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RESEARCH LETTER

How do General Practitioners assess physical activity and prescribe exercise in patients with different cardiovascular diseases? An Italian pilot study

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Current guidelines consistently underline physical activity's cardinal role in primary prevention, rehabilitation and secondary prevention in patients with cardiovascular diseases (CVDs).[1–3] Although exercise prescription guidelines are available,[4,5] the European Association of Preventive Cardiology (EAPC) EXPERT (Exercise Prescription in Everyday practice & Rehabilitative Training) working group recently observed a large variance in exercise prescription between clinicians involved in cardiovascular rehabilitation.[6] Thus, a digital training and decision support system for optimized exercise prescription, the EXPERT tool, was developed.[7,8]

Outside the rehabilitative setting, a key figure in healthcare who is involved in the long-term care and should thus be able to prescribe exercise for patients with cardiovascular diseases, besides cardiologists and sport medicine specialists, is the General Practitioner (GP). A recent call for action by the nucleus 'Primary Care and Risk Factor Management' of the EAPC addressed the need for investigating daily practice, identifying barriers for implementation and possible solutions to provide adequate prevention and treatment of CVD in primary care.[9] So far, little is known about whether physical activity counselling and exercise prescription is regularly provided and of sufficient detail to increase patients' physical fitness.[10] Thus, the aim of this pilot study was to analyse Italian GPs' clinical routine in prescribing physical exercise training in patients with cardiovascular risk factors and diseases.

A standardized survey was submitted to GPs, investigating their professional experience with high risk cardiovascular patients, if and how physical activity level was assessed during clinical routine, how exercise prescription was carried out and whether patients' compliance was verified in the long term.

Subsequently, GPs were requested to provide exercise prescriptions for four clinical cases (*Table 1*), specifying endurance exercise intensity (light, moderate, high, very high, high intensity interval training), number of weekly sessions (1 to >5 per week), duration of each session (<20 min to >60 min), additional types of exercise training (strength-, postural-, flexibility-, proprioceptive-training, electro stimulation, hand grip exercise, etc.) and total programme duration (4 weeks to >36 weeks). Finally, GPs were asked to evaluate their current exercise prescription skills as well as the usability of a digital decision support system for their clinical practice.

Of the 120 GPs that were contacted, 37% agreed to participate (70% males, median age 61.5, interquartile range (IQR) 8.3 years; median years of work: 30, IQR 14.8 years). Of these, 88.6% routinely assess the physical activity level during history taking, but only a minority performs or orders objective evaluations of physical performance such as exercise stress test (24%), cardiopulmonary exercise test (7.3%) or six minute walking test (7.3%). All GPs (100%) considered exercise prescription to be important in high-risk cardiovascular patients and, thus, 93% regularly prescribed physical activity/exercise training. However, only 15% provided recommendations in writing. Moreover, 80% declared to tailor exercise prescription to patients by determining the weekly frequency (76%), exercise time/duration (76%) and intensity (44%) of endurance training. Other quantifiable parameters, such as heart rate intensity range (34%) and total training programme duration (32%), were less specified. The

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Table 1 **Standardized patient cases together with guidelines-based exercise prescription.**

