

# Assessing the Level of Health Literacy among Adult Visitors in the Primary Health Care Setting of National Guard Health Affairs, Jeddah, Saudi Arabia

Bander K. Alamari<sup>1</sup>, Badr Aljasir<sup>2</sup> & Mohammed I. Habadi<sup>3</sup>

<sup>1</sup>Department of family Medicine, King Abdulaziz Medical City, National Guard, Jeddah, KSA

<sup>2</sup>Department of Community Medicine, King Abdulaziz Medical City, National Guard, Jeddah, KSA.

<sup>3</sup>Department of family Medicine, Jeddah University, KSA, Jeddah

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## ABSTRACT:

**BACKGROUND:** Health literacy is becoming an increasingly important worldwide. Thus, adapting and validating a tool and investigating the burden of the health literacy in Saudi Arabia using such validated tool deemed necessarily. Therefore the objectives of this study are to validate an Arabic version of the Short Test of Functional Health Literacy in Adult (S-TOFHLL) as an instrument to measure the health literacy and To determine the prevalence of inadequate health literacy among adult visitors and patients in the primary health care setting of National Guard health affairs in Jeddah and the associated factors in 2010.

**METHODS:** a total of 205 visitors, aged (18 to 75 years) were randomly chosen from the primary health care setting of National Guard health affairs in Jeddah, then health literacy level measured using a validated Arabic (S-TOFHLL).

**RESULTS:** This study showed that around 83.9% (n=172) of the primary health care visitors were categorized as (adequate literacy), while around 10.2% (n= 21) were categorized as (marginal literacy) and 5.9% (n=12) of them in (inadequate literacy). It has been shown that there are significant association between the health literacy score and level of education ( $p = 0.000$ ) gender ( $p=0.010$ ) and Internet usage ( $p=0.04$ ) and the adjusted R square is (0.390).

**CONCLUSION:** Further studies need to be conducted regarding the health literacy in our Arabic community, not only describing the prevalence but also to understand the issue in more details and find out its relation with the patient behavior and the disease outcome.

## 1. Introduction

Health literacy is commonly defined as an individual's "ability to gain access to, understand and use health information" for promoting and

maintaining health. In other words it is "the degree to which individuals and communities have the capacity to obtain, process, and understand basic health information and services" needed to make appropriate health decisions. There is a direct link between health literacy and health education in the way that health literacy is a public health outcome and health education is a public health process.(1)

There are different instruments used to measure the health literacy and reading ability showing in Table 1.(2)

The problem with those individuals with low health literacy that they often feel a sense of shame and they may be too embarrassed to ask their physician to explain or repeat instructions and other relevant information. The behaviors suggestive of limited literacy are listed in Table 2.(3)

In 1993 the National Adult Literacy Survey (NALS) reports that around 21% of the adult population in the United States have inadequate reading and numeracy skills. Also The Institute of Medicine (IOM) has just released a report on health literacy, which indicates that nearly half of the adult population in the United States—90 million men and women—may have trouble understanding and acting on health information. Not only this, the Department of Health and Human Services (DHHS) added improved health literacy as one of the nation's Healthy People objectives in 2010.(4)

However, the extent to which it is a problem in many low and middle income countries has to be further researched and documented.(1) Unfortunately, our Arabic countries are not far from this.

To find out the impact of health literacy on general health, many studies were conducted in this area. They found that Literacy problems can inhibit a patient's ability to attend appointments because they may not be able to register for health insurance or follow directions to the physician's office. The majority of patients with literacy problems are unable to follow the prescription directions. They also have difficulty controlling chronic illnesses. A cross-sectional, observational study showed that patients with diabetes and inadequate health literacy have poorer glycemic control and higher levels of retinopathy than patients with adequate literacy skills. Patients with asthma and inadequate health literacy do not use their inhalers as well as patients with asthma and adequate literacy skills. Finally, patients with low health literacy are more likely to be hospitalized than those with adequate health literacy.(3)

Table 1. Instruments Used to Measure Reading Ability

Instrument	Method of assessment	Description of test
Wide Range Achievement Test (WRAT)	Word recognition and pronunciation	Offers two equivalent alternate test forms to be used individually or in combination for comprehensive test result
Rapid Estimate of Adult Literacy in Medicine (REALM)	Word recognition and pronunciation	Designed to be used in public health and primary care setting to identify patients with low reading levels
Test of Functional Health Literacy in Adults (TOFHLA)	Prompts and modified Cloze method	Used to measure functional health literacy-both numeracy and reading comprehension-using health related materials available in Spanish and English.

