categories of health care professionals. A p-value< 0.05 was considered statistically significant.

5. Conclusions

The study participants have relatively good knowledge and positive attitudes toward the importance of physical activity. They feel self-confident and they need public health support for systematic training, health-promoting resources, and national guidelines. Also, there is a need for advocating for a culture that gives importance to physical activity and supporting environments for physical activity in public facilities for sports and PA-related services within the health services.

Community nurses with sufficient knowledge, self-confidence, and less pressed by time, in comparison with family doctors, can be a very useful resource for health promotion of physical activity for health.

By the other hand the identified barriers and opinions on means of improvement allow us to identify further direction of intervention for public health. The most important of them are related to revision and approval at national level of national guidelines for physical activity interventions for nurses and family doctors complemented with systematic training, available and accessible for primary care health professionals.

References

1. Kyu HH, Bachman VF, Alexander LT, Mumford JE, Afshin A, Estep K, et al. Physical activity and risk of breast cancer, colon cancer, diabetes, ischemic heart disease, and ischemic stroke events: systematic review and dose-response meta-analysis for the Global Burden of Disease Study 2013. Bmj. 2016;354:i3857. Epub 20160809. doi: 10.1136/bmj.i3857. PubMed PMID: 27510511; PubMed Central PMCID: PMC4979358.
2. Booth FW, Roberts CK, Laye MJ. Lack of exercise is a major cause of chronic diseases. Compr Physiol. 2012;2(2):1143-211. doi: 10.1002/cphy.c110025. PubMed PMID: 23798298; PubMed Central PMCID: PMC4241367.
3. Lin YH, Chen YC, Tseng YC, Tsai ST, Tseng YH. Physical activity and successful aging among middle-aged and older adults: a systematic review and meta-analysis of cohort studies. Aging (Albany NY). 2020;12(9):7704-16. Epub 20200429. doi: 10.18632/aging.103057. PubMed PMID: 32350152; PubMed Central PMCID: PMC7244057.
4. Umpierre D, Ribeiro PA, Kramer CK, Leitão CB, Zucatti AT, Azevedo MJ, et al. Physical activity advice only or structured exercise training and association with HbA1c levels in type 2 diabetes: a systematic review and meta-analysis. JAMA. 2011;305(17):1790-9. doi: 10.1001/jama.2011.576. PubMed PMID: 21540423.
5. Du Z, Li Y, Li J, Zhou C, Li F, Yang X. Physical activity can improve cognition in patients with Alzheimer's disease: a systematic review and meta-analysis of randomized controlled trials. Clin Interv Aging. 2018;13:1593-603. Epub 20180904. doi: 10.2147/CIA.S169565. PubMed PMID: 30233156; PubMed Central PMCID: PMC6130261.
6. Jia RX, Liang JH, Xu Y, Wang YQ. Effects of physical activity and exercise on the cognitive function of patients with Alzheimer disease: a meta-analysis. BMC Geriatr. 2019;19(1):181. Epub 20190702. doi: 10.1186/s12877-019-1175-2. PubMed PMID: 31266451; PubMed Central PMCID: PMC6604129.
7. World Health Organization. WHO Guidelines on Physical Activity and Sedentary Behaviour. Geneva, 2020. ISBN 978-92-4-001512-8 (electronic version), Licence: CC BY-NC-SA 3.0 IGO. PMID: 33369898
8. Patnode CD, Evans CV, Senger CA, Redmond N, Lin JS. Behavioral Counseling to Promote a Healthful Diet and Physical Activity for Cardiovascular Disease Prevention in Adults Without Known Cardiovascular Disease Risk Factors: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. JAMA. 2017;318(2):175-93. doi: 10.1001/jama.2017.3303. PubMed PMID: 28697259.
9. Krist AH, Davidson KW, Mangione CM, Barry MJ, Cabana M, Caughey AB, et al. Behavioral Counseling Interventions to Promote a Healthy Diet and Physical Activity for Cardiovascular Disease Prevention in Adults With Cardiovascular Risk Factors: US Preventive Services Task Force Recommendation Statement. JAMA. 2020;324(20):2069-75. doi: 10.1001/jama.2020.21749. PubMed PMID: 33231670.
10. World Health Organization. Romania Physical Activity Factsheet 2021 | Sport (europa.eu). In: Communication DGf, editor.: European Commission; 2021.
11. Cucu MA, Cristea C, Matei E, Galan A, Ursu C, Dima C, et al. Raport National privind Starea de Sanatate a Populatiei Romaniei 2020 [National Report on Romanian Population Health Status 2020]. Bucharest: National Institute of Public Health, 2021 Contract No.: ISSN 2559 -2610, ISSN-L 2559-2610. Available at: https://insp.gov.ro/2021/12/29/raportul-national-al-starii-de-sanatate-a-populatiei-2020.
12. OECD/ European Observatory on Health Systems and Policies. Romania: Country Health Profile 2021. Paris/European Observatory on Health Systems and Policies, Brussels: 2021.

13. Inatitute for Health Metrics and Evaluation (IHME). GBD Compare. Seatle, WA:IHME, University of Washington, 2015. http://vizhub.healthdata.org/gbd-compare. (Accessed [08.01.2023])

14. National Health Insurance House. Raport anual 2016 [Annual Report 2016]. Bucharest: 2016. Available from: http://www.cnas.ro/page/rapoarte-de-activitate.html.

15. Romanian Ministry of Health, Romanian National Insurance House. Order no. 1068/627/2021 on the approval of the Methodological Norms for the application in 2021 of the Government Decision   s.l. : Officialy Monitor, 30 June 2021. Vol. 642. Available from: http://www.casan.ro/media/pageFiles/01.07.2021--Ordinul%20nr.%201.

