

PREDICTORS OF SCREENING PROGRAMS ADHERENCE: REPORT OF A POPULATION BASED STUDY IN SHIRAZ, IRAN

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ABSTRACT

Background: Screening allows early detection of diseases or the predisposing factors, and has the potential for improved treatment and reduction of probable mortalities, if followed by acceptable and appropriate treatment.

Aims & Objectives: To study the predictors of screening programs adherence in the population of Shiraz, Iran.

Materials and Methods: This cross sectional study suggests the predictors of using the screening tests and exams among a representative sample of Shirazi adults.

Results: About half of eligible participants never perform the Pap test, breast exam and fecal occult blood test. And about a quarter of them never did the prostate and skin exam. Age, sex, marital status, occupation, educational level, residential place and smoking history as well as stress level could be the predictors of using the screening tests and exams.

Conclusion: Overall, the rate of using the screening tests and exams is unacceptably low. This emphasizes the urgent need of developing strategies to promote it.

Key Words: Screening Programs; Iran; Adherence; Predictors

Introduction

Global burden of non-communicable diseases continues to grow. In 2005, Non-communicable diseases, mainly cardiovascular diseases like diabetes, cancers, and chronic respiratory diseases, are responsible for about 35 million deaths annually. The figures show 60% of total mortalities globally, with 80% of mortalities occurring in low- and middle-income countries, and near 16 million deaths among people under the age of 70 years. Nonetheless, it is estimated that the total mortality rates from non-communicable diseases tend to increase about 17% by the next 10 years.^[1,2]

Screening allows early detection of diseases or the predisposing factors, and has the potential of improving treatment and reduction of probable mortalities, if followed by acceptable and appropriate treatment.^[3-5] The American Cancer Society opines that early detection can contribute saving many lives and alleviate suffering from some kind of cancers including breast, colon, rectum, cervix, prostate, testis, oral cavity and skin, applying physical examinations and available screening tests.^[6-9]

The Healthy People goals call for rates of adherence to national cancer-screening guidelines of 97% for Pap smear, 70% for bilateral mammography, and 50% for colorectal cancer screening by 2010.^[10,11] Unfortunately,

in Iran, few national programs are active now according to the World Health Organization (WHO) guidelines for screening and prevention. On the other hand, many people don't have enough desire to do such tests and exams.^[12] The question is why people and health care systems don't have enough motivation for screening tests. And what can we do to encourage them? To this end, this study aimed to estimate prevalence of self-report screening test and exams including weight and blood pressure measuring, breast, prostate and skin exam, fecal occult blood test, serum lipid test and Pap test. We tried to suggest the predictors of using the screening tests and exams among a representative sample of Shirazi adults. Therefore Sociodemographic and lifestyle characteristic of the study population were correlated.

Materials and Methods

Setting: This population-based survey was performed in Shiraz, Iran in 2010. In a cross-sectional design, we assessed a representative sample of Shirazi adults. Shiraz is the capital of Fars province and is the biggest city in southern half of Iran with near 1,400,000 populations according to the 2009 National Census.

Participants: Participants of this survey were over 18 year old residents of Shiraz. People who reside in institutions and extremely remote locations as well as

nationals from other countries were excluded from this study. Known cases of hypertension, diabetes, hyperlipidemia and any kind of cancers were excluded, too. The minimum sample size was calculated 800, and finally 500 men and 500 women were recruited. Applying the multistage cluster sampling method, Shiraz city were divided into districts, and some of these districts were selected randomly at first step. Then the selected districts were divided into blocks, and blocks were chosen randomly from within each selected district. Finally, houses were listed within each selected block, and some of these houses were selected randomly. Completion of the survey implies consent. The questionnaires were completed by face to face and structured interview conducted by well-educated and expert interviewers.

