International Journal of Medical Research Professionals
P-ISSN: 2454-6356; E-ISSN: 2454-6364
DOI: 10.21276/ijmrp

Original Research Article.

Assessment of Clinical Preventive Medicine Services Knowledge, Attitude and Practice among Physicians at National Guard PHC Centers, Saudi Arabia-Western Region

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ABSTRACT

Background: Although the effectiveness of preventive health services is beyond any doubt, actual rates for delivery of preventive care services remain quite low.

Aim of the Study: To assess magnitude of preventive services utilization by primary health care (PHC) physicians and associated determinants and barriers.

Materials and Methods: Following a cross sectional study design at the National Guard (NG) PHC Centers, in the western region of Saudi Arabia, 103 PHC physicians were included. A self-administered questionnaire has been constructed for data collection.

Results: Finding showed that 22.3% of participants had 100% scientific evidence about applied screening tests, while 47.6% had 75% knowledge, 25.2% had 50% knowledge and 4.9% had 25% knowledge. Main sources of knowledge about applied screening tests were evidence based medicine sources (79.6%) and continuous medical education (CME) (68.9%). The most frequent barrier to deliver evidence-based clinical preventive services was busy clinic time (93.2%). About one fourth of participants (27.2%) do not apply screening tests. The most commonly implemented test was to screen for diabetes (33%). Participants' most frequent practice was "advise to perform physical activities". Physicians' knowledge sources differed significantly according to their position as regard CME (p=0.009), and regarding colleagues' advice (p=0.041). The use of a log book for preventive medicine services differed according to physicians' age (p=0.01). Barriers against delivery of preventive services at NG PHC clinics differed according to physicians' position (p=0.012). Physicians' age group was the only significant independent variable (p=0.016) in the binary logistic regression model for practicing preventive services at the NG PHC clinics.

Conclusions: PHC physicians at NG PHC clinics, especially younger ones, address the importance of CME at and outside PHC clinics, and having proper guidelines for applying clinical preventive services. The most frequently stated barrier to deliver evidence-based clinical preventive services is busy clinic time.

Keywords: Knowledge, Attitude, Practice, National Guard, Primary Healthcare.

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Article History:

Received: 26-11-2018, **Revised:** 21-12-2018, **Accepted:** 11-01-2019

Access this article online	
Website: www.ijmrp.com	Quick Response code
DOI: 10.21276/ijmrp.2019.5.1.035	

INTRODUCTION

Preventive medicine is a specialty that focuses on the health of individuals, communities, and defined populations. Its goal is to protect, promote, and maintain health and well-being and to prevent disease, disability, and death.[1]

The *Healthy People 2010,* a health promotion and disease prevention initiative, called for improving of preventive service delivery in primary care setting by primary health care (PHC) physicians.[2]

Preventive medicine services represent an important service for the secondary prevention of disease practice by family medicine physicians. Such delivery of this service is low and represent an obstacle in the healthy goal for all.[3-5]

Attempts have been made to increase the application of the preventive medicine delivery, and not all of these interventions achieved success. These include the use of continuing medical education, audit and feedback, computerized reminder systems, the involvement of nursing staff, the use of chart-based algorithms, and the implementation of continuous quality improvement programs.[6-11] Barriers and demands, such as acute illness care, chronic diseases, patient preferences and

psychological problems may limit the effort to improve the delivery of the preventive medicine services in the primary care clinics.[12-14] In the Kingdom of Saudi Arabia, non-communicable, chronic diseases are increasing. In 2011, the mortality rate due to non-communicable diseases was 753 deaths per 100,000. Cardiovascular diseases have been a cause in 314 deaths per 100,000 (42%).[15]

Cardiovascular diseases are related mostly to modifiable risk factors. Around 80% of these modifiable risk factors include diabetes mellitus, hypertension, hypercholesterolemia, decreased physical activity, obesity, unhealthy diet and smoking.[16] Diabetes mellitus definition is a fasting sample of high blood glucose level of 126 mg/dL or more which is from failure of the pancreas to secrete insulin or failure of insulin action.[17] Diabetes is a reason of 1.3 million death worldwide in 2008.[16]

