


**ORIGINAL RESEARCH**

# Effect of Health Information Websites on Healthcare Facility Visits in the Eastern Province of Saudi Arabia

Mohammad AlJumaan, Ahmed A. Aldajani , Yousef Al Jamaan, Adnan Alawami, Mohammed Alarfaj, Faisal Alkhadra

Emergency Medicine Department, King Fahd Hospital of the University  
Imam Abdulrahman Bin Faisal University  
Dammam, Saudi Arabia

## ABSTRACT

**Introduction:** The internet has been widely available with 18 million users in Saudi Arabia alone. The rapid growth of internet use has proven to effect healthcare. The main objective was to determine a correlation between health-related information (HRI) website use & healthcare facility visits in the Eastern Province of Saudi Arabia.

**Methodology:** This study was designed as a survey-based cross sectional study involving the population of the Eastern province of Saudi Arabia. Data was collected by distributing a validated survey via an online survey application over a 4-month period. It consisted of demographic data and questions concerning internet use for HRI. Logistic regression was used to establish a correlation between internet use for HRI & healthcare facility visits and to see influencing factors.

**Results:** From the 1095 replies, 788 fit our inclusion criteria. 90% of our subjects have used the internet for HRI using mainly General medical websites 47.9%, Social Media 20.17%, Forums 19.16% and government websites 12.69%. We found 52.27% have used HRI websites to diagnose & treat their own medical conditions without professional medical advice. Visiting healthcare facilities after reading online HRI occurred 62.2% of the time, while the remaining did not due to being reassured of their condition. Outpatient clinics were most visited at 57.63% followed by ER & Pharmacy visits at 21.11% each. Those who have used the internet for HRI were more likely to visit a healthcare facility than those who haven't (OR(95%CI) 2.05(1.24-3.36) (p-value<0.05).

**Conclusions:** There seems to be a correlation between HRI website use & healthcare facility visits, which is influenced by level of education & occupation status.

**KEYWORDS:** Internet; Health-related information websites; healthcare; e-health.

**Correspondence :** Dr. Ahmed A. Aldajani, Dammam, Saudi Arabia P. O. Box 5473. Email: [dajaniaa@gmail.com](mailto:dajaniaa@gmail.com)

**Copyright © 2020** Mohammad AlJumaan et al. This is an open access article distributed under the [Creative Commons Attribution 4.0 International](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

## INTRODUCTION

The Internet has been widely available with over 3 Billion internet users worldwide [1] and more than 18 million users in Saudi Arabia alone [2]. The rapid growth of internet use has proven to effect healthcare. [3-4] A previous study showed that over 58% of Saudis are using the internet as a source for Health-related information (HRI). [5] It may contribute to Emergency departments (ED) over crowdedness since this is a relatively new issue

in up to 91% of EDs contributing to poor patient outcome & increased length of stay. [6-7]

In the Middle East (including Saudi Arabia), not many studies have been conducted to show the effect of HRI website use on patient visits to various healthcare facilities.[5] So, the main objective of this study is to determine a correlation between health information website use & healthcare facility visits in the Eastern Province of Saudi Arabia. We need such studies to

determine the extent of effect of HRI online on healthcare facility visits including the ED.

**METHODOLOGY**

We have conducted a cross sectional study & data was collected by distributing a validated questionnaire over a period of 4 months from June to September 2016. It was validated by our biostatistician using the Collingridge outlines for validation. The survey consisted of questions for gathering demographic data as well as questions including the use of internet for HRI, type of websites used, the reason behind the internet search, which healthcare facility they visited if any at all and whether seeking health-related information on the internet influenced their healthcare facility visits. Any response from outside the Eastern Province was excluded from our study. The survey was distributed randomly using an online survey application (Google Drive) via social media and personal interview at hospital emergency rooms and lobbies.

The target population were individuals living in the Eastern Province, Saudi Arabia involving all age groups, sexes and socioeconomic statuses. We included all responses from the Eastern Province, Saudi Arabia. We excluded all individuals from outside the Eastern Province and any incomplete response.

