

The use of a standardized pre-participation physical examination form in Turkish adolescent athletes

Hakan Yaman, MD, MS, Halil Ozbas, MD, Fusun Toraman, MD, Aylin Yaman, MD.

ABSTRACT

Objectives: The pre-participation physical examination (PPE) has become the standard of care for athletes of all ages. The PPE is generally intended to identify medical conditions that may affect safe and effective participation in organized sports. The aim of this study is to validate and to implement a standardized questionnaire in Turkish language, which might aid Turkish physicians during the PPE.

Methods: A total of 1350 athletes visiting the yearly PPE of the Directorate of Sports and Youth in Isparta, Turkey were asked to participate in this study between October 2001 and November 2001. Eight hundred and ten (60%) students accepted to fill out the questionnaire. A self-reported questionnaire that includes 2 parts has been administered. The first part included questions on socio-demographics. Second part is a translated PPE evaluation form. The questionnaire has been piloted in 15 adolescent students. Athletes have been examined afterwards by one of the medical practitioner and he used the questionnaire (PPE Evaluation Form) to identify additional problems in each athlete.

Results: Participants were predominantly male, with

higher family income and social security, active at an amateur level, participated in team, and in contact sports. Internal consistency of the PPE form was Cronbach alpha=0.69. Thirty-one (3.8%) athletes had significant findings that needed further evaluation. No one was disqualified after follow-up. Eight items, which asked for certain cardiovascular risk factors, had significant relation to cardiovascular findings of PPE [Chi-Square (1) = 7.4-99.6, $p < 0.01$]. An additional 132 (16.3%) athletes had significant problems that never had been adequately evaluated or treated but which were not likely to affect safe sports participation.

Conclusion: The Turkish PPE form seems to be promising tool to support the physician during PPE. Using a standardized and valid PPE tool might diminish the dependency of primary care physicians to technological equipment, which are mostly not available in developing countries' primary health care settings and would also reduce the costs of PPE, which might not be affordable for athletes without social security.

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The pre-participation physical examination (PPE) has become the standard of care for athletes of all ages and is generally intended to identify medical conditions that may adversely affect participation in sports.¹⁻³ The American Medical Association (AMA) Group on Science and Technology indicated that every physician should seek to complete 2 main objectives during the PPE:

1) to identify those athletes who have medical conditions that place them at substantial risk for injury or sudden death and disqualify them from participation or ensure they receive adequate medical treatment before participation and 2) to not disqualify athletes unless there is a compelling medical reason.¹ Similar objectives were suggested by the PPE Task Force, a group established by the

From the Department of Family Medicine (Yaman H.), Medical Faculty, School of Physical Education and Sports (Toraman), Akdeniz University, Department of Neurology (Yaman A.), State Hospital, Antalya, and the Emergency Department (Ozbas), Children and Birth Hospital, Isparta, Turkey.

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Address correspondence and reprint request to: Dr. Hakan Yaman, Associate Professor, Department of Family Medicine, Faculty of Medicine, University of Akdeniz, Antalya, Turkey. Tel. +90 (242) 2274343. Fax. +90 (242) 2274490. E-mail: hakanyaman@akdeniz.edu.tr

American Academy of Family Physicians, American Academy of Pediatrics, American Medical Society for Sports Medicine, American Orthopedic Society for Sports Medicine, and American Osteopathic Academy of Sports Medicine.³ These objectives were a) to detect conditions that may predispose to injury, b) to detect conditions that may be life threatening or disabling, and c) to meet legal and insurance requirements.

While the effectiveness of the PPE in detecting serious physical abnormalities has been shown,⁴ Assessing fitness level, determining general health, counseling and health education are accepted as the secondary objectives of the PPE.² The medical history contributes significantly to any participation decision. A complete history is expected to identify approximately 75% of problems that affect athletes.^{5,6} The PPE Task Force has developed a history form that emphasizes the areas of greatest concern for sports participation. This format has also been found to greatly increase the implementation of preventive counseling or care by the physician in non-PPE settings.⁷ The PPE serves as an opportunity when many of these risk factors might be addressed.² Although the PPE is not intended to substitute for an athlete's regular health examination, previous data demonstrate that more than 78% of athletes use the PPE as their only health care contact with a physician or other health care provider during the year.^{5,6} Anecdotal observations indicate that PPE might also be the only visit-doctor for preventive health services in adolescents.⁷ Lack of health insurance coverage, a personal (family) physician, and screening services for the adolescents might be further reasons for that. On the other hand, problems with PPE still exist. A certificate of PPE can be obtained from any health institution, standardization of PPE is lacking and most physicians working in these institutions are not trained for PPE.⁸

The purpose of this study was to validate and to implement a standardized questionnaire in Turkish language, which might aid Turkish physicians during the PPE.