In Saudi adults aged above 30 years, prevalence of diabetes mellitus is (23.7%).[18] Mortality rates due to heart diseases are higher among diabetic compared to non-diabetic patients.[19] Hypertension one of leading causes for cardiovascular diseases in the world.[16] It is estimated that 1.56 billion adults will be hypertensive.[20] Prevalence of hypertension among the Saudi population aged above 30 years is 26%.[18] Blood pressure readings between 130-139/85-89 mmHg are associated with double increase of the relative risk from cardiovascular diseases compared with people of a normal blood pressure.[21]

Adults with body mass index (BMI) of 30 kg/m^2 or more are considered as obese.[22] Prevalence of obesity among the Saudi population is (35.6%).[18] It has been observed that BMI above 21 kg/m^2 is associated with more than half of patients with diabetes and 21% of patients with ischemic heart disease.[20]

High levels of blood cholesterol constitute one of the leading causes for ischemic heart disease. Mortality due to ischemic heart disease includes 4.5% of the total mortality worldwide. Worldwide, prevalence of high total blood cholesterol was 39%.[16] In 2004, prevalence of high blood cholesterol in Saudi Arabia reached 53.9%, which is higher than those reported worldwide.[18]

Smoking is one of the significant risk factors for CVD and accounts for 10% of its causes.[16] In 2004, prevalence of smoking in Saudi Arabia was reported to be 12.8% compared that in USA, which was 19% in 2011.[18] Dietary history is quite important, as diets rich in salt, fat and low in fruits and vegetables constitute important risk factors for cardiovascular diseases. Dietary behavior which has low fruits and vegetables are associated with 2.8% of the deaths worldwide.[16]

Vaccinations are also important in preventing several diseases. A study showed that old people who received influenza vaccine were not infected by pneumonia or influenza by 30-70 %.[23,24] Mammography, as a screening strategy, plays an important role in decreasing mortality rates due to breast cancer by early detection and management.[25] Also screening for colorectal cancer can decrease the risk of death by 59%.[26]

Family medicine physicians have high potential to change PHC patients' lifestyle by giving advice, collaborating with other specialists for effective referral and by effective health education through provision of informative brochures or written materials.[27-29] Thus, preventive medicine services proved to be very helpful in detecting risk factors for non-communicable (chronic) diseases and in screening (early detection) and diagnosis of malignant diseases that would increase survival and lead to successful management. The aim of this study is to assess magnitude of preventive services utilization by primary health care physicians and associated determinants and barriers. The findings of this study are expected to increase the delivery for preventive services.

SUBJECTS AND METHODS

Observational, cross sectional study was carried out at National Guard PHC Centers, Saudi Arabia - Western Region, which include 5 centers: Jeddah – King Faisal Residential City (Iskan Jeddah PHC), Jeddah – Specialized Poly Clinic PHC**,** Jeddah – Bahra PHC**,** Taif – King Khalid Residential City (Iskan Taif PHC) and Makkah – Sharaie PHC. Any physician working or receiving training at these centers for at least two months was eligible for inclusion.

The minimum sample size for this study has been decided, as follows:

$$n = \frac{Z^2 \times P \times Q}{D^2}$$

where: n: Calculated minimum sample size

Z: The z-value for the selected level of confidence = 1.96.

P: Estimated magnitude of preventive services utilization by primary health care physicians = 50%, i.e., 0.5.

Q: (1 – P) = 50%, i.e., 0.5

D: The maximum acceptable error [precision level] = 0.1.

$$n = \frac{1.96^2 \times 0.5 \times 0.5}{0.1^2} = \frac{3.8416 \times 0.25}{0.01} = 96.04$$

A census has been conducted, in which the questionnaire was administered to all subjects who fulfilled the inclusion criteria in the target population. Through communication with office of the Deputy Executive Director, Medical Services, Primary Health Care-WR, a complete list of physicians who currently work at the MNG PHC centers-WR and fulfill the inclusion criteria was obtained: staff physicians, family medicine residents, family medicine assistant/associate consultants and family medicine consultant. A self-administered questionnaire has been constructed by the researcher based on thorough review of literature. The questionnaire's validity has been assessed by 3 experts in the field of Preventive Medicine with ample experience in survey research methods. Following a simple random sampling technique, the researcher distributed the study questionnaire sheets to 120 PHC physicians during their work hours. However, after repeated personal communications, only 103 complete questionnaire sheets could be received (i.e., response rate = 85.8%).