Statistical analysis: The data was then put on an excel sheet & analyzed using SPSS version 16. Descriptive statistics such as frequency and percentage were used for all categorical variables. Logistic regression was used to see if there was a correlation between using the internet for HRI & healthcare facility visits as well as to explain the relationship between using the internet among different demographic data & their healthcare visits.

**RESULTS**

From the 1095 replies, 788 subjects fit the inclusion criteria for this study. We excluded 307 replies due to being from outside the Eastern Province. Regarding the demographic data starting with age, those <18 years old consisted of 7.7% (61) of the population, 18-45 year olds consisted 73.4% (578), 46-55 years were 13.3% (105), and those >55 years consisted of 5.6% (44) of the population. Males represented 58.9% (464) of the population, while females represented 41.1% (324). The responders were mainly Saudi nationals consisting 92.6% (730) of the

replies, while non-Saudi nationals represented 7.4% (58) of our study population. Based on their marital status, 49.7% (392) were married, 47.5% (374) were single, & 2.8% (22) were either divorced or widowed. In regards to their level of education, those holding at least a high school diploma or less consisted of 23.7% (187) of the study population, those holding a Bachelor's degree were 67% (528), those holding a Master's degree were 6.1% (48) & PhD holders represented 3.2% (25) of our population. Regarding their occupational status, 45.9% (362) of the responders were employed, 21.3% (168) were unemployed & the remaining 32.7% (258) were full time students. (Table 1)

**Table 1: Demographic Data**

Demographic Data	Number (%)
<b>Age</b>	
< 18 years	61 (7.7%)
18 – 45 years	578 (73.4%)
46 – 55 years	105 (13.3%)
>55 years	44 (5.6%)
<b>Sex</b>	
Male	464 (58.9 %)
Female	324 (41.1%)
<b>Nationality</b>	
Saudi	730 (92.6%)
Non-Saudi	58 (7.4%)
<b>Education</b>	
At least a High School Diploma	187 (23.7%)
Bachelor's degree	528 (67%)
Master's degree	48 (6.1 %)
PhD holders	25 (3.2%)
<b>Occupation</b>	
Student	258 (32.7%)
Unemployed	168 (21.3%)
Employed	362 (45.9%)

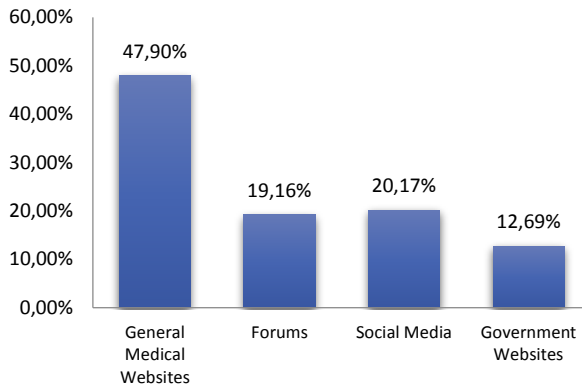
When it came to demographic data & its influence on using online HRI, we found that level of education and occupation status were the only statistically significant influencing factor for using this service. Bachelor's degree holders were more likely to have this practice than those carrying a high school diploma or less (OR(95%CI)) 2.40 (1.32 – 4.34)(p-value<0.05). Also, those who were unemployed were more likely to do so when compared to students 0.34 (0.15 – 0.80)(p-value<0.05). (Table 2)

**Table 2: Logistic regression explaining the relationship between demographic, internet usage variables to Internet health related use.**

