Online Health Information (OHI) Utilization among Selected Worksite Employees in Taiwan

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Abstract

Purpose - *This study compared Internet and online health information (OHI) utilization among selected employees age 40-49 and 50-64 years, and examined the influence of age, gender, education, and worksite.* ***Methods -*** *A questionnaire was administered to participants from two worksites in Taiwan.*

Results - *A total of 527 employees completed the survey (mean age = 46.21 years). Participants age 40-49 years old were more likely to have ever gone online (84.8% vs. 60.0%), visited Internet more frequently and stayed longer. They were also more likely to seek for OHI (77.8% vs. 56.4%), find OHI useful, and change health behaviors. After adjusting for gender, education, and worksite, those age 40-49 years were still more likely to utilize the Internet (OR=2.86), to use it every day (OR=1.87), and to stay more than an hour (OR=2.24).*

Conclusion – *Findings provide researchers and workplace managers better understandings on OHI behaviors among middle age employees in Taiwan. This is the first international study using some of the same Internet and OHI measures developed in the U.S. and piloted in Taiwan, and examining OHI behaviors by key demographic characteristics including worksite. The results could build important foundation for future cross-nation comparisons, as well as Internet studies on health communication.*

Keywords *Internet, Online Health Information, Utilization, Employees, Taiwanese / Chinese*

Introduction

The rapid growth in use of the Internet for acquiring health information has received a great deal of attention in recent years. The Pew Internet Study estimated 8 in 10 U.S. Internet users have looked for online health information (OHI).[1] The recent Health Information National Trends Survey (HINTS) report [2] also indicated that more than two-thirds of U.S. adult use the Internet, and about 60 percent of the online users have searched OHI. Although physicians are still the preferred first source of health information, only a small portion of the U.S. population reported their physicians being the first line of inquiry, while near 50% reported that the Internet as their first source.[3] This trend remains consistent in recent HINTS data, which indicated the two most frequently used sources of cancer information was the Internet (55.3%), followed by health care providers (24.9%).[4]

The increased Internet utilization is also true among older adults. In a national survey of older Americans on how seniors use the Internet, Kaiser Family Foundation [5] reported that although less than a third of all seniors have ever gone online, 70% of those age 50-64 years have used the Internet. As these individuals get older, seniors using the Internet are likely to increase dramatically. Data suggest the huge untapped opportunities with online health interventions for older adults.

A few international studies have also begun to examine online health behaviors among samples beyond the U.S. population. Huntington and colleagues[6] examined public's use and attitudes towards a range of interactive online health services among a British sample. Results showed that older populations have increasing interests in gaining health information.[6] Their study found those aged over 65 were four times as likely to email their doctor compared to those 24 years and younger, and those in poor health were approximately 10-13 times more likely to have participated in an online support group compared to those in only fair, good or excellent health. However, the overall online health services utilization was still relatively low (approximately 8-14%) despite extensive consumer interests at the time of the study. Chung and colleagues[7] recently conducted a qualitative study examining OHI use and barriers among older adults in Korea. But this was only a small portion that looked at a specific population group and there is an urgent need to continue research efforts to provide more data on OHI utilization among populations around the world, and especially in the middle and older-age groups.

In addition to age factor, certain demographic characteristics also could shape individuals' online health behaviors. Examples include males seeking information about sexual health,[8] women using OHI to help cope with illness,[9] and people with stigmatized illness[10] and chronic conditions[11] utilizing the Internet to gain information on treatments. These may be due to the sensitive nature of their conditions and/or merely gender-based characteristics. Further examination on OHI utilization and the key social-demographic factors is needed.

With the rapidly aging population worldwide, it is imperative that researchers fill the knowledge gap on eHealth communication beyond the U.S. population. While most studies have analyzed the older population by age groups of 50-64 and 65+, early signs and symptoms of many chronic diseases may begin in those ages of 40 and older.[12, 13] Women also may face greater risk of developing cardiovascular disease once reaching age 40 years.[14] These studies and others indicated that the younger middle age group also needs more attention.