Before data collection, the researcher clearly explained to potential participants the purpose of the study. An informed consent was fulfilled by all participants.

Received questionnaire sheets were revised. Collected data were entered into a personal computer, using the Statistical Package for Social Sciences (SPSS, version 22). Descriptive statistics (i.e., frequencies, percentage, means and standard deviations) were calculated. Chi square test was applied to test significance of differences according to participants' personal characteristics. Fisher's exact test was applied instead when more than 25% of the expected values were less than 5.[30] Binary logistic regression analysis was applied to elicit the significant independent variables associated PHC physicians' preventive services practices. Differences were considered as statistically significant at $p<0.05$.

Table 1: Participants' knowledge aspects regarding clinical preventive medicine services

Aspects of participants' knowledge	No.	%
How much scientific evidence do you know about screening test you apply?		
100%	23	22.3
75%	49	47.6
50%	26	25.2
25%	5	4.9
Sources for knowledge about clinical preventive services		
Evidence based medicine sources	82	79.6
Continuous medical education	71	68.9
Educational background	63	61.2
Work related materials for application or programs for implementation and adherence	34	33.0
Scientific studies or literature	29	28.2
Colleagues advice	27	26.2
Social media or public newspaper and magazine	9	8.7
Do you update your knowledge about screening tests?		
Yes, every 3 months	24	23.3
Yes, at least once a year	63	61.2
Yes, every 3 to 5 years	12	11.7
No, I do not update my knowledge	4	3.9
In the last 3 years, did you take courses about delivering of clinical preventive services?		
Yes, as a session in a conference or symposium	39	37.9
Yes, as a part of a bigger or review course that included other subjects	19	18.4
Yes, as course, workshop or conference specific and designated to this topic	17	16.5
No, since this topic is rarely addressed by educational activities such as courses or conferences	24	23.3
No, I didn't look for such educational activity for such purpose	15	14.6

Table 2: Participants' attitude regarding provision of clinical preventive medicine services

Statements	No.	%
Family physicians should apply clinical preventive services with every patient		
Strongly agree	69	67.0
Agree	30	29.1
Neutral	4	3.9
It is mandatory to take consent from patients before any preventive service		
Yes	74	71.8
No	19	18.4
Do not know	10	9.7
Family physicians should follow guidelines in repeating a screening or preventive test for a healthy individual when the test is negative at first visit		
Yes	89	86.4
No	6	5.8
Do not know	8	7.8
Percent score for physicians' attitude (Mean±SD)	80.3±20.6	

RESULTS

The study included 103 physicians. About 40.8% of them aged 30-40 years, while 32% aged less than 30 years and 27.2% aged more than 40 years. Almost one half of participants (46.6%) were males. Almost one third of participants (31.1%) were staff physicians, 28.2% were family medicine residents, 23.3% were family medicine assistant/associate consultants and 17.5% were family medicine consultants. Table (1) shows that 22.3% of participants had 100% scientific evidence about applied screening tests, while 47.6% had 75% knowledge, 25.2% had 50% knowledge and 4.9% had 25% knowledge. Participants' main sources of knowledge about applied screening tests were evidence based medicine sources (79.6%), continuous medical education (68.9%), or their own educational background (61.2%). Regarding participants' upgrade of their knowledge about screening tests, 61.2% used to do that annually, 23.3% every three months, 11.7% every 3-5 years, while 3.9% do not update their knowledge. Regarding taking courses about delivering of clinical preventive services, 37.9% of participants took a session in a conference or a symposium, 18.4% took it as a part of a bigger course or review course that included other subjects and 16.5% took it as a course, workshop or a conference specific and designated to the topic. However, 23.3% of participants did not take courses about delivering of clinical preventive services since

that topic is rarely addressed and 14.6% did not look for such educational activity for such purpose. Majority of the physicians (93.2%) correctly stated that hemophilia A is not a component of premarital screening program in Saudi Arabia. However, 6.8% incorrectly stated other responses, e.g., sickle cell anemia, hepatitis B&C, HIV/AIDS (1.9% for each), or thalassemia (1%).

Table (2) shows that most participants (67%) strongly agree and 29.1% agree that family physicians should apply clinical preventive services with every patient. Most participants (71.8%) agree that it is mandatory to take consent from patients before any preventive service.