Variable	Internet Use		Unadjusted OR		Adjusted OR	
	Yes	No	OR (95% CI)	p-value	OR (95% CI)	p-value
	n (%)	n (%)				
<b>Age</b>						
< 18 years	44(72.1)	17(27.9)	0.66 (0.26 – 1.67)	0.38	0.60(0.17-2.08)	0.42
18 – 45 years	543(93.9)	35(6.1)	3.99 (1.78 – 8.95)	0.00	2.29(0.92-5.72)	0.08
46 – 55 years	87(82.9)	18(17.1)	1.24 (0.51 – 3.03)	0.63	1.13(0.44-2.93)	0.79
>55 years	35(79.5)	9(20.5)				
<b>Sex</b>						
Male	413(89.0)	51(11.0)				
Female	296(91.4)	28(8.6)	1.30 (0.80 - 2.12)	0.28		
<b>Education</b>						
High School or less	145(77.5)	42(22.5)				
Bachelor	492(93.2)	36(6.8)	3.96 (2.44 – 6.41)	0.00	2.40 (1.33 – 4.35)	0.00
Masters	48(100.0)	0(0)	0.00 (0.00 – -)	1.00	0.00 (0.0 – -)	1.00
PhD	24(96.0)	1(4.0)	6.95 (0.91 – 52.9)	0.06	4.46 (0.55 – 36.02)	0.16
<b>Occupation</b>						
Student	232(89.9)	26(10.1)				
Unemployed	137(81.5)	31(18.5)	0.49 (0.28 – 0.87)	0.01	0.35 (0.15 – 0.80)	0.01
Employed	340(93.9)	22(6.1)	1.73 (0.96 – 3.13)	0.07	0.82 (0.36 – 1.84)	0.63

OR – Odds Ratio; CI – Confidence interval

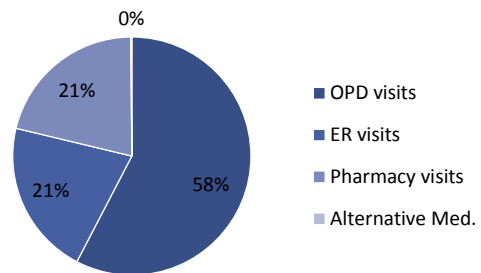
In regards to the use of internet for HRI, 90% (709) of the population have done so, while 10% (79) have not. They have obtained their HRI from sources such general medical websites (e.g. mayoclinic, webmd, etc.) at 47.9% (616), followed by social media 20.17% (259), then forums 19.16% (246) and finally government websites 12.69% (163). (Figure 1) The information that was looked for was related to their own medical condition in 38.43 % (515) of cases, a medical condition concerning someone they knew in 25.37% (340), and just for their personal interest in 36.19% (485) of the cases.



**Figure 1:** Types of websites used for obtaining HRI

The reason why people were searching for HRI online was to diagnose & treat their condition on their own without professional medical advice in 52.27% (541) of the cases, while 25.41 % (263) did so due to the inability to get a close referral or appointment. 22.32% (231) did so due to their lack of time to visit healthcare facilities. Those that have used the internet for HRI visited a healthcare facility afterwards in 62.2% (490) of cases. The remaining 37.8% (298) claimed there was no need to visit a healthcare facility after being reassured of their symptoms & conditions. The majority of those who do visit healthcare facilities, visit outpatient clinics

representing 57.63% of cases (404), followed by a tie between the ER & local pharmacies at 21.11% (148) each, while 0.14% (1) sought alternative medicine facilities. (Figure 2)



**Figure 2:** Healthcare facilities people tend to visit due to HRI websites

Our study showed statistically significant results when comparing healthcare facility visits by individuals who used the internet for HRI vs those who did not. The odds of internet users who have used the internet for HRI were more likely to visit healthcare facilities than those who do not use the internet for HRI (OR(95%CI) 2.05 (1.24 – 3.36) (p-value <0.05). There was no statistically significant difference in healthcare facility visits in our population when it came to age & sex. Bachelor’s degree holders were less likely to visit healthcare facilities when compared to those holding a high school diploma or no diploma at all with OR of 0.55 (0.38 – 0.81) (p-value <0.05). When it came to being compared to Students, both employed & unemployed people were more likely to visit healthcare facilities with an OR of 1.86 (1.23 – 2.81) (p-value <0.05) & 1.68 (1.21 – 2.34) (p-value <0.05) respectively. (Table 3)