Table 2. Behaviors suggestive of limited health literacy skills:

Asking staff for help.
Bringing someone along who can read.
Inability to keep appointments.
Making excuses
Noncompliance with medications
Postponing decision making (“May I take the instructions home?” or “I’ll read through this when I get home.”).
Watching others (mimicking behavior)

## 2. Rationale:

Health literacy is becoming as an increasing important worldwide. Nevertheless such a topic has not been investigated in Arab world and specially saying in Kingdom of Saudi Arabia. Adding to that, the personal experience that the investigator has gained during the residency program that has shown difficulties in addressing health education subjects to the visitors and patients in primary health care setting. Thus, adapting and validating a tool and investigating the burden of the health literacy using such validated tool deemed necessarily.

## 3. Aim:

Assessing the prevalence of health illiteracy among visitors and patients in the primary health care setting of National Guard health affair in Jeddah and the associated factors using a validated tool.

## 4. Objectives:

1. To validate an Arabic version of the Short Test of Functional Health Literacy in Adult (S-TOFHLT) as an instrument to measure the health literacy.
2. To determine the prevalence of inadequate health literacy among adult visitors and patients in the primary health care setting of National Guard health affair in Jeddah and the associated factors in 2010.

## 5. Literature Review:

A study conducted in Roosevelt University in Chicago, USA, to assess adult health literacy in urban healthcare settings. The objective of that study was to determine if health literacy is lower among those using the emergency department as compared to those using community health clinics. In the overall, he found that around 20% of subjects had marginal or inadequate functional health literacy. Also he found that there was an association between literacy level and education ( $t=2.653$ , sig 0.008) and age ( $t=-6.451$ , sig 0.001).(5)

In another study done by department of family medicine in Ohio State University College of medicine, Columbus, Ohio from (2006 to 2007) to identify screening questions to predict the limited health literacy in diabetic patients, they found that around 15% of the patients have limited health literacy and it is associated with the reading ability of the patients.(6)

There is another article with name (health literacy: gap between physicians and patients) submitted in American family physician journal at august 2005, summarize some of the outcome of health literacy. It showed that inadequate health literacy can result in difficulty accessing health care, following instructions from a physician, and taking medication properly. Patients with inadequate health literacy are more likely to be hospitalized than patients with adequate skills.(3)

Finally, a large systematic review to assess the health literacy and outcome done by International-University of North Carolina Evidence-based Practice Centre in 2004 they found that patients with low literacy had poorer health outcomes, including knowledge, intermediate disease markers, measures of morbidity, general health status, and use of health resources. Patients with low literacy were generally 1.5 to 3 times more likely to experience a given poor outcome.(2).

## 6. Methodology:

### Study area:

Jeddah is a Saudi Arabian city located on the coast of the Red Sea. It is the largest city in Makkah Province, and the second largest city in Saudi Arabia after the capital city, Riyadh. The population of the city currently stands at over 3.4 million. Jeddah is the principal gateway to Makkah, Islam's holiest city.

The study was conducted in the primary health care centers of the National Guard health affair in Jeddah which is include 3 centers (Al-Iskan, Bahra and Al-Waha).

### Study period:

The field work of the study that involved collection of the data using the validated tool was in June 2010.

### Study design:

Cross-sectional study in which interviewer questionnaires to detect the prevalence of health illiteracy were distributed to the targeted population.

### Study population:

All Adult visitors male or female (more than 18 years old age) were attending the primary health care centers.

### Inclusion criteria:

Any adult male or female, Arabic speaker who is able to read.

### Exclusion criteria:

- Any visitor below 18 years old age.
- Any adult who can't read due to any vision impairment.
- Any adult with history of mental illnesses.