The current study was designed to include the younger middle age adults (40-49 years), in addition to the older middle age group (50-64 years), and examines their Internet and OHI utilization to assess the potential of eHealth communication before they reach their senior or retirement years. Since adults spend more than one-third of time at work, the type of workplace setting should also be taken into consideration when examining these groups. The study analyzed the bi-variate as well as combined adjusted influence of age, gender, education, and worksite on Internet and OHI utilization. This was the first international study using some of the same Internet and OHI utilization measures developed in the U.S. national studies[1,5] and piloting among a selected Taiwanese working adult sample.

Methods

Participants

The survey was administered to employee age 40+ years in two worksites in Taiwan, a traditional industrial car company and a high-tech manufacturing company. To increase the possibility of piloting eHealth programs among employees age

40+ years, we intentionally selected two different types of worksite and both with ongoing employee health programs to examine how worksite characteristics might play a role on employees' OHI behaviors. The majority employees in both companies were assembling-line workers. The car company is a U.S. company and was established in 1972 in Taiwan. The company has great employee health benefits with an onsite outpatient clinic. It also has an onsite nurse who coordinates various health promotion programs. The high-tech manufacturing company was established in Taiwan in 1971. The company has a long history of collaboration with the occupational medical specialist team from a major national university in Taiwan with its onsite outpatient clinic. It has two full-time wellness managers and an onsite nurse who coordinate various health promotion programs. The two types of companies were chosen to allow the researchers the ability to preliminarily examine and understand the potential influence the type of workplace has on employee's OHI utilization. The selection of these two specific sites was also partly due to their long-term commitment and exemplary efforts on employee health and wellness, as well as the history of collaboration with the researchers.

Data collection

The same data collection procedures were used for both worksites. The research team communicated with the site managers and nurses about the study purpose, consent procedures, and collaboratively discussed ways to identify eligible participants. Site unit leaders and nurses assisted in recruitment, with study purpose and procedures explained during unit meetings. Employees age 40+ were given the self-administered survey, with assistance provided as needed. Completed surveys were returned to the site nurse, with a pedometer as a thank-you gift.

Measurement

Internet Utilization: Items on Internet utilization including ever online, frequency, location, perceived usefulness of online health information, etc. were adapted from the "Health Care and the Internet Survey" developed by the Princeton Survey Research Associates for the Pew Internet in American Life Project.[1]

OHI Behaviors: OHI behaviors refer to using the Internet to gather health information.[12, 15] Some items were adapted from the national survey of older Americans on eHealth and the elderly conducted by the Kaiser Family Foundation.[14] Sample questions asked participants whether discussed OHI with others, changed behavior or made treatment decisions because of OHI found, and whether discussed OHI with health providers.

Age group classification: The current study included younger middle age (40-49 years) in addition to the older middle age (50-64 years) working adults. Due to the societal norms and policies in many organizations and companies in Asia, retirement age of 65 years is commonly accepted and mandated in many situations. Thus, it was not surprising that the study had a very small sample of employee age 65 and older. The accumulated evidence and resulting information from the study can help to determine the Internet and OHI utilization and bridge our knowledge gap among these individuals as they transient into their senior ages.

Data analyses

SPSS was used for data analyses. Dependent variables of interests were the Internet and OHI utilization. Bivariate analyses using cross-tabulations and chi-square were utilized to examine the influence of demographics on dependent variables (Tables 1 & 2). Demographic variables with significant associations ($p<0.05$) with one or more dependent variables were included in the multiple logistic regression models to assess the adjusted effect when considering all demographic variables at once. All possible interaction terms were also examined, and the various Internet and OHI utilization variables were re-coded into binary variables for the multiple logistic regression analyses.