Study Design: Sociodemographic characteristics and some lifestyle variables were selected to depict the probable specific predictors of doing screening tests and exams among Shirazi men and women. Age, sex, marital status, occupation, educational level and residential place as well as smoking history were obtained. Stress level obtained by the Perceived Stress Scale (PSS) which is widely used psychological instrument for measuring the perception of stress. It is a measure of the degree to which situations in one's life are appraised as stressful. Items were designed to tap how unpredictable, uncontrollable, and overloaded respondents find their lives. The scale also includes a number of direct queries about current levels of experienced stress. The PSS was designed for use in community samples with at least a junior high school education. The items were easy to understand, and the response alternatives are simple to grasp. Moreover, the questions are of a general nature and hence are relatively free of content specific to any sub population group. The questions in the PSS enquired about feelings and thoughts during the last month. In each case, respondents were asked how often they felt a certain way.

Cancer family history, history of measuring weight and checking blood pressure were obtained. The criteria for determining thresholds for inadequate weight and blood pressure monitoring were derived from prevention guidelines^[13,14] history of Breasts exam, digital rectal exam (DRE) and whole body Skin exam by health care provider were considered too. History of Fecal occult blood test, Pap test and serum total cholesterol test were asked as well.

Statistical Analysis: The data were analyzed using standard descriptive statistics. Appropriate parametric (t-test) or non-parametric (Mann-Whitney-U, Kruskal-Wallis) tests were applied depending upon the distribution of each particular variable. Proportions were compared using a Chi-square test. Logistic regression provided adjusted estimates for binary outcomes. All multivariable models were developed using a forward conditional elimination procedure and the threshold significance level to keep a variable was 0.05. Analyses were performed using SPSS 11.5 software (SPSS Inc., Chicago, Illinois, USA).

Results

Table 1 shows Sociodemographic characteristics of study population. Nearly half (497, 51.2%) of the participants tested serum lipid during last year, 181 (18.6%) between 1-5 years ago, 186 (19.2%) more than 5 years ago and 107 (11.0%) had never tested. Frequency of adequate weight monitoring was 87.4% and 89.2% among men and women respectively. Prevalence of adequate blood pressure monitoring (<2 years ago) was 79.0% and 88.0% among men and women respectively. Frequency of adequate cholesterol monitoring was 74.2% and 82.7% among men and women respectively. Nonetheless, about half of participants never underwent the Pap test, breast exam and fecal occult blood test. About a quarter of them never underwent the prostate and skin exam (table 2, 3).

Significant differences existed in weight measuring in ideal manner based on the subgroups of age, educational level and occupation. Blood pressure measuring was correlated to sex, age, marital status, educational level and occupation. Doing Serum lipid test in desired intervals was associated with sex, age, marital status, educational level, occupation and living location (SES).

Multivariate analyses performed adjusted for socio-demographic variables in addition to other lifestyle variables as well as family history for cancer. Using this model, age and occupation was correlated to weight measuring. People aged 18 to 36 years were 2.814 times more likely to measure their weight than ≥ 73 year's old people. Being male and single was negatively correlated to Blood pressure measuring. Jobless/ housewife and people in non-manual and manual occupations were 2.839, 4.355 and 1.719 times more likely than students to measure their blood pressure, respectively. Serum lipid measuring had reverse correlation with marital status, single person were less likely, (OR: 0.394).

Table-1: Socio-demographic characteristics of study population

Characteristics	Female (n=500)	Male (n=500)	P-value	Total (n=1000)
Mean ± SD	38.9 ± 14.1	39.1 ± 16.4	0.887	39.0 ± 1.5
Age	18-36	46.90%	0.039	48.20%
	37-54	37.70%		34.30%
	55-72	13.80%		14.90%
	≥73	1.60%		2.60%
Marital Status	Single	30.60%	0.011	34.40%
	Married	69.40%		65.60%
Education	≤5 years	23.20%	<.001	18.50%
	6-12 years	47.00%		44.80%
	13-16 years	25.60%		30.30%
	≥17 years	4.20%		5.30%
Living Location	Poor	12%	1	12%
	Low to Moderate	24.80%		24.80%
	Moderate to High	39.20%		39.20%
	Good	15%		15%
	Excellent	9%		9%
Occupation	Jobless/Housewife	71.60%	<.001	44.60%
	Non-Manual	9.80%		23.20%
	Manual	8.80%		47.60%
	Student	9.80%		11.60%
Emotional Stress	Cigarette Smoking	13.20%	0.204	11.90%
	High	37.40%		36.40%
	Low	62.60%	0.743	63.10%