### Variables:

#### Independent variables:

1. age
2. gender
3. level of education
4. marital status
5. number of children
6. number of hours for watching the TV and listening to the radio
7. number of hours for reading the newspaper
8. number of hours for using internet

#### Dependent variables:

Level of health literacy (inadequate, marginal and adequate)

### Sampling:

Based on the previous study that estimated the limited health literacy which found to be 20%, sample size calculated by using Epi-info program with 90% confidence interval and the power of 80% for confidence interval width (5%) the minimum sample size needed 190 subjects. By adding the 10% to adjust the drop out for answering the questions, so the total sample size was 219 subjects.

Those 219 subjects were chosen randomly from the three primary care centers. In which 73 subjects were chosen from each center.

The duration of the study was within one month. After subtracting the weekend days, we had almost 20 working days. The average subjects to be tested in each day will be 9 to 10. The 1st subject was chosen by the reception desk randomly by a random numbering sheet. Then every third visitor was chosen consecutively.

The centers visited in the following order:

1. Al-Iskan center
2. Al-waha center
3. Bahra center

Each center was visited for the whole day. To ensure randomization in visiting the centers, the order of visiting continued in the order mentioned above. Visiting a center for a whole of the working day and the next day was for another center until fulfillment of the required sample size i.e. Saturday (Iskan center), Sunday (Al-waha center), Monday (Bahra center), Tuesday (Al-Iskan center), Wednesday (Al-waha center), Saturday (Bahra center) and so on...

Data collection and technique:

1. The Short Test of Functional Health Literacy in Adult (S-TOFHLT), it is a validated and standardized literacy assessment tool, which is used to measure health literacy. It is available in English and Spanish language which it takes usually around 7 minutes to be completed. It contains many sentences with spaces in which the subject must select a word to fit into the blank spaces from the 4 multiple-choice options provided for each space. S-TOFHLA is scored on a scale of 0 to 36. Patients are categorized as having adequate health literacy if the score is 23-36, marginal health literacy if it is 17-22, and inadequate health literacy if the score is 0-16.(7)

S-TOFHLA was translated to Arabic language by one of the official translation center in Jeddah. Then translated again after into English language to ensure proper translation. After insurance of proper translation and validity of the questionnaire, It was tested in the pilot study and the results reviewed finally by the group of expert.

2. This health literacy tool contained 2 parts:
  - The first part was about socio-demographic data, the educational background and associated factors which are contain the number of hours in watching the TV, listening to the Radio and using the internet.
  - The second part was the S-TOFHLA to measure the health literacy.

It was distributed and collected by the researcher. All the data was coded and entered to a personal computer.

Data entry and analysis:

Data was entered to a personal computer by the researcher and was analyzed by using SPSS software statistical program, version 16. Summarization of the data will be presented using tables and graphs. The prevalence of health illiteracy along with the 90% confidence interval will be presented. Multiple logistic regression will be used to determine the associated factors with health illiteracy at level of significant of 0.05. Accordingly Odds ratio for the

statistically significant associated factors was presented.

Pilot study:

The aim of the pilot study was to test the developed tool. To assess its validity among the general public, so any ambiguous word would be clarified. It helped as well into assessing the time needed to complete the questionnaire by the participants. It helped as well to assess the methodology that used into conducting the study. The pilot study was conducted among 20 adult visitors using the developed Arabic version of S-TOFHLA.

Ethical considerations:

1. Permission was taken from the joint program of family and community medicine to conduct the study.
2. Oral consent was taken from the visitors.
3. Confirming confidentiality of the data.

Budget: Self-funded.

## 7. Results:

Part I:

Constriction of a validated Arabic Questionnaire for Assessment of Health Literacy:

In order to validate an Arabic version of the Short Test of Functional Health Literacy in Adult (S-TOFHLT) as first objective of our study, the available English health literacy instrument was translated to Arabic by one of accredited translation center in Jeddah, which was retranslated to English language again to ensure proper translation.

The (S-TOFHLT) contains two main passages. Each passage contains many sentences with spaces. The subject must select a word from four multiple-choice options (to fit into the blank spaces).

The first passage about (X-ray preparation), was translated without any changes, while the second part about (MEDICAID rights and responsibilities) was replaced by (the well-known rights and responsibilities in The National Guard Health Affair) to be suitable for our settings and culture after proper consultation with experts in the field, whom were involved further to validity all contents of the questionnaire (content validity).