Results

Participant Characteristics

A total of 533 employees participated in this study, 6 were age 65+ years and were excluded from the analyses. Among the remaining 527 individuals, 251 (47.6%) were from the car company and 276 (52.4%) from the high-tech company. Most participants were married (87.3%). The mean age was 46.21 (SD=5.01) years. Nearly three-fourth of the participants aged between 40-49 years. The age distributions are proportion to that of the respective participating companies.

There was no significant difference on gender between the two age groups. However, adults age 50-64 years were less likely to have college education (25.0% versus 50.9%; p<.001). Participants from the car company also tended to be a few years older (47.9 vs. 44.7 years old; p<.001).

Bivariate Analyses of Internet Utilization by Age

Overall, participants in the 40-49 age group were more likely to have gone online or used emails (84.8% vs. 60.3%; p<.001), and used Internet at workplace (33.2% vs. 14.9%). Majority of the participants used the Internet everyday, the proportion was higher for the 40-49 age group (52.7% vs. 32.8%; p<.001). Table 1 presents data on Internet utilization by age group.

Multiple Logistic Regression Analyses of Internet Utilization by Age

None of the interaction terms were statistically significant on any of the dependent variables and thus were not included in the final logistic regression analyses. The demographic variables included in the multiple logistic regression models were age, gender, education, and worksite. The multiple logistic regression models were used to assess the adjusted effects on Internet and OHI utilization (Table 3).

After adjusting for gender, education, and worksite, data showed that employees age 40-49 years old were still more likely to have ever gone online (OR=2.86; 95% CI=[1.75, 4.69]), used the Internet everyday (OR=1.87; 95% CI=[1.18, 2.97]), and stayed online longer (OR=2.24; 95% CI=[1.44, 3.48]). However, the difference of online location by age group was no longer significant. Table 3 provides results on multiple logistic regression analyses of Internet utilization and OHI seeking behaviors by age, gender, education, and worksite.

Bivariate Analyses of OHI Utilization by Age

Participants age 40-49 years old were more likely to have searched OHI (77.8% vs. 56.4%; p<.001). Overall, about one-third of the participants considered OHI very useful. Over half of the participants have discussed OHI with others, changed behaviors, or made treatment decision from OHI. Half of the participants considered Internet or emails very important part of their life, while a significant higher portion of the 50-64 years indicated that they could live without the Internet or emails (27.1% versus 14.5%). Table 2 presents OHI utilization by demographics.

Multiple Logistic Regression Analyses of OHI Utilization by Age

After adjusting for other demographic variables, results showed that participants age 40-49 years were still more likely to had ever sought OHI (OR=1.85; 95% CI=[1.18, 2.90]), changed behaviors due to OHI (OR=1.79; 95% CI=[1.16, 2.75]), or discussed OHI with doctors / nurses (OR=1.67; 95% CI=[1.10, 2.55]). However, there were no longer significant differences between age groups on discussing OHI with others, their view towards the usefulness of OHI, or importance of life with the Internet (see Table 3).

Internet and OHI Utilization by Gender, Education, and Worksite – Bivariate and Multiple Logistic Regression Analyses

Bivariate analyses showed that overall male participants had higher Internet and OHI utilizations. After adjusting for other demographic variables, results still showed that males were more likely to have gone online (OR=1.97; 95% CI=[1.17, 3.32]), visited the Internet everyday (OR=2.19; 95% CI=[1.43, 3.34]), made treatment decision from OHI (OR=1.84; 95% CI=[1.24, 2.72]) and view life with the Internet as very important (OR=2.06; 95% CI=[1.36, 3.12]).

Bivariate analyses showed that, except for making treatment decision or discussing OHI with doctors, having a college education was significantly associated with all the Internet and OHI variables. After adjusting for other demographic variables, all the relationships remained.

Participants in the high-tech manufacturing company were more likely to have ever gone online, visited the Internet more frequently and stayed longer, and have sought for OHI. There was no significant relationship between worksite and the rest OHI related variables. After adjusting for age, gender, and education, most of the significant relationships disappeared, except that high-tech company participants were still more likely to stay online longer and go online from workplace.