**Table 3:** Logistic regression explaining the relationship between demographic, internet usage variables to health care visit

Variable	Health care visit		Unadjusted OR		Adjusted OR	
	Yes n (%)	No n (%)	OR (95% CI)	p-value	OR (95% CI)	p-value
<b>Age</b>						
< 18 years	33 (54.1)	28(45.9)	0.61 (0.27 – 1.36)	0.25		
18 – 45 years	360(62.3)	218(37.7)	0.85 (0.45 – 1.63)	0.63		
46 – 55 years	68 (64.8)	37 (35.2)	0.95 (0.45 – 1.99)	0.89		
>55 years	29 (65.9)	15 (34.1)				
<b>Sex</b>						
Male	281(60.6)	183(39.4)				
Female	209(64.5)	115(35.5)	1.18 (0.88 – 1.59)	0.26		
<b>Education</b>						
High School or less	126 (67.4)	61 (32.6)				
Bachelor	315(59.7)	213(40.3)	0.72 (0.50 – 1.02)	0.06	0.55 (0.38 – 0.81)	0.00
Masters	34 (70.8)	14 (29.2)	1.18 (0.59 – 2.35)	0.65	0.76 (0.37 – 1.58)	0.46
PhD	15 (60.0)	10 (40.0)	0.73 (0.31 – 1.71)	0.46	0.45 (0.18 – 1.10)	0.08
<b>Occupation</b>						
Student	139 (53.9)	119 (46.1)				
Unemployed	111(66.1)	57(33.9)	1.67 (1.11 – 2.49)	0.01	1.86 (1.23 – 2.81)	0.00
Employed	240 (66.3)	122 (33.7)	1.68 (1.21 – 2.34)	0.00	1.88 (1.33 – 2.67)	0.00
<b>Internet use for HRI</b>						
Yes	40(50.6)	39(49.4)	1.69 (1.06 – 2.70)	0.03	2.05 (1.24 – 3.36)	0.00
No	450(63.5)	259(36.5)				

## DISCUSSION

Internet use is rapidly growing in Saudi Arabia and has shown to have an impact on healthcare. [3, 4] As expected, our study has shown that there is a correlation between health information website use & health care facility visits in Saudi Arabia. Those who have used the internet for HRI are about twice as likely to visit a healthcare facility then those who have not.

It was shown that it was influenced by level education where Bachelor's degree holders who are using the internet for HRI were about half as likely to visit a healthcare facility as those holding a high school diploma or less. It is shown to be influenced by occupation as well where both employees & unemployed individuals using the internet for HRI were more likely to visit a healthcare facility then those who were students. Age & sex had no statistically significant influence on these results.

This was also shown by the fact that (62%) of the people included in our study have stated that using the internet for medical information have lead them to visit health care facilities. Interestingly, from the (62%) the most common healthcare facility visited by them were the outpatient clinics (57.63%) when compared to the ED & Pharmacy visits each at (21.11%) each. This may contribute to the ED over crowdedness as stated in a few studies, [6,7] but may also reflect that people are aware that the ED should be reserved for potentially life threatening situations. Visiting a pharmacy directly in this high percentage may be potentially harmful or at the least not beneficial for the patient. Although these points need to be studied further.

It was shown in our study that the majority of responders (73.4%) were between ages 18 to 45 years of age which is comparable to other studies, [8] and that may be due to the fact that this age group are the most to have grew up with the internet around and have had its use incorporated heavily in their day to day activities. Also, the majority held a bachelor's degree (67%) and that may be due to educated people having more access to the internet. [7,9] For those who have used the internet to seek medical information, we had 90% of the population which is considered a substantial increase from a 2012 Saudi study of 58.4% and of a Pew Internet and American Life Project study which claimed 55% of American Adults with internet access have used it for seeking medical information. [5,10] This can be attributed to the fact that internet have been made more accessible and convenient in the last 4 years.