Case 1	Case 2	Case 3	Case 4
Age: 55 years	Age: 70 years	Age: 65 years	Age: 79 years
Body height: 160 cm	Body height: 182 cm	Body height: 165 cm	Body height: 170m
Body weight: 85 kg	Body weight: 80 kg	Body weight: 90 kg	Body weight: 59 kg
Sex: female	Sex: male	Sex: female	Sex: male
VO_2 max: 1600 ml/min, 18.8 ml/kg per min (108% of predicted normal value)	VO_2 max: 1500 ml/min, 18.7 ml/kg per min (73% of predicted normal value)	VO_2 max: 1450 ml/min, 16.1 ml/kg per min (90% of predicted normal value)	VO_2 max: 1250 ml/min, 21.2 ml/kg per min (88% of predicted normal value)
Resting HR: 102 beats/min	Resting HR: 52 beats/min	Resting HR: 52 beats/min	Resting HR: 56 beats/min
Peak exercise HR: 151 beats/min	Peak exercise HR: 112 beats/min	Peak exercise HR: 100 beats/min	Peak exercise HR: 111beats/min
Total cholesterol: 267 mg/dl	Total cholesterol: 189 mg/dl	Total cholesterol: 234 mg/dl	Total cholesterol: 178 mg/dl
Fasting glycaemia: 108 mg/dl	Fasting glycaemia: 102 mg/dl	Fasting glycaemia: 115 mg/dl	Fasting glycaemia: 125 mg/dl
Blood pressure: 115/72 mmHg	Blood pressure: 125/80 mmHg	Blood pressure: 135/75 mmHg	Blood pressure: 135/87 mmHg
Medication intake: statin, ACE- inhibitor, orlistat, antiplatelet, metformin, sulphonylurea	Medication intake: statin, anti- platelet, beta-blocker, digitalis, mucolytics, bronchodilators	Medication intake: beta-blocker, statin, exogenous insulin, nitrate, erythropoietin	Medication intake: beta-blocker, bronchodilator, anti-platelet
Co-morbidities: type 2 diabetes	Co-morbidities: heart failure with preserved ejection fraction, mild COPD	Co-morbidities: renal failure, type I diabetes	Co-morbidities: cachexia and frailty, COPD
Additional information: gonarthrosis present		Additional information: chronic aspecific low back pain	
Referred for: obesity	Referred for: AMI with CABG	Referred for: stable myocardial ischaemia (threshold at 87 beats/min)	Referred for: peripheral vascular disease
Intensity:	*Intensity*:	*Intensity*:	*Intensity*:
Moderate	Moderate	Moderate	Up to claudication threshold
HR 122–131 beats/min	HR 76–87 beats/min	HR 71–80 beats/min	
Session duration:	Session duration:	Session duration:	Session duration:
30 up to 60 min	20 up to 60 min	30 up to 60 min	20 up to 60 min
Frequency:	*Frequency*:	*Frequency*:	*Frequency*:
5 days/week	5 days/week	5 days/week	5 days/week
Minimal duration:	Minimal duration:	Minimal duration:	Minimal duration:
40 weeks	40 weeks	40 weeks	12 weeks
Strength training:	*Strength training*:	*Strength training*:	*Strength training*:
Yes	Yes	Yes	Yes
Additional training strategies:	Additional training strategies:	Additional training strategies:	Additional training strategies:
Additional isometric hand grip exercise training is advised	In the case of CABG surgery, strength training for the arm muscles is allowed only when the	Ending an exercise with HIT training is advised to prevent post-exercise hypoglycaemia	Nordic walking and arm cranking exercises may be promoted
			Additional isometric hand grip

Continued

Table 1 Continued

Case 1	Case 2	Case 3	Case 4
>900 kcal/week of energy expenditure should be achieved	sternum is stabilized Add inspiratory muscle training Additional isometric hand grip exercise training is advised Breathing exercises should be added >900 kcal/week of energy expenditure should be achieved	Additional isometric hand grip exercise training is advised Flexibility and balance exercises should be added >900 kcal/week of energy expenditure should be achieved	exercise training is advised Breathing exercises should be added Muscle electrostimulation, balance training may be added

Retrieved from Hansen et al., 2018.[6]
ACE: angiotensin-converting enzyme; AMI: acute myocardial infarction; CABG: coronary artery bypass graft; COPD: chronic obstructive pulmonary disease; HIT: high-intensity training; HR: heart rate

prescription of other recommended components of exercise training, such as flexibility exercises (12%), neuromotor exercises (7%) and strength training (5%), was also underutilized. Patients' compliance was referred to be verified in 88% of the cases; however, only a minority of GPs (12%) performed an objective medical evaluation. The majority of GPs (76%) only verbally verified compliance. Subsequently, 68% of the GPs adjusted exercise prescription during follow-up. Overall, more than 75% acknowledged clinical benefits of their exercise prescriptions on patients.

For the analysis of the exercise prescription skills of GPs by standardized clinical cases, 18 GPs dropped out of this study. The remaining GPs (n=26) showed a large range of inter-clinician variability of exercise prescription (*Figure 1*). When compared with guidelines, the prescription of exercise intensity and frequency was under-dosed. Furthermore, the single session duration showed a conservative approach, with the prescription of a generally limited time of exercise. Indeed, great heterogeneity emerged in the prescription of additional types of exercise and strength training was generally not prescribed, even though it was indicated in all cases. Moreover, adherence to guidelines was low and a too precautionary attitude toward exercise prescription was observed (*Figure 1*). GPs themselves evaluated their exercise prescriptions skills as insufficient. This is mirrored by the finding that 80% of GPs would welcome a guidelines-based digital decision support tool for everyday clinical practice.

Conclusions

Evidence-based exercise prescription is an essential element of CVDs' treatment. The collaboration of different health care figures and a comprehensive approach, with physical/fitness tests when appropriate, clearly written exercise prescription, behavioural support and regular follow-up, is fundamental. This study revealed that the cornerstone role of the exercise 'pill' in high-risk cardiovascular patients is acknowledged by only a minority of Italian GPs, which might indicate a lack of knowledge and interest in the topic. The small size of the final sample can give a generic, though presumably realistic, idea of the current situation in primary care, in which all aspects of exercise prescription are provided heterogeneously, and lack of standardization. The low adherence to guidelines is reflected by a too restrictive attitude toward exercise prescription, which is the result of the missing competence perceived by the GPs and the need for further specific training. Providing healthcare professionals with a guideline-based digital decision support system and training tool might be a valuable add-on strategy.

