ORIGINAL ARTICLE

Assessment of the operation of a pilot program of preventive medicine for adults in three primary care centers of Athens and Piraeus: a cross-sectional study

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Summary

Objective. *To evaluate the operation of the pilot Program of Preventive Medicine for Adults (PPMA) from the provision of healthcare services in three primary health care centers of Athens and Piraeus (Greece).*

Design. An observational, cross-sectional study was undertaken. A structured questionnaire was used to collect data.

Setting. *Three public primary health centers of Athens, Greece.*

Participants. 142 participants, 40-55 years of age, with no previously identified/diagnosed health issues (overall healthy) that should not have undergone any type of screening in the past 12 months.

Measures and results. *The majority of participants were female (75.4%), aged 40-45 years (43.7%), Greek nationals (88%),*

employed (62.7%) and high school graduates (52.8%). 68.3% of participants scheduled an appointment in the first two days and 58.9% waited up to 5 minutes in the waiting room. The paramedical personnel scored higher evaluation (4.94) than the doctor (4.61), but all health care centers received a very high general evaluation (4.87). Multiple linear regression showed significant association between the evaluation of the pilot PPMA, the evaluation of health visitor/nurse (B = .240) and the communication of results to participants (B = .245).

Conclusions. *Findings show an extremely positive evaluation of the pilot PPMA, a result that can be used by healthcare managers for the expansion of the screening program to the general population.*

Introduction

In Greece evidence shows that metabolic syndrome (MetS) affects 20-30% of the adult population [1], meanwhile 98 per 100,000 persons die each year from chronic heart disease and 200 per 100,000 persons die from malignant neoplasms [2]. Lifestyle and family history have been shown to contribute to the development of both acute and chronic disease [3]. Health Screening Programs are the most important aspects of prevention, representing basic tools of modern public health, aiming at early detection of disease [4]. Several screening programs have been implemented over the years worldwide for targeting risk factors and specific populations at risk [5, 6]. Preventive medicine and screening have gained a growing interest in Greece with the Ministry of Health launching in 2008 the National Plan of Action on Public Health, aiming at the effective protection and health promotion, through measures, programs, structures and new prevention strategies [7]. In Greece there are organizational barriers in the provision of screening services, with only a small percentage of the Greek population receiving screening [8]. There are only few nationwide screening programs for cancer or chronic diseases [9-13] and few more local programs in rural areas [9, 11], so preventive screening uptake is low, making timely treatment problematic.

Due to the lack of a nationally organized invitational screening programs, screening is carried out mostly on the advice of general practitioners (GP) or based on the individual's request. In this context, in 2009 the pilot Program of Preventive Medicine for Adults (PPMA) was established by the National Organization for Healthcare Provision (EOPYY) providing primary health care to citizens aged 40-55 years. The program aims to raise awareness among citizens regarding annual screening for the early diagnosis of diseases such as heart disease, malignant neoplasms, metabolic syndrome and their effective management.

To our knowledge, no national or international study to date has evaluated the operation of the PPMA and aimed to analyse which from the health services offered within this primary health care program of EOPYY are important for its evaluation. Program evaluation permits to identify program strengths, weaknesses, and areas for improvement.

Materials and methods

DESIGN

An observational, cross-sectional study was undertaken to evaluate the operation of the pilot PPMA. The study

took place in primary health care centers of Athens and Piraeus (primary health care centers of Kallithea and Peristeri in Athens and Agia Sofia in Piraeus), densely populated districts of the capital and the largest seaport of Greece, covering approximately 300,000 citizens (according to the 2011 census). A questionnaire was specifically developed for data collection.

ETHICAL CONSIDERATIONS

The study was approved by the Department of Prevention and Health Promotion of EOPYY (protocol number 3917).