16. National Health Insurance House. Raport annual 2017 [Annual Report 2017]. 2017. Available from: http://www.cnas.ro/page/rapoarte-de-activitate.html.

17. National Institute of Public Health, National Centre for Family Medicines Studies, Aliance for Fighting Against Alcoolism and Toxicomanies. Ghid de prevenție - Stilul de viață sănătos și alte intervenții preventive prioritare pentru boli netransmisibile, în asistența medicală primară [Preventive Guideline - Healthy life style and other priority preventiev interventions for non-communicable disease in primary health care). online: 2016.

18. [Online] © 2021 EUPAP, March 19, 2019. [Cited: December 3, 2021.] https://www.eupap.org/about. 2019.

19. Lundqvist S, Börjesson M, Cider Å, Hagberg L, Ottehall CB, Sjöström J, et al. Long-term physical activity on prescription intervention for patients with insufficient physical activity level-a randomized controlled trial. Trials. 2020;21(1):793. Epub 20200915. doi: 10.1186/s13063-020-04727-y. PubMed PMID: 32933577; PubMed Central PMCID: PMC7493144.

20. Lawlor DA, Keen S, Neal RD. Increasing population levels of physical activity through primary care: GPs' knowledge, attitudes and self-reported practice. Fam Pract. 1999;16(3):250-4. doi: 10.1093/fampra/16.3.250. PMID: 10439978.

21. Florindo AA, Mielke GI, Gomez GA, Ramos LR, Bracco MM, et al. Physical activity counseling in primary health care in Brazil: a national study on prevalence and associated factors. . 2013 Aug 31;13:794. BMC Public Health. 2013;13. doi: 10.1186/1471-2458-13-794. PMID: 24005006; PMCID: PMC3844313.

22. Wheeler PC, Mitchell R, Ghaly M, Buxton K. Primary care knowledge and beliefs about physical activity and health: a survey of primary healthcare team members. BJGP Open. 2017;1(2):bjgpopen17X100809. Epub 20170419. doi: 10.3399/bjgpopen17X100809. PubMed PMID: 30564660; PubMed Central PMCID: PMC6169952.

23. Chatterjee R, Chapman T, Brannan MG, Varney J. GPs' knowledge, use, and confidence in national physical activity and health guidelines and tools: a questionnaire-based survey of general practice in England. Br J Gen Pract. 2017;67(663):e668-e75. Epub 20170814. doi: 10.3399/bjgp17X692513. PubMed PMID: 28808077; PubMed Central PMCID: PMC5604830.

24. O'Brien S, Prihodova L, Heffron M, Wright P. Physical activity counselling in Ireland: a survey of doctors' knowledge, attitudes and self-reported practice. BMJ Open Sport Exerc Med. 2019;5(1):e000572. Epub 20190722. doi: 10.1136/bmjsem-2019-000572. PubMed PMID: 31423324; PubMed Central PMCID: PMC6677951.

25. Burdick L, Mielke GI, Parra DC, Gomes G, Florindo A, Bracco M, et al. Physicians', nurses' and community health workers' knowledge about physical activity in Brazil: A cross-sectional study. Prev Med Rep. 2015;2:467-72. Epub 20150610. doi: 10.1016/j.pmedr.2015.06.001. PubMed PMID: 26844104; PubMed Central PMCID: PMC4721435.

26. Ampt AJ, Amoroso C, Harris MF, McKenzie SH, Rose VK, Taggart JR. Attitudes, norms and controls influencing lifestyle risk factor management in general practice. BMC Fam Pract. 2009;10:59. Epub 20090826. doi: 10.1186/1471-2296-10-59. PubMed PMID: 19706198; PubMed Central PMCID: PMC2746183.

27. American College of Sport Medicine. Exercise is medicine. Health care providers' action guide. 2021. Available at https://www.exerciseismedicine.org/wp-content/uploads/2021/02/EIM-Health-Care-Providers-Action-Guide-clickable-links.pdf.

28. Silva CS, Mendes R, Godinho C, Monteiro-Pereira A, Pimenta-Ribeiro J, Martins HS, et al. Predictors of physical activity promotion in clinical practice: a cross-sectional study among medical doctors. BMC Med Educ. 2022;22(1):624. Epub 20220817. doi: 10.1186/s12909-022-03686-z. PubMed PMID: 35978358; PubMed Central PMCID: PMC9386999.

29. Ünsal Delialioğlu S, Mandıroğlu S, Göksel F. Awareness and attitudes of oncology physicians recommending exercise to patients with cancer. Turk J Phys Med Rehabil. 2022;68(1):70-5. Epub 20220301. doi: 10.5606/tftrd.2022.7120. PubMed PMID: 35949962; PubMed Central PMCID: PMC9305640.

30. Barton CJ, King MG, Dascombe B, Taylor NF, de Oliveira Silva D, Holden S, et al. Many physiotherapists lack preparedness to prescribe physical activity and exercise to people with musculoskeletal pain: A multi-national survey. Phys Ther Sport. 2021;49:98-105. Epub 20210219. doi: 10.1016/j.ptsp.2021.02.002. PubMed PMID: 33662892.

31. Dacey ML, Kennedy MA, Polak R, Phillips EM. Physical activity counseling in medical school education: a systematic review. Med Educ Online. 2014;19:24325. Epub 20140724. doi: 10.3402/meo.v19.24325. PubMed PMID: 25062944; PubMed Central PMCID: PMC4111877.

32. Hauer KE, Carney PA, Chang A, Satterfield J. Behavior change counseling curricula for medical trainees: a systematic review. Acad Med. 2012;87(7):956-68. doi: 10.1097/ACM.0b013e31825837be. PubMed PMID: 22622220; PubMed Central PMCID: PMC3386427.