Table-2: Prevalence of weight and blood pressure measuring intervals

	≤1years N (%)	1-2 years N (%)	≥2 years N (%)	Never N (%)
Weight	734 (73.4)	147 (14.7)	115 (11.5)	4 (0.4)
Blood pressure	706 (70.7)	128 (12.8)	145 (14.5)	19 (1.9)

Table-3: Prevalence of Pap test, Fecal occult blood test, Breast exam, Prostate exam and Fecal occult blood test intervals

Tests	Interval (Years ago), N (%)					
	≤ 1	1-3	3-4	≥5	Never	Don't Remember
Pap test	93 (18.6)	64 (12.8)	25 (5.0)	28 (5.6)	279 (55.8)	11 (2.2)
Breast exam	66 (13.2)	48 (9.6)	25 (5.0)	26 (5.2)	326 (65.2)	9 (1.8)
Prostate exam (DRE)	38 (7.6)	28 (5.6)	10 (2.0)	17 (3.4)	381 (76.2)	26 (5.2)
Fecal occult blood test	150 (15.0)	76 (7.6)	53 (5.3)	64 (6.4)	574 (57.4)	83 (8.3)
Skin exam	8 (0.8)	16 (1.6)	11 (1.1)	23 (2.3)	897 (89.7)	54 (5.4)

Occupation was correlated positively with Serum lipid measuring. Jobless/housewife and people in non-manual jobs were 3.787 and 2.777 times more likely to measured their serum lipid level. People with high SES were 2.869 times more likely than very high SES to test their serum lipid level (Table 5).

Significant difference existed for being examined for Prostate cancer detection by physician due to digital rectal exam, based on the subgroups of living location (SES) (Table 6). This difference remains even after adjustment. Men who lived in places of high SES were

less likely to undergo prostate examination than who live in places of very high SES (OR: 0.424) (Table 7).

Table-4: Weight and Blood pressure measuring and serum lipid test according to Sociodemographic and lifestyle characteristic of the study population

Characteristics	Weight		Blood Pressure		Serum Lipid		
	%	P-value	%	P-value	%	P-value	
Sex (%)	Male	87.4	0.376	79	<0.001	74.2	0.002
	Female	89.2		88		82.7	
Age (%)	18-36	93.1	<0.001	75.3	<0.001	65.2	<0.001
	37-54	88		90.9		87	
	55-72	74.5		91.3		91.5	
	≥73	84.6		100		100	
Marital Status (%)	Single	91	0.055	72.7	<0.001	62.7	<0.001
	Married	86.9		89.2		85.6	
Educational Level (%)	≤5 years	79.5	<0.001	92.4	0.001	90.8	<0.001
	6-12 years	88.7		82.6		77.6	
	13-16 years	93.7		80.2		71.5	
	≥17 years	84.9		79.2		79.1	
Occupation (%)	Jobless/Housewife	88.6	0.027	89.2	<0.001	86.8	<0.001
	Non-manual	92.1		91.5		84.1	
	Manual	84		78		71.5	
	Student	92.5		61.7		50.6	
Living Location	Poor	86.7	0.254	80.7	0.687	69.1	0.01
	Low to Moderate	88.7		84.3		79.6	
	Moderate to High	90.1		83.6		76.9	
	High	83.3		86.7		87.8	
	Very high	90		81.1		80.3	
Emotional Stress (%)	High	89.2	0.518	84.3	0.688	77.1	0.423
	Low	87.8		83.3		79.4	