DESCRIPTION OF PILOT PROGRAM OF PREVENTIVE MEDICINE FOR ADULTS (PPMA)

Each primary health care center had a physician or a cardiologist, a midwife and a health visitor (healthcare professional who deals mainly with the protection and promotion of health for the most vulnerable population groups) or nurse. The midwife and health visitor or nurse worked mainly by protocol. The doctor met with participants for counselling and health promotion activities, with the exception of the Kallithea health care center where the physician had minimal involvement unless a medical problem occurred. The program offers participants annual screening including clinical assessments and laboratory tests. Eligible participants should be between 40-55 years of age, overall healthy and should not have undergone any type of screening in the past 12 months. Exclusion criteria were a recorded diagnosis of hypertension, diabetes, cardiovascular disease, thyroidopathy, hyperlipidaemia, prostatitis and anaemia. Participants who met the inclusion criteria were scheduled to undergo the recommended screening tests which included: Cell Blood Count (CBC), urine analysis, erythrocyte sedimentation rate (ESR), thyroid stimulating hormone (TSH), lipid panel screening, urea, fasting blood sugar and electrocardiogram. Women also received a mammography and Pap smear and men received a prostate-specific antigen test (PSA). Demographic characteristics, anthropometric, clinical data and test results for all participants were obtained by a health visitor/nurse then registered on the participant's medical record so that the doctor could make a medical evaluation. If during the screening a medical problem was discovered the participant was referred to the appropriate specialty for further evaluation and treatment (Fig. 1).

PARTICIPANT RECRUITMENT

The target population comprised participants who were already taking part in the program and had completed the entire screening process. Participants were informed about the program only through announcements in the primary health care centers or through relatives and friends. Assuming an effect size $(f^2) = 0.2$, α error probability = 5%, statistical power = 95% and number of predictors = 6, an a priori power analysis using the G power software (version 3.1) [14] revealed that data would have to be collected from N = 111 participants. Overall 149 people had verbally consented to participate in this

Fig. 1. Flow diagram of P.P.M.A program operation, showing the steps each participant is to take.
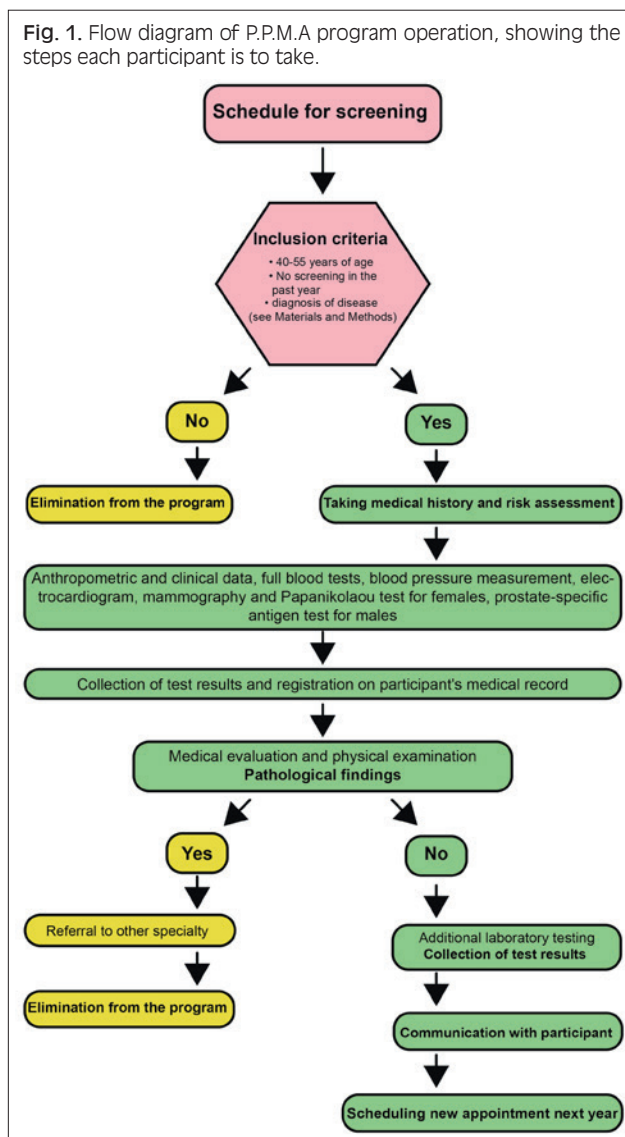
study, 7 participants left the questionnaires incomplete. In total, 142 respondents, 50 participants from Kallithea, 50 from the Peristeri health care center and 42 from Agia Sophia, who completed the questionnaire were included in quantitative analysis. The overall response rate was 95.3%.