When it came to why they were searching for HRI, (52.27%) of our population sought for medical information on the internet to diagnose their own medical condition based on their symptoms to treat it on their own. While (25.41%) said they did so due to their inability to find a close appointment. These findings are important since it seems to be the first of its kind in Saudi Arabia. This leads us to ask ourselves how effective self-treatment is when compared to visiting health care facilities. This is important since one study stated that 62% of American

internet users assessed the quality of health information on the internet as excellent & 60% thought that the information was either equal to or superior to of a doctor's. [11] Another study done in the USA showed that 79% of those who did not seek professional medical help stated that looking up the information online was enough for them not to do so. [8] The general population seems to trust online information regardless of the source. In an Indian study, 95% of the responders found the information in internet to be reliable. [12] A Hispanic study showed that most of the responders agree that internet health information helps them understand their medical conditions and gives them confidence to talk to doctors about their health concerns. [13] Thus it is our role as health-care providers to educate the patients about which sites to use to look up health-related information and which to avoid. Regarding those who were unable to find a close appointment, we need to see why this is the case to further improve our health care system.

A surprising finding in our study was that official government websites were the least to be used by the participants with a low (12.69%) while (20.17%) have used social media as a source for their medical information. Most of the participants were using general medical websites as their main source followed by forums. This is potentially dangerous since it has been shown that much of the internet information is inaccurate, inadequate or obsolete as well as commercial in use. [14-16] On the other hand, one study showed that searching for health related information was related with a decrease in unnecessary visits to health facilities. [17] Another study showed that 48% have improved their behavior toward their health based on information they found in the internet. [18] It was also shown that patients looking for HRI were associated with improvement in patient health, more understanding of their disease and overall general health, better patient-physician relationship. [10,18] That is why we should embrace online health-information rather than dismissing it. Also, this is why it is important for doctors to discuss the use of the internet to obtain health information correctly and direct people to the correct websites and platforms as without proper guidance this habit may cause more harm. [15,19]

The large sample size of (788) is what increases the strength of our study; however a limitation is that it may not represent the total population because we only targeted internet users. We need to increase the sample size and increase the duration in which the data is collected as well as pass the survey on non-internet users as well.

For further studies we would like to answer the question of how frequently do people go to medical websites for information as well as how their knowledge of the English language, acuteness or chronicity of the disease affected the frequency of their searches. We would also like to know how affective their self-treatment is when compared to visiting a health care facility.

## CONCLUSION

In conclusion, this study suggests that there is a correlation between health-related information website use & healthcare facility visits. It was shown that those who have used the internet for HRI were about twice as likely to visit a healthcare facility than those who have not, especially to the outpatient clinics in the Eastern Province of Saudi Arabia. This is influenced by level of education & occupation, but not age & sex.

## AUTHORS' CONTRIBUTIONS

The participation of each author corresponds to the criteria of authorship and contributorship emphasized in the [Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly work in Medical Journals](#) of the [International Committee of Medical Journal Editors](#). Indeed, all the authors have actively participated in the redaction, the revision of the manuscript and provided approval for this final revised version.