Pap test was correlated with living location and history of tobacco use. Breast examination was associated with age, marital status, occupation, emotional stress, tobacco use and family history for cancer (Table 6). Even after adjustment, the correlation of breast examination with family history of cancer, age, occupation, marital status and having a high perceived level of emotional stress remained predictors. Women with family history of cancer were less likely to examine their breasts, (OR: 0.496), people in non-manual jobs were 10.116 times more likely to being examined by physician for breast cancer screening. Single women were less likely to perform breast exam by a health professional, (OR: 0.499), women with high perceived level of emotional stress were 1.763 times more likely to examined their breast by a health professional (Table 7).

Fecal occult blood testing were correlated with, educational level, occupation, living location, emotional stress and family history for cancer (Table 6). After applying the multivariate model and adjustment, occupation, educational level and having a high perceived level of emotional stress remain predictors of performing fecal occult blood test.

Table-5: Predictors of Weight, blood pressure measuring and serum lipid test

Predictor	B	S.E.	P-value	β	95.0% C.I. for EXP (B)	
					Lower	Upper
Weight	Age *		<0.001			
	18- 36	1.035	0.586	0.078	2.814	0.892 8.875
	37-54	0.324	0.573	0.572	1.383	0.449 4.255
	55-72	-0.632	0.58	0.276	0.532	0.17 1.658
	Occupation**			0.019		
	Jobless/housewife	0.218	0.433	0.615	1.244	0.532 2.907
	Non-Manual	0.728	0.507	0.151	2.071	0.766 5.598
Manual	-0.276	0.431	0.522	0.759	0.326 1.766	
R ² : 0.086	Constant	1.529	0.689	0.026	4.613	
Blood pressure	single	-0.736	0.201	<0.001	0.0479	0.323 0.71
	Occupation**			<0.001		
	Jobless/housewife	1.043	0.282	<0.001	2.839	1.633 4.935
	Non-Manual	1.471	0.373	<0.001	4.355	2.096 9.049
	Manual	0.542	0.278	0.052	1.719	0.996 2.966
	male	-0.517	0.209	0.013	0.596	0.396 0.898
	R ² : 0.124	Constant	1.464	0.3	<0.001	4.324
Serum lipid	single	-0.932	0.201	<0.001	0.394	0.266 0.584
	Occupation**			<0.001		
	Jobless/housewife	1.332	0.299	<0.001	3.787	2.107 6.807
	Non-Manual	1.021	0.343	0.003	2.777	1.417 5.444
	Manual	0.46	0.289	0.112	1.583	0.898 2.792
	Living location***			0.006		
	Poor	-0.303	0.395	0.442	0.738	0.341 1.6
	Low to Moderate	0.2	0.371	0.591	1.221	0.59 2.526
	Moderate to High	0.112	0.352	0.75	1.118	0.561 2.229
	High	1.054	0.434	0.015	2.869	1.225 6.718
R ² : 0.164	Constant	0.641	0.429	0.134	1.898	

Reference category: *≥73, **student, ***very high

Table-6: Prostate exam, Pap test, Breast exam, Fecal occult blood and Skin exam according to Sociodemographic and lifestyle characteristic of the study population