PROCEDURE AND DATA COLLECTION

A structured questionnaire for patients was developed to evaluate primary care in a number of key areas ranging from the access to care, the helpfulness of visitors/nurses, the doctors' communication skills and overall program evaluation on validated questionnaires used in primary care in Greece, UK, US and Europe [15-17].
To increase confidence a pre-study evaluation of the questionnaire (with 5 patients, 2 nurses and 1 physician) was performed to test validity in terms of language and understanding. The questionnaire consisted of 37 questions and was divided into four sections: sociodemographic features, ease of access to the program, attitude of health care personnel and general program

evaluation. The majority were closed-ended questions using five-point Likert scale, ranging from 1 (very dissatisfied), 2 (dissatisfied), 3 (undecided), 4 (satisfied), 5 (very satisfied), so that higher scores indicate greater satisfaction. The remainder were in yes/no format and multiple choice questions based on guidelines reported in other studies [16, 18]. Evaluation of health visitor/nurse and evaluation of doctor is defined as the participant's opinion about the existence of good communication, courtesy and concern of the health visitor/nurse and the doctor with participant's questions/worries. The evaluation of the pilot PPMA is defined as the participant's opinion about organizational structure, accessibility to the program, physical environment, ease of arranging appointment(s) and good service attitude. Each participant who had completed the entire screening process was interviewed after visiting the physician. The interviews took 10 to 15 minutes on average to complete and were scheduled on specific days. The primary author (T.M) of this study collected the data independently. No monetary benefit was given to the respondents for participation in this study.

STATISTICAL ANALYSIS

Statistical analysis was carried out with SPSS (Version 22.0. Chicago: SPSS Inc.). A descriptive analysis for categorical variables was carried out using Pearson's Chi-square test, to evaluate the associations between each health care center. The results are presented as counts and percentages. Continuous variables were expressed as means and standard deviation (SD) using analysis of variance (ANOVA) for measuring the difference between means. To identify which variable(s) is the best predictor of the evaluation of the pilot PPMA, a standard multiple linear regression analysis was performed including variables whose association were significant at a value P < 0.2. After excluding collinearity, the best subset of variables was selected. The predictor (independent) variables for this study were demographic characteristics (age and gender), attention and interest of health visitors/nurse, evaluation of doctor, communication of results to participants and evaluation of health visitor/nurse. The evaluation of the pilot PPMA was the dependent variable. The statistically significant threshold was set at .05 probability value.

Results

CHARACTERISTICS OF THE PARTICIPANTS

Most participants were female (75.4%), aged 40-45 years (43.7%), Greek nationals (88%), married (78.2%), employed (62,7%) and high school graduates (52.8%). In addition, we found a significant association between the 3 primary health care centers and participant characteristics: nationality (X^2 = 19.918, p < .001, Cramer's V = .375), age (X^2 = 14.289, p = .006, Cramer's V = .224) and gender (X^2 = 8.086, p = .017, Cramer's V = .239) (Tab. I).