This new Arabic instrument was tested in a pilot study done in a Primary Health Care Centre of King Faisal Residential City for about 12 visitors. These subjects were not included in the main study result; proper modification for the questionnaire was conducted accordingly (Face validity) (appendix for the final version of the validated Arabic instrument).

Part II:

Demographical results of subjects included in the health literacy assessment:

There are 205 visitors attended the 3 different Primary Health Care Centers in National Guard Health Affairs in Jeddah were approached to participate in the study after full explanation of the study objectives and getting the appropriate approval to participate in the study.

The age of participants ranged from 18 to 75 years with an average age of 34 years and standard deviation (S.D= 11.41) (see figure1). Male visitors were 129 (62.9%) and female visitors were 76 (37.1%). See (table 1) to display the socio-demographic data of the visitors.

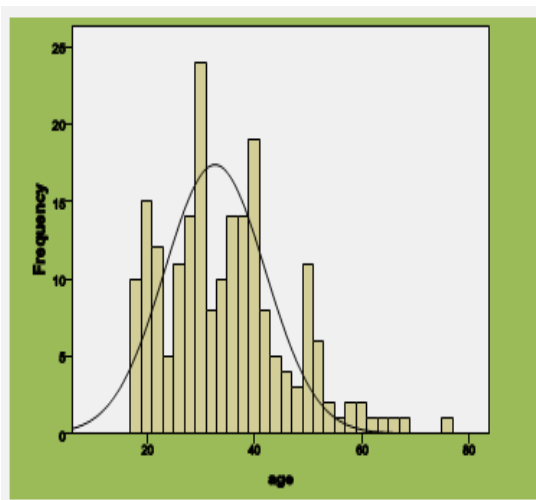


Figure 1: histogram shows age distribution of the Primary Health Care visitors of National Guard Health Affairs in Jeddah.

Using the S-TOFHLA, visitors were categorized as having adequate health literacy if the score is (23–36), marginal health literacy if it is (17–22), and inadequate health literacy if the score is (0–16). This study showed that around 83.9% (n=172) of the primary health care visitors were categorized as (adequate literacy), while around 10.2% (n= 21) were categorized as (marginal literacy) and 5.9% (n=12) of them in (inadequate literacy) (figure 2).

Categories	Variables	Frequency	Percentage
Gender	Male	129	62.9%
	Female	76	37.1%
Marital status	Married	149	72.70%
	Single	52	25.40%
	Divorced	4	2%
Educational level	Read & write	1	0.50%
	Primary	20	9.80%
	Elementary	51	24.90%
	Secondary	72	35.10%
	Bachelor	52	25.40%
	High education	9	4.40%
Number of children	No children	74	36.10%
	4 and less	66	32.20%
	more than 4	65	31.70%
Internet use	Not using	87	42.40%
	Using	118	57.60%
TV and radio use	not watching	3	1.50%
	2 and less	105	51%
	more than 2	97	47.30%
Newspapers use	not using	52	25%
	2 and less	128	62.40%
	more than 2	25	12.20%

Table 3: The different demographic data of the Primary Health Care visitors of National Guard Health Affairs in Jeddah

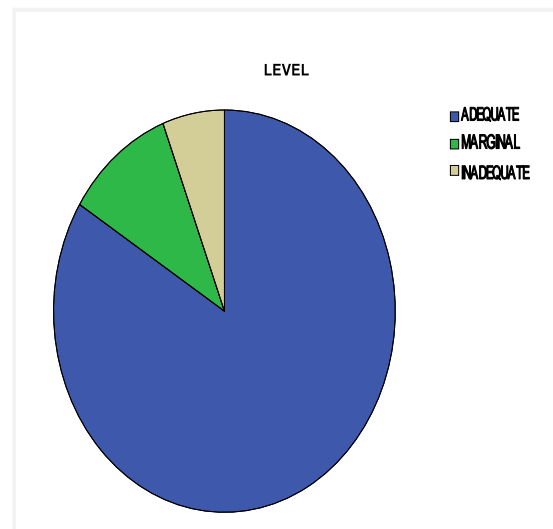


Figure 2: percentage of health literacy level of the Primary Health Care visitors of National Guard Health Affairs in Jeddah.