Characteristics	Prostate exam (DRE)		Pap test		Breast exam		Fecal occult blood		Skin exam	
	%	P-value	%	P-value	%	P-value	%	P-value	%	P-value
Sex (%)	Male	-	-	-	-	-	32.6	0.257	4	0.015
	Female	-	-	-	-	-	36		7.6	
Age (%)	18-36	43.3	20.1	18.4	33.1	4.4				
	37-54	36.4	17.6	45.2	33.6	7.3				
	55-72	47.5	15.9	50.7	40.9	7.4				
	≥73	44.4	25	25	30.8	3.8				
Marital Status (%)	Single	43.5	-	-	16.3	<0.001	35.5	0.574	4.4	0.158
	Married	41.1	-	-	40.3		33.7		6.6	
Educational Level (%)	≤5 years	42	12.1	37.1	37.3	8.1				
	6-12 years	43.3	22.1	35.3	28.5	5.4				
	13-16 years	41.1	17.2	23.4	38.9	4.3				
	≥ 17 years	37.5	23.8	42.9	47.2	9.4				
Occupation (%)	Jobless/housewife	44.3	18.4	35.8	30.3	5.6				
	Non-manual	37.1	14.3	53.1	44.2	9.1				
	Manual	43.3	22.7	20.5	32.3	5.7				
	Student	43.1	20.4	4.1	41.1	1.9				
Living Location (%)	Poor	51.7	15	30	41.7	15				
	Low to Moderate	45.2	15.3	32.3	38.3	16.1				
	Moderate to High	42.9	18.4	35.7	45.2	14.3	<0.001			<0.001
	High	25.3	17.3	21.3	26	12.7				
	Very High	44.4	35.6	46.7	41.1	7.8				
Emotional Stress (%)	High	43.4	17.1	39	45.5	7.3	<0.001			0.117
	Low	41	19.5	29.4	27.7	4.9				
Tobacco Use	yes	60	26.1	21.7	36.1	8.2	0.697			0.278
	no	41.8	16.9	35.5	34.1	5.5				
Family history for cancer	yes	43.9	15.8	30.9	42.9	5.1	0.06			0.756
	no	41.8	19	49.1	33.4	5.9				

Jobless and housewives were less likely to perform occult blood test to screen colon and rectum cancers (OR: 0.557). People with lower educational level were less likely to perform occult blood test. Thus people with high

perceived level of emotional stress were 2.170 times more than those without significant emotional stress (Table 7).

Table-7: Predictors of prostate exam, Pop test, Breast exam, Fecal occult blood and skin exam

	Predictor	B	S.E.	P-value	β	95.0% C.I. for EXP (B)	
						Lower	Upper
Breast Examination	Family history of cancer	5.048	0.025	0.025	0.496	0.269	0.914
	Age*			<0.001			
	18- 36	0.089	0.879	0.919	1.093	0.195	6.122
	37-54	1.013	0.874	0.246	2.753	0.497	15.263
	55-72	1.38	0.895	0.246	3.973	0.688	22.939
	Occupation**			0.006			
	Jobless/housewife	1.362	0.781	0.081	3.902	0.845	18.029
	Non-Manual	2.314	0.811	0.004	10.116	2.064	49.579
	Manual	1.276	0.831	0.124	3.583	0.704	18.246
	single	-0.695	0.299	0.02	0.499	0.278	0.896
Prostate Examination (DRE)	Emotional stress	0.567	0.215	0.008	1.763	1.156	2.69
	R ² : 0.215						
	Constant	-2.209	1.189	0.063	0.11		
	Living location***			0.026			
	Poor	0.29	0.396	0.464	1.336	0.615	2.903
	Low to Moderate	0.029	0.35	0.934	1.029	0.518	2.044
	Moderate to High	-0.065	0.333	0.846	0.938	0.488	1.8
	High	-0.858	0.401	0.032	0.424	0.193	0.93
	R ² : 0.030						
	Constant	-0.223	0.3	0.457	0.8		
Pap test	Living location***			0.051			
	Poor	-1.14	0.477	0.017	0.32	0.126	0.815
	Low to Moderate	-1.115	0.399	0.005	0.328	0.15	0.717
	Moderate to High	-0.897	0.362	0.013	0.408	0.201	0.829
	High	-0.967	0.436	0.026	0.38	0.162	0.893
	R ² : 0.028						
Fecal occult blood test	Constant	-0.595	0.311	0.056	0.552		
	Occupation**			0.005			
	Jobless/housewife	-0.0585	0.251	0.02	0.557	0.341	0.911
	Non-Manual	0.178	0.263	0.497	1.195	0.714	2
	Manual	-0.17	0.253	0.5	0.843	0.514	1.384
	male	-0.41	0.168	0.014	0.664	0.478	0.922
	Educational level****			0.015			
	≤5 years	-0.127	0.335	0.705	0.881	0.457	1.699
	6-12 years	-0.65	0.31	0.036	0.522	0.285	0.959
	13-16 years	-0.386	0.312	0.217	0.68	0.369	1.254
Skin Examination	Emotional stress	0.775	0.14	<0.001	2.17	1.649	2.857
	R ² : 0.080						
	Constant	-0.05	0.368	0.891	0.951		
	Occupation**			0.01			
	Jobless/housewife	0.826	0.748	0.27	2.284	0.527	9.896
	Non-Manual	1.871	0.77	0.015	6.495	1.437	29.36
	Manual	1.551	0.773	0.045	4.716	1.037	21.442
	male	-1.119	0.339	0.001	0.327	0.168	0.635
	R ² : 0.050						
	Constant	-3.502	0.722	<0.001	0.03		