Concerning access to the program, 68.3% of participants scheduled an appointment in the first two days, while 58.9% declared a waiting time in the waiting room of up to 5 minutes. Moreover, all participants totally agreed (100%) that they will continue undergoing screening and that they will recommend the program to family and friends. The majority of participants (66.4%) learned about the program through friends and relatives, while a smaller number of participants (9.4%) were informed by their doctor (Tab. 2). With regards to the counselling, the participants declared that they preferred the doctor to perform health promotion counselling (43.7 %), where it was available (see discussion) or health visitor/nurse (48.6%) (Tab. II). Moreover, we found a significant association between the 3 primary health care centers and the amount of waiting time (X^2 = 16.687, p < .001, Cramer's V = 0.342) and the health promotion counselling (X^2 = 45.806, p < .001, Cramer's V = .401).

Concerning the attitude of the health care personnel, analysis of variance showed greater satisfaction with the health visitor/nurse of Kallithea and Peristeri. Participants stated that they received more attention and interest and that the health visitors/nurses in these centres were more capable, available and helpful compared to the health professionals at Agia Sofia (Tab. III). The doctor of Agia Sophia received the highest score (4.90) in the doctor's evaluation and the doctor of Peristeri the lowest (4.32). There was no statistically significant difference in the general evaluation of the pilot PPMA between the primary health care centers. Allhealth care centers received very high evaluation showing impressive satisfaction rates from the operation of the pilot PPMA.

Multiple linear regression was used to identify independent determinants of the evaluation of the pilot PPMA (Tab. IV). The results of linear regression revealed attention and interest of health visitors/nurse, evaluation of doctor, gender and age not to be statistically significant predictors to the model (p > .05). However, the results of multiple linear regression analysis revealed a statistically significant association between communication of results to participants and evaluation of health visitor/nurse (R^2 = .355, adjusted R^2 = .326, F (6, 135) = 12.381, p < .001).

Discussion

The aim of the current study was to evaluate the operation of the pilot PPMA organized by EOPYY in 3 primary health care centers of Athens and Piraeus. To the best of our knowledge, the present study is the first to evaluate the operation of the program. The results of our study demonstrate great evaluation of participants regarding access to the program. Most participants were informed about the program from family and friends with only a small number referred by their doctor. Research has shown that Greek doctors have limited awareness of screening [19] so it is crucial to educate physicians in using effective strategies for the implementation of prevention [13]. Also, protocols and guidelines should be established to improve doctors screening attitudes [20].

Tab. I. The sociodemographic characteristics of the participants of the pilot Program of Preventive Medicine for Adults (PPMA) in the 3 different Primary health care centers, N (%).

Demographic characteristics		Primary health care centres						
		Kallithea	Peristeri	Agia Sophia	Total	p-value[a]	X²-value	Cramer's V -value
Gender						.017	8.086	.017
	Male	19 (13.4)	7 <(4.9)	9 (6.3)	35 (24.6)			
	Female	31 (21.8)	43 (30.3)	33 (23.2)	107 (75.4)			
Age in years						.006	14.289	.224
	40 - 45	15 (10.6)	21 (14.8)	26 (18.3)	62 (43.7)			
	46 - 49	21 (14.8)	19 (13.4)	11 (7.7)	51 (35.9)			
	50+	14 (9.9)	10 (7.0)	5 (3.5)	29 (20.4)			
Nationality						<.001	19.918	.375
	Greek	36 (25.4)	50 (35.2)	39 (27.5)	125 (88.0)			
	Other	14 (9.9)	0	3 (2.1)	17 (12.0)			
Educational level						.342	8.995	.178
	Read and write	3 (2.1)	3 (2.1)	3 (2.1)	9 (6.3)			
	Elementary	6 (4.2)	5 (3.5)	7 (4.9)	18 (12.7)			
	High school graduates	29 (20.4)	28 (19.7)	18 (12.7)	75 (52.8)			
	University/college graduates	8 (5.6)	11 (7.7)	5 (3.5)	24 (16.9)			
	Master or PhD	4 (2.8)	3 (2.1)	9 (6.3)	16 (11.3)			
Occupational status						.091	4.796	0.183
	Employed	37 (26.1)	30 (21.1)	22 (15.5)	89 (62.7)			
	Unemployed[b]	13 (9.2)	20 (14.1)	20 (14.1)	53 (37.3)			
Marital status						.207	3.142	0.148
	Married	35 (24.6)	42 (29.6)	34 (23.9)	111 (78.2)			
	Not in relationship[c]	15 (10.6)	8 (5.6)	8 (5.6)	31 (21.8)			