Most participants (86.4%) agree that family physicians should follow guidelines in repeating a screening or preventive test for a healthy individual when the test is negative at first visit. Physicians' attitude means percent score regarding provision of clinical preventive medicine services was 80.3±20.6%.

Table (3) shows that the most frequently stated actions that increase delivery of clinical preventive services at MNG PHC clinics were continuous medical education at the PHC center (95.1%), having guideline for preventive services (92.2%), continuous medical education at conferences or workshops outside the center at the national or international level (68%) and self-dependent learning (64.1%)

The most frequently stated barriers to deliver evidence-based clinical preventive services at MNG PHC clinics were busy clinic time (93.2%), physicians' limited knowledge or skills (61.2%) and service's recipient or patient preferences (59.2%). patients were screened mainly by appointments or regular visits (59.2%). About one fourth of participants (27.2%) do not apply any screening tests. The commonly implemented tests were mainly to screen for diabetes (33%), hypertension (15.5%), lipid profile (13.6%), and mammography (12.6%).

Table 3: Actions that increase delivery of clinical preventive services at MNGHA PHC clinics

Action	No.	%
Continuous medical education at the PHC center	98	95.1
Guideline for preventive services	95	92.2
Continuous medical education at conferences or workshops outside the center at the national or international level	70	68.0
Self-dependent learning	66	64.1
Self-education with period exams and evaluation by the MNGHA	32	31.1
Log book for the usage of preventive medicine services for each physician	29	28.2
Continuous assessment and surveillance for the files of the individuals and patients registered at the PHC center	47	45.6
Random surveillance for the files seen by each physician and proper feedback for the physician with incomplete files for improvement	30	29.1

MNGHA: Ministry of National Guard Health Affairs

PHC: Primary health Care

Table 4: Participants' practices related to clinical preventive services at MNGHA PHC clinics

Practices	Always		Sometimes		Rarely		Never	
	No.	%	No.	%	No.	%	No.	%
Screening of immunization status	42	40.8	36	35.0	21	20.4	4	3.9
Advise to perform physical activities	94	91.3	9	8.7	0	0.0	0	0.0
Advise to eat balanced diet	91	88.3	12	11.7	0	0.0	0	0.0
Advise to quit smoking	73	70.9	20	19.4	9	8.7	1	1.0
Percent practice mean score (Mean±SD)	76.5±14.9							

MNGHA: Ministry of National Guard Health Affairs

PHC: Primary health Care

Table 5: Binary logistic regression model for physician practices of preventive services at MNGHA PHC clinics

Independent Variables	B	S.E.	Wald	P value	Exp (B)	95% CI for Exp (B)	
						Lower	Upper
Study clinic	0.132	0.302	0.191	0.662	1.141	0.631	2.063
Age groups	1.799	0.749	5.767	0.016	6.046	1.392	26.258
Gender	-0.106	0.827	0.016	0.898	0.900	0.178	4.546
Position	-0.116	0.368	0.100	0.752	0.890	0.433	1.831
Attitude	0.028	0.015	3.569	0.059	1.029	0.999	1.060
Constant	-2.849	2.566	1.233	0.267	0.058		

MNGHA: Ministry of National Guard Health Affairs

PHC: Primary health Care

Table (4) shows that participants' most frequent practices were "advise to perform physical activities", followed by "advise to eat balanced diet", "advise to quit smoking" and lastly "screening of immunization status". Physicians' mean percent practice score regarding clinical preventive services was 76.5±14.9%

The most frequently screening tests were applied to screen for hypertension, diabetes, dyslipidemia and obesity. On the other hand, the least frequently implemented screening tests were those for lung cancer, melanoma, and cancer prostate.

Female participants perform screening for osteoporosis and cancer cervix significantly more than male participants ($p<0.001$), while male participants perform screening for prostate cancer significantly more than female participants ($p<0.001$). However, there were no significant differences regarding screening for other diseases according to participants' gender. Physicians' knowledge sources about clinical preventive services differed significantly according to their position as regard continuing medical education ($p=0.009$), with highest percentage among staff physicians (90.6%) and as regard colleagues' advice ($p=0.041$), with highest percentage among family medicine residents (37.9%). However, other knowledge sources, (i.e., EBM sources, educational background, work-related materials, scientific studies and social media) did not differ significantly according to participants' position.