Reference category: *≥73, **student, ***very high, ****≥17years

Skin exam was correlated with sex and living location (Table 6). Thus after adjustment, occupation and sex were correlated to skin examination. People in non-manual and manual jobs were 6.495, 4.716 times more than students examined their skin by a health professional to screen skin cancer, respectively. Men were less likely to perform skin examination (Table 7).

Discussion

Findings of this study indicate about a quarter of participants performed adequate weight monitoring and measured their blood pressure during the last year. The overall frequency of blood pressure monitoring is unacceptably low (Healthy People 2010 goal is 95%).^[15] But still, women are more likely to apply the recommendations for blood pressure measuring than

men. Nearly half of participants tested serum lipid during last year. As a matter of fact, overall frequency of cholesterol monitoring was adequate among women; but the same among men was unacceptably low (Healthy People 2010 goal is 80%).^[15] Statistics shows that for all leading causes of death, and in every age group, men and boys have higher death rates than women and girls. Men not only suffer from more severe chronic diseases, but also die six years younger than women. They generally take less care of their diet and body fat, neglect exercise and skip doctor's visits and screening tests. The stressful life, career, financial and family pressures may influence men's attention to their health.^[16] These findings suggest improvement in the frequency of cholesterol and blood pressure monitoring should be a priority for Iranian health care system, especially among men, to reduce the burden of hypertension and hyperlipidemia related

morbidity and mortality. The American Cancer Society (ACS) recommends, and tries, to level down the burden of cervical and breast cancers by means of annual Pap smears, beginning at age 21 years, and annual mammograms, beginning at age 40 years and annual fecal occult blood test (FOBT) in addition to sigmoidoscopy every 5 years; or colonoscopy every 10 years, beginning at the age of 50 years, is recommended by ACS for early detection of colorectal cancers. Annual digital rectal exam (DRE) and prostate-specific antigen (PSA) testing beginning at age 50 years for men at average risk is recommended by ACS to detect prostate cancer.^[15]

In this study about half of participants never underwent the pop test, breast exam and fecal occult blood test. And about a quarter of them never underwent the prostate and skin exam. Age and occupation was correlated to weight measuring. Younger people were more likely to measure their weight. Younger people were more concerned about their weight and being in shape. Being male and single was negatively correlated to blood pressure measuring. Jobless/housewife and people non-manual and manual occupations were more likely than students to measure their blood pressure. Serum lipid measuring had reverse correlation with marital status, single person were less likely to test their serum lipid level. It seems that marriage can be a commitment to health. Couples are involved in to take each other to the doctor or care for, when they feel sick. Occupation was correlated positively with serum lipid measuring. Jobless/housewife and people in non-manual jobs were more likely to measure their serum lipid level. People with high SES were more likely than who are with very high SES to test their serum lipid level. One study in Boston, US revealed that lower use of preventive cardiovascular services such as measuring serum lipid and blood pressure have been correlated with biopsychosocial factors including race, age, sex, insurance and having a source of care as well as low educational attainment, low income, depression, social isolation, and neighborhood characteristics.^[5] The results of this study indicated significant difference existed in being examined for prostate cancer detection by physician through digital rectal exam, based on the subgroups of living location (SES). These differences remain even after adjustment. Men who lived in places which are indicators of high SES were less likely to undergo prostate examination than those who lived in places of very high SES. Higher knowledge and higher economic wealth correlated to SES on one hand and may be easier access