All respondents agreed that they will continue undergoing screening and that they will recommend the program to family and friends. Research findings show substantial benefits from undergoing annual examinations especially with patients receiving lipid screening and gynaecological screening [21, 22]. Communication of health results and health promotion could be performed by nurses or health visitors due to the confidence, proximity and comfort participants feel for them [23]. Our study revealed a higher satisfaction rate for the health visitors/nurses than with doctors. Participants stated that they received more attention and interest from the paramedical personnel (midwives, health visitors and nurses). The negative rating of the doctor's evaluation could possibly be attributed to the lack of time due to part-time occupation and/or lack of interest.

Despite the relatively low evaluation of the program's doctor in our study, participants gave great evaluation for the operation of the pilot PPMA as a whole in all three primary health care centers. This is attributed to the courtesy of personnel, the provision of free screening tests and ease of appointments. The latter confers with findings from other studies showing that participants will evaluate health care services with high scores provided they are satisfied with the organizational structure, the waiting room, the waiting time and the behaviour of the health care personnel [24, 25]. Importantly, using a multiple linear regression analysis in order to identify variables important for the evaluation of the program, demonstrated that the communication of results to participants and evaluation of health visitor/nurse were associated with higher general evaluation of the PPMA from the participants.

The present study has certain limitations. The survey

Tab. II. Different parameters of the pilot Program of Preventive Medicine for Adults (PPMA) in the different Primary health care centers, N (%).

Parameters		Primary health care centers						
		Kallithea	Peristeri	Agia Sophia	Total	*p*-valuea	X^2-value	*Cramer's V* -value
Access to the program						.311	2.337	0.128
	0-2 days	31 (21.8)	38 (26.8)	28 (19.7)	97 (68.3)			
	More than 3 days	19 (13.4)	12 (8.5)	14 (9.9)	45 (31.7)			
Waiting time						<.001	16.687	0.342
	Up to 5 minutes	27 (19.1)	21 (14.9)	35 (24.8)	83 (58.9)			
	More than 5 minutes	23 (16.3)	28 (19.9)	7 (5)	58 (41.1)			
Continue screening and recommend the program						-	-	-
	Yes	50 (35.2)	50 (35.2)	42 (35.2)	142 (100)			
	No							
Information for the program's operation						.257	5.3021	0.143
	Relatives/ friends	32 (25)	35 (27.3)	18 (14.1)	85 (66.4)			
	Internet/ public health social media campaigns	12 (9.4)	11 (8.6)	8 (6.3)	31 (24.2)			
	Doctor	4 (3.1)	2 (1.6)	6 (4.7)	12 (9.4)			
Health promotion counseling						<.001	45.806	.401
	Doctor	5 (3.5)	15 (10.6)	42 (29.6)	62 (43.7)			
	From the health visitor/ nurse	44 (31)	25 (17.6)	0 (0)	69 (48.6)			
	From both	1 (0.7)	10 (7)	0 (0)	11 (7.7)			