## ACKNOWLEDGMENT

Nil

## REFERENCES

- [1] Kim P, Homan JV, Metzger RL, Breese J. Blurred Lines: Defining the Motives for Mobile and Social Media Use for Marketing Strategy. In Proceedings of the Conference on Information Systems Applied Research ISSN 2015 (Vol. 2167, p. 1508).
- [2] Hoda N, Ahmad AR, Melibari A. Analysis of Demographic Factors, Internet Usage and Online Shopping for Social Media Users in Saudi Arabia.2014
- [3] Saudi Arabia - Internet usage, broadband and telecommunications reports. [Internet] (accessed 15/10/2016). Available from: <http://www.internetworldstats.com/me/sa>
- [4] Murray E, Lo B, Pollack L, Donelan K, Catania J, Lee K, et al. The impact of health information on the Internet on health care and the physician-patient relationship: national U.S. survey among 1,050 U.S. physicians. *J Med Internet Res.* 2003 Aug 29;5(3):e17. DOI:10.2196/jmir.5.3.e17
- [5] AlGhamdi KM, Moussa NA. Internet use by the public to search for health-related information. *Int J Med Inform.* 2012 Jun;81(6):363–73. DOI:10.1016/j.ijmedinf.2011.12.004
- [6] Schneider S, Zwemer F, Doniger A, Dick R, Czapranski T, Davis E. Rochester, New York: A decade of emergency department overcrowding. *Acad Emerg Med.* 2001;8(11):1044–50. DOI:10.1111/j.1553-2712.2001.tb01113.x
- [7] Di Somma S, Paladino L, Vaughan L, Lalle I, Magrini L, Magnanti M. Overcrowding in emergency department: an international issue. Vol. 10, *Internal and Emergency Medicine*. Springer-Verlag Italia s.r.l.; 2015. p. 171–5. DOI:10.1007/s11739-014-1154-8
- [8] Siliquini R, Ceruti M, Lovato E, Bert F, Bruno S, De Vito E, et al. Surfing the internet for health information: An Italian survey on use and population choices. *BMC Med Inform Decis Mak.* 2011;11(1). DOI:10.1186/1472-6947-11-21
- [9] Cotten SR, Gupta SS. Characteristics of online and offline health information seekers and factors that discriminate between them. *Soc Sci Med.* 2004 Nov;59(9):1795–806. DOI:10.1016/j.socscimed.2004.02.020
- [10] Fox S, Rainie L. Pew Internet and American Life Project. The online health care revolution: How the web helps Americans take better care of themselves. November 26, 2000. [Internet] (accessed 18/06/2020). Available from: <https://www.pewresearch.org/internet/2000/11/26/the-online-health-care-revolution/>
- [11] Diaz JA, Griffith RA, Ng JJ, Reinert SE, Friedmann PD, Moulton AW. Patients' use of the Internet for medical information. *J Gen Intern Med.* 2002;17(3):180–5. DOI:10.1046/j.1525-1497.2002.10603.x
- [12] Akerkar SM, Kanitkar M, Bichile LS. Use of the Internet as a resource of health information by patients: A clinic-based study in the Indian population. *J Postgrad Med.* 2005 Jun;51(2):116–8.
- [13] Peña-Purcell N. Hispanics' use of Internet health information: An exploratory study. *J Med Libr Assoc.* 2008 Apr;96(2):101–7. DOI:10.3163/1536-5050.96.2.101
- [14] Skinner H, Biscope S, Poland B, Goldberg E. How adolescents use technology for health information: Implications for health professionals from focus group studies. *J Med Internet Res.* 2003;5(4):53–68. DOI:10.2196/jmir.5.4.e32
- [15] Shon J, Marshall J, Musen MA. The impact of displayed awards on the credibility and retention of Web site information. *Proc AMIA Symp.* 2000;794–8.
- [16] Impicciatore P, Pandolfini C, Casella N, Bonati M. Reliability of health information for the public on the world wide web: Systematic survey of advice on managing fever in children at home. *Br Med J.* 1997;314(7098):1875–9. DOI:10.1136/bmj.314.7098.1875
- [17] Wanless D. *Securing our Future Health: Taking a Long-Term View Final Report.* 2002.
- [18] Chen X, Siu LL. Impact of the media and the Internet on oncology: Survey of cancer patients and oncologists in Canada. *J Clin Oncol.* 2001 Dec 1;19(23):4291–7. DOI:10.1200/JCO.2001.19.23.4291
- [19] Cline RJ, Haynes KM. Consumer health information seeking on the internet: The state of the art. *Health Educ Res.* 2001;16(6):671–92. DOI:10.1093/her/16.6.671

A large portion of internet users for HRI are visiting healthcare facilities. However, many are using potentially inaccurate medical information from general medical websites, social media and forums, while official government websites were used the least. Further studies need to be done to assess this behavior on public health.

## STATEMENT OF ETHICS

“The authors have no ethical conflicts to disclose.”

## DISCLOSURE STATEMENT

“The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript”

## FUNDING SOURCES

Nil