Table 4: Comparison of gender difference, educational level and internet usage in relation to health literacy level (scores).

Variable	Categories	Frequency/ N	Mean result of health literacy	T-test P value
Gender	Male	129	28.76	0.010
	Female	76	30.88	
Education level	below university	143	27.85	0.000
	university and above	62	33.29	
Internet usage	not using	87	26.54	0.000
	Using	118	31.67	

Part III:

Evaluation Of The Univariate Association Of Different Visitors Characteristic And Health Literacy Level

In order to compare the result of health literacy (score of the S-TOFHLA) and different demographical and other characteristic factors, using the appropriate statistical analysis test (table 2).

As we noticed in the previous table (table 2), the average score of female visitors was (30.88) and male visitors (28.76). By applying the independent T-test, it showed significant difference between the 2 means (P = 0.010) with the female performance better than male. Results also showed a significant difference in the result (P=0.000) between visitors who use the internet (mean =31.67) and those who don't (mean=26.54). Coming to a very important part of the results that showed an average score of (33.29) for those who have a university certificate or above and for those with a certificate below university was (27.85) and applying the same T-test showed a significant difference between the 2 means (p-value=0.000), the higher education level is, the more and better is the performance in the health literacy score.

In evaluating the health literacy score regarding the newspapers' reading, there was a significant association with (ANOVA test p-value = 0.005); those who read for more than 2 hours, had a higher health literacy score in comparison with those who don't (Post Hoc Test, Schiffp-value= 0.007 ), while there wasn't any significant association between the health literacy score for those who use media like TV& radio (ANOVA test p-value= 0.822) and those with different marital status (ANOVA test p-value = 0.271) (table 3).

Table 5: Association between different variables and health literacy score of the Primary Health Care visitors of National Guard Health Affair in Jeddah using the ANOVA test

Dependant variable	ANOVA test (p-value)
Read newspapers	0.005
Watch TV and listen to radio	0.822
Marital status	0.271

In order to determine the association between the level of education and different demographic data, (table 4) shows the relation between each factor and Chi Square for each was calculated. The analysis showed that the higher the certificate or level of education, the more is the percentage of using the Internet (chi Square p-value =0.000), also the more reading the newspapers was associated with higher level of education (chi square p-value = 0.007) (Figure 3, 4, 5 and 6).

Table 6: Association between educational level of the Primary Health Care visitors of National Guard Health Affair in Jeddah and different demographic data.

Demographic data	Certificate below university	University certificate	Chi Square
Gender	male	96	0.042
	Female	47	
TV & RADIO	not using	2	0.266
	2hours and less	68	
	More than 2 hrs	73	
Internet usage	not used	77	0.000
	Used	66	
Newspaper not reading	2 hours and less	43	0.007
	More than 2 hrs	12	
	Reading	88	
Newspaper reading	2 hours and less	2	0.007
	More than 2 hrs	12	

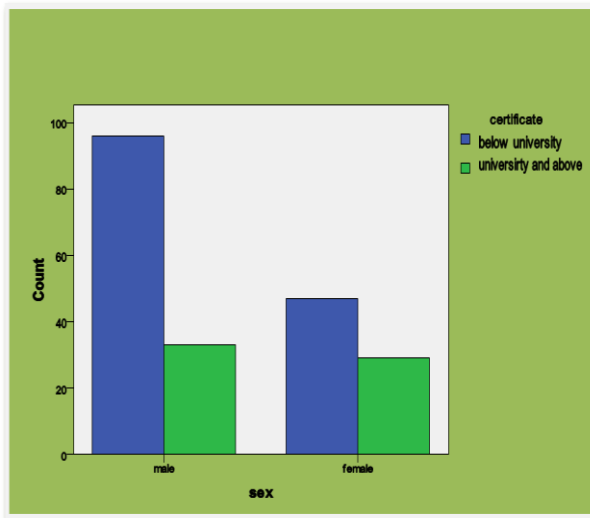


Figure 3: The relation between the level of education and gender of the Primary Health Care visitors of National Guard Health Affair in Jeddah