Physicians' actions that increase delivery of provided clinical preventive services at MNGHA PHC clinics differed significantly according to physicians age group attending CME at conferences or workshops ($p=0.007$), being highest among those aged above 40 years. Moreover, the use of a log book for preventive medicine services differed according to physicians' age groups ($p=0.01$), being highest among those aged 30-40 years. However, other actions (i.e., CME at the PHC center, Guideline for preventive services, Self-dependent learning, Self-education with exams and evaluation by MNGHA, Continuous assessment and surveillance for files, and Random surveillance for files seen by each physician) did not differ significantly according to their age groups.

Physicians' actions that increase delivery of provided clinical preventive services at MNGHA PHC clinics differed significantly according to their position regarding use of a log book for preventive medicine services ($p=0.002$) and regarding random surveillance for files seen by each physician ($p=0.01$), being highest among consultants in both. However, other actions did not differ significantly according to their position.

Barriers against delivery of preventive services at MNGHA PHC clinics differed significantly according to physicians' position, with limited physician's knowledge or skills ($p=0.012$) and the adverse effects of the screening tests ($p=0.003$), being highest among family medicine residents for both barriers. However, other barriers against delivery of preventive services at MNGHA PHC clinics did not differ significantly according to physicians' position.

Table (5) shows that physicians' age group was the only significant independent variable ($p=0.016$) in the binary logistic regression model for practicing preventive services at the MNGHA PHC clinics, with an Exp (B) (i.e., odds ratio) of 6.046 (95% CI: 1.392-26.258), i.e., with an age group increase there is about 6 times increase in the probability of performing preventive services by participants. Other independent variables (i.e., study clinic, participants' gender, position or attitude) did not have a significant impact upon delivery for preventive services.

DISCUSSION

Preventive services constitute an important component of primary health care medicine.[30] Primary health care physicians hold a strategic position for the delivery of preventive services due to the accessibility to the population and the long-term relationship with patients.[31] Nevertheless, although the effectiveness of preventive services is beyond any doubt, actual rates for delivery of preventive health care services remain quite low.[32]

Therefore, the present study aimed to assess magnitude of preventive services utilization by primary health care physicians and associated determinants and barriers.

The present study revealed that sources for knowledge aspects about clinical preventive medicine services for most primary care physicians were in the majority reliable. It showed that around 70% of participants had 75% or more solid scientific evidence about applied screening tests, the main sources of knowledge about applied screening tests were evidence based medicine sources, continuing medical education, or their own educational background and the upgrade of their knowledge about screening tests was more than 80% for getting updates on a yearly basis or more. About one fourth of participants did not take courses about delivering of clinical preventive services since that topic is rarely addressed.

Courses, meetings and congresses were considered the most important CME activities. Primary care physicians spent less than 3 hours per week on medical reading, compared with more than 4.5 hours among hospital doctors. Only 59% of primary care physicians had access to the Internet compared with 76% among hospital doctors. Time spent on medical reading and formalized courses are progressively decreasing.

Moreover, our finding is much better than what reported in Guatemala, Corral et al.[33] reported that primary care physicians' knowledge on preventive services is limited. Participants' knowledge sources about clinical preventive services differed significantly according to their position, with highest percentage of continuing medical education among staff physicians and highest percentage of colleagues' advice among family medicine residents.

This observation highlights the difference in learning patterns among physicians, where family medicine residents prefer group-based peer-learning, while staff physicians prefer more individual-based learning through continuing medical education. Participant PHC physicians suggested that the most frequently needed actions to increase their delivery of clinical preventive services at PHC clinics were continuous medical education at the PHC center, having guidelines for preventive services, continuing medical education at conferences or workshops outside the center at the national or international level and self-dependent learning.

These results indicate that preventive medicine training for primary care physicians should be strengthened and that there is a pressing need for development of evidence-based guidelines for the implementation of clinical preventive services at primary health care level.

Results of the present study showed that most PHC physicians had positive attitude toward provision of clinical preventive medicine services at the Ministry of National Guard Health Affairs PHC clinics.

This finding is in agreement with that reported by Scott et al.[34], who reported that the majority of preventive care services were

viewed as more important to clinical practice by primary care physicians than by physicians with non-primary care specialties.