Methods. A total of 1350 athletes consecutively visiting the yearly PPE of the medical outpatient clinic of the Directorate of Sports and Youth in Isparta, Turkey, were asked to participate in this study between October 2001 and November 2001 (Table 1).

Questionnaires were administered to students with a request to fill them out before the PPE. Eight hundred and ten (60%) students accepted to fill out the questionnaire. Those who did not explained this to be due to having no time for this procedure.

A self-reported questionnaire included 2 parts. First part had questions on socio-demographics, family income (high, medium, low), type of social security, activity level, sports type, training duration in years and monthly training duration. Second part included a questionnaire (PPE Evaluation form), which was forward to translation office to translate it into Turkish language by 3 native Turkish-speaking translators. Back translation was performed by one fluently English-speaking translator who was not allowed to see the original. The questionnaire has been piloted in 15 adolescent students. After the linguistic validation, the questionnaire was carried out, all students filled out the questionnaire under the same conditions and explained to them the aim and method of filling out the questionnaire.

The PPE Evaluation Form has been recommended for routine use during PPE by PPE Task Force in 1997.⁹ While 3 items recommended by American Heart Association (AHA) were not included, using this form may help especially primary care physicians to make a thorough cardiac examination during PPE¹⁰ (*Appendix 1 and 2). Athletes have been examined afterwards by one medical practitioner and he used the questionnaire (PPE Evaluation Form) to identify additional problems in each athlete.

Statistical analyses. Characteristics of the respondents and PPE Evaluation form results were presented as mean \pm SD and with a range or with frequency and percentage. The reliability of the

Table 1 - Participants' socio-demographic.

Socio-demographic	n (%)
Mean age (years)	14.1 \pm 2.11 (10-24)
Gender	
Male	476 (59.1)
Female	330 (40.9)
Family income	
Lower level	219 (27)
Medium level	225 (27.8)
Higher level	366 (45.2)
Social security	
Yes	507 (89.4)
No	60 (10.6)
Activity level	
New beginner	146 (26.1)
Amateur	330 (58.9)
Professional	84 (15)
Sports type	
Team sports	484 (59.8)
Individual sports	326 (40.2)
Sports type	
Contact	528 (65.2)
Non-contact	282 (34.8)
Training duration (months)	10.4 \pm 4.41 (1-18)
Monthly training duration (hours)	21.9 \pm 11.85 (2-24)

*The full text including Appendices 1 to 3 is available in PDF format on Saudi Medical Journal website (www.smj.org.sa)

questionnaire was evaluated by determining its internal consistency using Cronbach's alpha coefficient. The following statistical package was used in statistical analysis of data: SPSS (Version 10, SPSS Inc. Chicago, Illinois, USA). The level of significance was =0.05.

Results. **Table 1** shows the socio-demographic of the participants, which includes the family income, social security, activity level and so forth. Internal consistency of the PPE form was at a medium-high level (Cronbach alpha=0.69). Answers to the PPE form are presented in ***Appendix 3**. Thirty-one (3.8%) athletes had significant findings that needed further evaluation before safe sports participation might be possible (**Table 2**). No one was disqualified after follow-up. Eight items, which looked at certain cardiovascular risk factors (refer to items 8-14 and 16 in **Table 2**), had significant relation to cardiovascular findings of PPE [Chi-square (1) = 7.4-99.6, $p < 0.01$]. On the other hand, items concerning musculoskeletal injury (Items 30-32) overestimated musculoskeletal conditions, because only 5 (0.6%) of participants, who claimed musculoskeletal problems, were referred for further evaluation. Additional 132 (16.3%) athletes had significant problems that never had been adequately evaluated or treated, but which were not likely to affect safe sports participation (**Table 3**). All participants were cleared to play, but the athletes and their families were informed on the problems and appropriate follow-up plans were recommended.