was conducted in only 3 of the 6 primary health care centers where the program runs including non-randomly selected participants. The selection of the health care centers was made taking into account the attendance rate in each health care center and the long-distance travel from Athens due to funding constraints. The participants were interviewed on a scheduled day when the rate of appointment was higher. Due to the lack of random selection it is difficult to generalize findings. Bias also may arise from the gratitude and satisfaction participants feel towards the health care personnel resulting in skewed values. We must also consider the probability of bias arising from the participants that were eliminated from the program, due to the inclusion/exclusion criteria, that may change the general evaluation rate. Despite these limitations this study is the first to evaluate the operation of the pilot PPMA and it is worth mentioning the really high rate of positive response. In Greece implemented prevention focuses mainly on cancer screening programs. The operation of this program is innovative due to the coverage of a wider range of diseases, so the benefit for citizens is greater. Additionally, in the current years of economic crisis, free of charge screening is considered a blessing for low- and middle-class population. These findings are valid and should be taken into account for the implementation of the program in larger general population groups.

Conclusion

The findings of the current study demonstrate high evaluation both for the operation of the pilot PPMA and the health care personnel in the all health care centers and the desire for continuation of the screening program on a general basis. In Greece the attendance rate in screening programs is extremely low due to the lack of centralized invitation system, guidelines and protocols and the reduced interest of primary care doctors for prevention. The results of our study can be used to inform preventive medicine program managers about the benefits of the program for the general population so it could lead to nation-wide implementation providing free or low-cost screening and should emphasize the contribution of health visitors and nurses in the successful operation and its acceptance.

Acknowledgements

Tab. III. Comparison of mean and standard error of participants' satisfaction in the 3 different Primary health care centers.

Attention and interest of health visitors/nurse					
	N	Mean	SD	F	*p*-value
Kallithea	50	4.94	.240	6.788	.002
Peristeri	50	4.92	.274		
Agia Sophia	42	4.69	.517		
Total	142	4.86			
Capability of health visitors/nurse					
	N	Mean	SD	F	*p*-value
Kallithea	50	4.92	.274	3.222	.042
Peristeri	50	4.84	.370		
Agia Sophia	42	4.71	.508		
Total	142	4.83			
Availability and helpfulness of health visitor/nurse					
	N	Mean	SD	F	*p*-value
Kallithea	50	4.94	.240	5.521	.004
Peristeri	50	4.88	.328		
Agia Sophia	42	4.69	.517		
Total	142	4.84			
Evaluation of health visitor/nurse					
	N	Mean	SD	F	*p*-value
Kallithea	50	4.98	.141	0.798	.452
Peristeri	50	4.90	.416		
Agia Sophia	42	4.93	.342		
Total	142	4.94			
Evaluation of doctor					
	N	Mean	SD	F	*p*-value
Kallithea	50	4.66	.772	5.793	.004
Peristeri	50	4.32	1.115		
Agia Sophia	42	4.90	.370		
Total	142	4.61			
Evaluation of the pilot P.P.M.A					
	N	Mean	SD	F	*p*-value
Kallithea	50	4.96	.198	1.924	.150
Peristeri	50	4.82	.482		
Agia Sophia	42	4.83	.437		
Total	142	4.87			

Tab. IV. Multiple regression of evaluation of the pilot P.P.M.A.

Predictor (IV)	B [95% CI]	β	Sr²
Attention and interest from health visitors/nurse	.053 [-0.130, 0.236]	.050	.002
Age	.007 [-0.006, 0.021]	.077	.008
Gender	.096 [-0.030, 0.222]	.106	.016
Evaluation of Doctor	-.007 [-0.030, 0.222]	-.034	.019
Evaluation of health visitor/nurse	.240 [0.150 ,0.330]**	.429	.171
Communication of results to participants	.245 [0.065, 0.425]**	.230	.051

Note: B and β indicate Unstandardized and Standardised Regression Coefficient, respectively. sr² indicates Squared Semi-Partial Correlations. CI = confidence interval
*p < .05. **p < .01.

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Conflict of interest statement

The authors declare no conflict of interest.

Authors' contributions

TM and AA conceived of the presented study. TM design the questionnaire and collect the data. AA performed the computations and supervised the findings of this work. All authors discussed the results and contributed to the final manuscript.

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