Checking participant PHC physicians' knowledge regarding premarital screening program in Saudi Arabia, the present study revealed that most participants correctly stated that hemophilia A is not a component of premarital screening program in Saudi Arabia. However, the application of different screening tests by physicians at MNGHA PHC clinics was low. Commonly implemented tests were mainly to screen for diabetes, hypertension, lipid profile, and mammography, while the least frequently implemented screening tests were those for lung cancer, melanoma, and cancer prostate. Moreover, about one fourth of participants do not apply any screening tests.

In the present study significantly more male physicians have never performed screening for osteoporosis and cancer cervix than female physicians. On the other hand significantly more female participants have never performed screening for prostate cancer than male participants.

Moreover, Woodward et al.[35] found that more female than male primary care physicians reported high coverage of female patients for female-specific preventive care measures (e.g., Pap smears, breast examinations, and mammography). They added that female PHC physicians usually question more patients about a greater number of health risks. They concluded that, PHC physician's gender can be the most prominent variable affecting delivery of clinical preventive care services.

Results of the present study showed that physicians' actions that increase their delivery of provided clinical preventive services at MNGHA PHC clinics differed significantly according to their age groups Use of a log book for preventive medicine services was highest among those aged 30-40 years and consultants, attending conferences being highest among those aged above 40 years, and random surveillance for files was highest among consultants.

These characteristics probably describe the usual work pattern and the differential responsibilities at MNGHA PHC clinics, where PHC physicians aged 30-40 years are more concerned with log books fulfillment, supervised by consultants, senior PHC physicians, aged above 40 years are more motivated toward attending conferences to acquire more up-to-date medical information, while consultants are more concerned with surveillance of files.

Results of the binary logistic regression model for practicing preventive services at the MNGHA PHC clinics in the current study showed that physicians' age group was the only significant independent variable with an odds ratio of 6.046 (95% CI: 1.392-26.258), i.e., with an age group increase there is about 6 times increase in the probability of performing preventive services by participants.

However, the study of Cornuz et al.[36], in Switzerland denied any significant differences in provided clinical preventive care services according to PHC physician's age.

The discrepancy in the finding reported by Cornuz et al.[36] and that of the present study indicates that practicing clinical preventive services at the MNGHA PHC clinics is probably more experience-related. In addition experienced and consultant have more relaxed time schedule to see patients in comparison to other groups. Consequently, there is a pressing need to motivate younger physicians at the MNGHA PHC clinics to practicing preventive services.

The present study revealed that the most frequently stated barriers to deliver evidence-based clinical preventive services at MNGHA PHC clinics were busy clinic time, physicians' limited knowledge or skills and service's recipient or patient preferences. These barriers differed significantly according to physicians' position, with limited physician's knowledge or skills and the adverse effects of the screening tests, being highest among family medicine residents for both barriers.

Snipelisky et al.[30] reported numerous barriers against the application of preventive medicine at primary care settings, e.g., lack of time, patient refusal or hesitance, and lack of physician knowledge. Yarnall et al.[32] reported that the average amount of time needed daily to discuss all preventive medicine topics was 7.4 hours per working day. Another important barrier to acknowledge is physician disagreement with the guidelines.[37-39]

Among the study limitations, the research focus on many objectives and the questionnaire was little bit long for the physicians, the research was self-funded and the researcher had to travel many time to collect from physicians, during data collection some of the physicians were on leave so I had to visit their centers many time to make sure all of them participate in the study and finally no many study with the same objectives done in the area so I had to compare more with an international studies.

In conclusion, nevertheless, despite the presence of several barriers against the application of clinical preventive services at MNGHA PHC clinics, some PHC physicians do practice it. Therefore, it is recommended that preventive medicine training for primary care physicians at MNGHA should be strengthened, especially among young physicians and evidence-based guidelines for the implementation of clinical preventive services at primary health care level should be developed.

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Source of Support: Nil.

Conflict of Interest: None Declared.

Cite this article as: Mohammed Ibrahim Alsubhi, Adel Jubran Alrogi, Badr Aljasir. Assessment of Clinical Preventive Medicine Services Knowledge, Attitude and Practice among Physicians at National Guard PHC Centers, Saudi Arabia-Western Region. Int J Med Res Prof. 2019 Jan; 5(1):163-69.
DOI:10.21276/ijmrp.2019.5.1.035