Discussion. Our study showed, that the Turkish version of PPE form has a medium-high level reliability (internal consistency). This form might therefore aid Turkish physicians gather reliable data concerning their yearly PPEs. The PPE Task Force,⁹ released a guidelines, which establishes the minimum content for PPEs and provides an outline regarding appropriate steps in the PPE. No optimal method of delivery of PPEs is endorsed. If the athlete's history and physical examination findings raise suspicion, further diagnostic work-up is recommended. According to this monograph a PPE form (***Appendix 1 & 2**) is included, which could be used by physicians. Use of the current PPE form can help ensure that examining physicians consider certain components of the cardiac evaluation recommended by the PPE Task Force.¹⁰ Nevertheless, the form is valid according to expert opinion, but no reliability analysis has yet been performed on this form.

Detecting physical conditions, serious enough to limit athletic participation, may include acute, recurrent, chronic, untreated, or inadequately treated injuries or medical problems.¹ However, such conditions are detected arbitrarily by physicians.¹¹ The rates of clearance (84.8-96.6%), clearance with follow-up (3.1-13.9%) or full restriction (0.2-2.6%) do vary in different studies.¹²⁻²¹ Our findings were within these ranges, except the full restriction rate. No athlete was restricted for full participation during our PPE. The low yield of pathological cardiac abnormalities from screening questioned the usefulness of the cardiac component of PPE.¹⁰

Table 2 - Athletes referred for further evaluation before participation (N=810).

Problems	n (%)
Medical problems	
Possible anemia	12 (1.5)
Hypertension (diastolic BP >90)	4 (0.5)
Possible pathologic heart murmur	3 (0.4)
Possible cardiac dysrhythmia	2 (0.3)
Convulsion disorder	2 (0.3)
Poorly controlled asthma	2 (0.3)
Undescended testis	1 (0.1)
Orthopedic problems	
Patellofemoral pain	1 (0.1)
Possible meniscus lesion	1 (0.1)
Possible ACL rupture	1 (0.1)
Ankle pain with effusion	2 (0.3)
Total	31 (3.8)

Table 3 - Athletes with significant problems cleared to participate (N=810).

Problems	n (%)
Vision	75 (9.3)
History of concussion	34 (4.2)
Constitutional delay	7 (0.9)
Scoliosis	6 (0.7)
Acute upper respiratory infections	5 (0.6)
Convulsion disorder	2 (0.3)
Poorly controlled asthma	2 (0.3)
Undescended testis	1 (0.1)
Total	132 (16.3)
21 (2.6%) patients had moderately severe musculoskeletal problems to be watched	

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Unfortunately, no cost-effective battery of tests to identify and most dangerous cardiovascular conditions is available.¹¹ Various screening methods for sudden cardiac death have been investigated, but no clear-cut cost-effective method could be determined.¹⁰ Because of heightened concern on sudden death in athletes, the AHA issued recommendations in 1996 for the cardiovascular component of the PPE. It is considered as the most practical and best available strategy for screening large populations of athletes.²² Three items are not included on the PPE form (namely family history of heart disease, heart murmur and the physical stigmata of Marfan's syndrome) that recommended by the AHA.²² Usage of the current PPE form can help ensure that examining physicians consider the following components of the cardiac evaluation recommended by the PPE Task Force.¹⁰ In our study, 8 of 10 items concerning cardiovascular problems significantly predicted cardiovascular examination findings of the PPE, which confirms the statements above. Pre-participation screening of athletes is obligatory in Turkey and every health care setting is allowed to perform this examination. However, the PPE may fulfill other objectives as well. In relation to direct patient care, it allows physicians to assess overall physical health and provides an opportunity for preventive medical services.¹¹ In our study population, the PPE helped to uncover undiagnosed conditions. Since periodic health examinations are not regularly performed in primary health care settings in Turkey, participants had been diagnosed for health problems such as anemia, hypertension, eye problems, skin problems, musculoskeletal problems and so forth during their PPE.

In conclusion, the Turkish PPE form seems to be promising tool to support the physician during PPE. The lack of a standardized and valid PPE for athletes is also evident in developed countries;¹² and every effort should be made to overcome this limitation. Morbidity and mortality rates in athletes need to be diminished. In countries where a periodic health examination is missing, PPE should also be used as an opportunity to screen children and adolescents for general health conditions. Using a standardized and valid PPE tool might diminish the dependency of primary care physicians to technological equipment, which are mostly not available in developing countries' primary health care setting and would also reduce the costs of PPE, which might not be affordable for athletes without social security.

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