Future directions

Our pilot study identifies the need to support GPs by providing specific education and training on current exercise guidelines, addressing barriers in their clinical practice and reinforcing motivation and understanding regarding the importance of physical exercise in the management of chronic diseases. Thus, GPs' competences in medical exercise prescription must be improved, also considering the assistance of guideline-based digital decision support systems like the EXPERT tool. Subsequently, it should be analysed how this affects exercise prescription and guideline adherence. It is expected that this

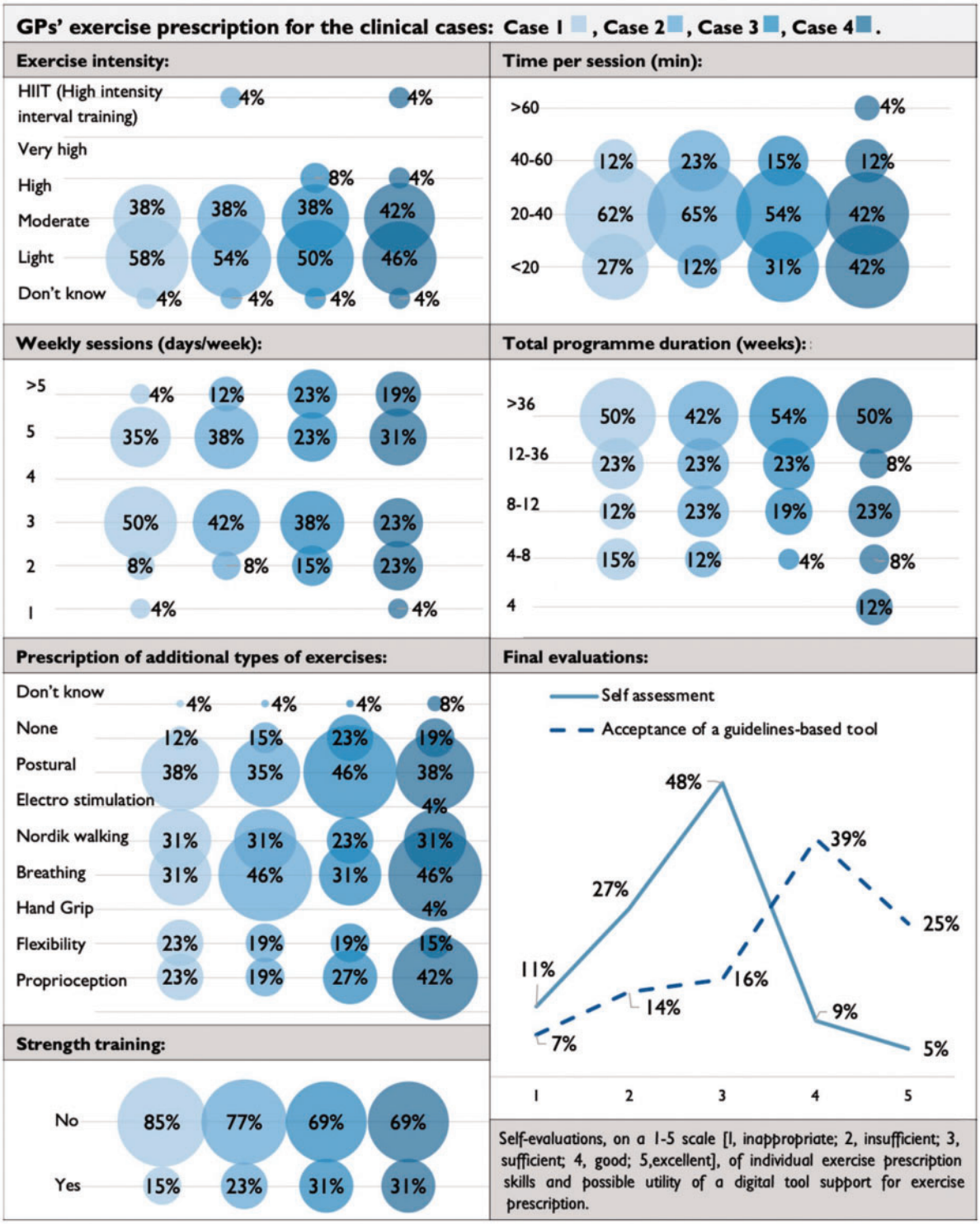

Figure 1 Inter-clinician variance in exercise prescription for the four standardized clinical cases. Evaluations of individual exercise prescriptions skills on a 1–5 scale, and of utility and possible acceptance of a guideline-based digital tool. GP: General Practitioner

would lead to standardized exercise prescription and to wider promotion of this highly effective treatment option for patients with cardiovascular risk/disease.

Author contribution

On behalf of the EAPC EXPERT working group, who contributed to the conception/design of this study and supported the writing process. The Sport and Exercise Medicine Division of the University of Padova performed this trial, including data acquisition, analysis and interpretation. Author to whom requests for reprints: the corresponding author.

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