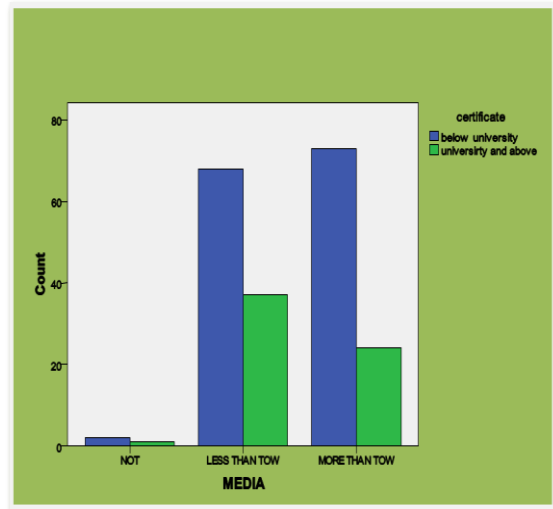


Figure 5: The relation between level of education and using the media (TV and radio) of the Primary Health Care visitors of National Guard Health Affair in Jeddah

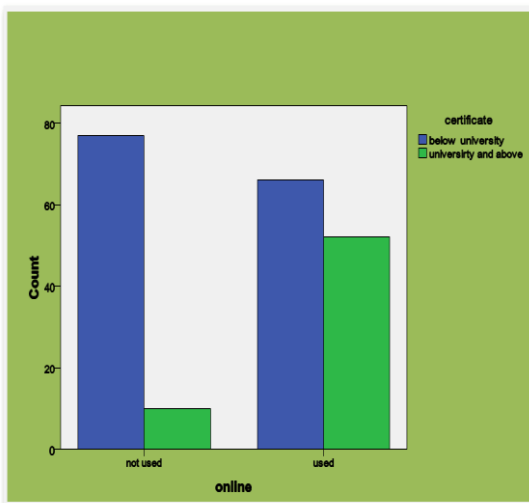


Figure 4: The relation between the level of education and internet use of the Primary Health Care visitors of National Guard Health Affair in Jeddah

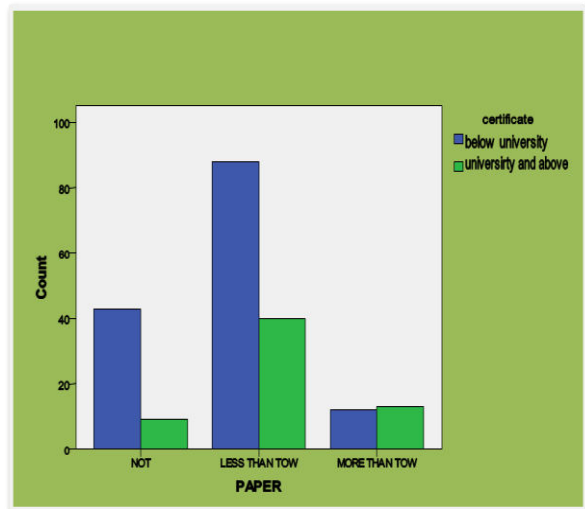


Figure 6: Showed the relation between level of education and reading the newspaper of the Primary Health Care visitors of National Guard Health Affair in Jeddah

Model	Un-standardized Coefficients		Standardized Coefficients	t-test	Sig. (p-value)
	B	Std. Error	Beta		
(Constant)	8.801	3.698		2.380	.018
Age	-.020	.037	-.038	-.548	.584
Gender	1.921	.736	.150	2.609	.010
Marital	.540	.932	.043	.579	.563
Children	.695	.595	.093	1.170	.244
Internet	1.790	.862	.143	2.075	.039
Newspaper	.063	.623	.006	.102	.919
MEDIA	.691	.657	.059	1.052	.294
Education	3.107	.391	.527	7.938	.000

Table 7: Liner regression model correlate between health literacy result of the Primary Health Care visitors of National Guard Health Affair in Jeddah and different variables

Model	Un-standardized Coefficients		Standardized Coefficients	t-test	Sig (p-value)
	B	Std. Error	Beta		
Educational	3.069	.377	.521	8.150	.000
Sex	2.114	.700	.165	3.020	.003
Internet	1.802	.798	.144	2.257	.025

Table 8: The final fitted model of liner regression shown the significant relation between (gender, internet use and education) and health literacy score

Part IV:

Liner regression between the different visitors characteristic and health literacy level:

In order to evaluate the association between different visitors characteristic and health literacy level a stepwise backward elimination liner regression model has been fitted.