to prevention services can be the reasonable causes. The Pop test was correlated with living location and history of tobacco use. The correlation of Breast examination with family history of cancer, age, occupation, marital status and having a high perceived level of emotional stress, were considerable even after adjustment. Women with family history of cancer were less likely to examine their breasts. Fear of disease or fear of family or relatives may be a possible reason of avoidance of breast exam to screen breast cancer.^[17] People in non-Manual jobs were more likely to be examined by physicians for breast cancer screening. Single women were less likely to perform breast exam by a health professional, women with high perceived level of emotional stress were more likely to get examined their breast by a health professional. Stressful personality can be a stimulating factor which poses people to higher utility of preventive services however over use of these services may be a potential threat.^[5] Occupation, Educational level and having a high perceived level of emotional stress remained predictors of undergoing fecal occult blood test, after applying the multivariate model and adjustment. Jobless people and housewives were less likely to perform occult blood test to screen colon and rectum cancers. People with lower educational level were less likely to undergo occult blood test. Previous studies on cancer screening admitted that, low educational attainment, and poverty may lead to lower access to preventive care.^[18-20] Thus people with high perceived level of emotional stress were more likely to undergo occult blood test than those without significant emotional stress. Occupation and sex were correlated to skin examination. People in non-manual and manual jobs underwent their skin test by a health professional to screen skin cancer more than students. Men were less likely to undergo skin examination.

The following factors may be responsible for low adherence of people to screening guidelines and warrant further attention in future studies: lack of training and knowledge, conventional behaviour and remedies, disapproval of screening test (the result is not always definite), strong religious beliefs, unavailability or difficult access to some medical facilities, poor financial status (un-affordability), autism, procrastination, fanaticism which is a major hindrance to rational approach and tackling the issue.

This study had some limitations. We knew that location is not sufficient enough to distinguish socio economic status comprehensively, but due to some limitations for

asking about other socioeconomic means such as family income, assets and properties, we applied the neighbourhood location as an indicator of SES. We tried to minimize the interviewer and to some extent recall bias by employing expert interviewers, nonetheless a continuum of recall and interviewer's bias were unavoidable. Social desirability bias arising from face-to-face interview may lead to over reporting and subsequently make it difficult to estimate the accurate screening tests performance and this may affect the accuracy of the results of this study too. Forward telescoping of dates in means of remembering an event more recently plays an identified role in over-reporting for both mammography and Pap smear.^[21,22] On the other hand a gynaecologic exam without a pop test can be mistakenly over reported as including a pop test. However, we believe underreporting may be more a concern for prostate and colorectal screening tests in self-report surveys. Embarrassment or privacy concerns can be an explanation for under-reporting of procedures such as DRE. Ultimately we have limitations in assessing all the potential factors related to lower adherence to screening tests and exams such as lack of time, encouraging health care providers to deliver and reinforce people for screen procedures^[23], etc. and it may lead to lower power of this study.

Not only the increasing prevalence of degenerative and chronic diseases, but also the improvement of screening techniques, and the steadily growing body of evidence about genetic predispositions of various diseases have resulted in growing availability of various screening tests in recent years.^[4]

Conclusion

Overall, the rate of using the screening tests and exams is unacceptably low. As a matter of fact, more comprehensive researches on this topic, specially assessing the accuracy of self-reported screening history, may contribute health care systems and policy makers to better management of burden of diseases across the communities. Assessment of screening history for different ethnic and socioeconomic groups warrants further attention.

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