The following variables were included initially in the model (sex, age, number of children, using the TV, internet use, reading the newspaper and level of education)(table 5).

It has been shown that there is a significant association between the health literacy score and level of education (p = 0.000) gender (p=0.010) and Internet usage (p=0.04) and the adjusted R square (0.390) thus this fitted model is able to explain 39% of the changes in the health literacy score. See (table 6) for the final fitted model of liner regression.

8. Discussion:

This was the first study of health literacy done in Saudi Arabia. We used a validated Arabic version of (S-TOFHLA) after it had been adapted to our population in National Guard Health Affair. Our study showed that around of 17% of the primary care visitors were low in health literacy (10.2% were marginal and 5.9% were inadequate). We found that around 82 % of the visitor were adequate in health



literacy. This result was almost comparable with study done in Roosevelt University in Chicago, USA, to assess adult health literacy in urban healthcare settings, found that around 20% of subjects had marginal or inadequate functional health literacy.(1) Our result was also close to that one done by department of family medicine in Ohio State University College of medicine, Columbus, Ohio from (2006 to 2007) to identify screening questions to predict the limited health literacy in diabetic patients, they found that around 15% of the patients have limited health literacy.(1) In study done on UK in order to measure the limited health literacy in adult population, result showed that around 11.4% of the participants had either marginal or inadequate health literacy.(1) The fact that most of the results of those studies were comparable to our study adds more validity to our Arabic version of (S-TOFHLA). In study done at Serbia, Belgrade the prevalence of inadequate and marginal health literacy was 41.0% which is higher compared with results from previous studies and explained by the author that is because of a lesser degree of health knowledge and skills, a low level of formal education, a decline associated with aging and with social stigma in their community.(1)

Our study also showed that functional health literacy was significantly different by gender (female pre-form better than male) level of education and using of the Internet. And by using the liner regression we showed that adequate health literacy more likely to be present in female, those with a higher level of education and those who using the Internet for more hours. The significant association between the low health literacy and being a male plus low level of education was the same in that study done in UK.(3) This relation was also obvious in that study done in Belgrade(4) and another one done among 2923 participants in Cleveland, OH, USA showed that approximately one-third of them had low health literacy and they are more likely to have a fewer years of education.(1)

This study designed to find out the prevalence of low health literacy in Primary health care centers of the National Guard health affair in Jeddah and we came out with a new validated Arabic version of (S-TOFHLA). This prevalence was around 17% of the visitors and we found a significant association between the low level of education, being a male and using less hours of Internet with the low health literacy.

#### Limitations of the study:

The limitations that may restrict the broader application of this study; including the sample of this study was selected from Primary health care centers of the National Guard health affair in Jeddah and the result only reflects this community. Also the Arabic version of (S-TOFHLA) was adapted to the National

Guard Health Affair visitor by using their well-known rights and responsibilities in the questionnaire. Therefore, the Arabic version might need to be adapted again for using outside National Guard. Also the predominance of male participants might have led to an underestimation of the true extent of limited health literacy, given the association between gender and health literacy, although the association had been reported by the literature. In addition investigation of other variables such as the medical condition of the visitor might improve the predication of the fitted model in the future..

## 9. Conclusion:

Health literacy has a strong impact on the general health and multiple disease outcomes.(1) We still need to have a lot of studies regarding the health literacy in our Arabic community, not only describing the prevalence but also to understand the issue in more details and find out the relation with patient behavior and disease outcome. So we can use those studies to guide policies and to propose incentives to encourage service providers and educators to facilitate health literacy in their interactions with clients, students, other community members and patients.

## 10. Recommendations:

- 1- Assessment of Health literacy needs to be determined in each primary care visitor as a part of his evaluation.
- 2- Predicted variables such as (low level of education and not using the internet) might gave an estimation of the level of health literacy.
- 3- Further evaluation of health literacy at the National level should be conducted
- 4- Further research regarding the variables that may predicted health literacy should take place such as (patient behaviors and chronic diseases) work was supported in part by a grant from the National Science Foundation.

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