Discussion

This study showed that although participants age 40-49 years old were more likely to have gone online or

used emails (85%), over 60% of the selected participants age 50-64 years old had already gone online or used emails as well. The overall Internet utilization prevalence is similar to that of the U.S. population found in the recent HINTS study.[9] Data showed significant portion of both the 40-49 years (>50%) and 50-64 years (33%) in the current study used Internet everyday, with those 40-49 years adults used the Internet more frequent, longer, and sought OHI. The overall online frequencies among selected participants in Taiwan in the current study were, however, lower compared with those in the U.S. The 2010 Pew Internet Study data showed that over 90% of those ages 50-64 years send or read emails; and more than half exchange email messages on a typical day.[16] Nevertheless, results of the current study pointed that around half of the participants, regardless of age groups, considered Internet or emails very important part of their life. The proportion of this view towards the importance of the Internet was in fact higher comparing with the 2005 Kaiser Family Foundation's report among older adults aged 50-64 years in the US.[15]

Regarding OHI behaviors, comparing with the adults age 50-64 years in the Kaiser study report,[5] more participants of the 50-64 age group in the present study indicated making treatment decision (45% vs. 35%) and changing behaviors (52% vs. 37%) due to OHI, but less reported discussing OHI with doctors / nurses (39% vs. 50%). Although this study used the same measures of Internet and OHI behaviors as those used in the U.S. studies, it should be noted that participants in the current study have different characteristics and variables when compared with the U.S. samples. Culture and social factors might play a role, and further research is needed to explore and examine some of the differences found from these preliminary observations. For example, doctors tend to be viewed with less authority and fewer communication on health information in the Chinese society or Asian countries.[17, 18] The level of trust towards OHI among older adults in the U.S. might also be different from the Chinese societies.[10] These data suggest the need for further research on culture factors and beliefs towards eHealth communication with developing age.

The data analyses results showed that after adjustment for demographics, male participants had higher Internet and OHI utilization. These were consistent with recent studies within and outside the U.S. that men are more likely to report a positive OHI seeking experience than women.[7, 19] Education consistently associated with most of the Internet utilization and OHI behaviors. On the other hand, the influence of worksite became non-significant after adjusting for age, gender, and education.

This study highlighted important differences as well as similarities in participants of different age, gender, education, and worksite characteristics regarding their Internet and OHI utilization. This was one the first studies to examine the combined influence and relationships among some of the most important social-demographic factors. A major limitation of the present study was the non-representative study sample which could limit the generalization. It is likely that the prevalence and utilization of Internet and OHI might differ among different demographic groups or samples. It should be noted that the two participating worksites both have active employee health promotion programs, thus employees from these sites might have different health information seeking behaviors than other working adults. Although the current study used existing standardized survey items developed in the U.S. population studies, reliabilities and validities of these items were not available. In addition, the dichotomized process of some of the dependent variables for the multiple logistic regression analyses in the current study was somewhat arbitrary. However, the researchers made their best effort using data to support and supplement with expert judgment for these cut-off decisions (e.g. meaningful or comparable sample sizes in each binary category, societal norms on Internet utilization among Asian older adults). The current study was able to describe the relationships of key demographic characteristics and their influence on the Internet and OHI utilization after adjusting for other important variables. Cultural, contextual and structural constructs could intertwine with other socio-ecological constructs as determinants of OHI utilization, and these factors should be examined further among the understudied middle- and older-age groups, as well as populations beyond the U.S. border. Future studies might consider examining how these relationships change or whether these relationships hold true among similar age adults in another country or different environment context.

Conclusion

In summary, this study compared and piloted some of the standard measures used in U.S. national studies on Internet and OHI utilization among participants age 40-49 and 50-64 years old in Taiwan. Results were discussed and compared with some U.S. based survey results preliminarily. Although studies have been conducted among different U.S. population groups, little attention has been paid to countries

outside the U.S. This preliminary study took the first step to examine these issues among people with different demographics and in different countries and more studies are needed. In addition, studies are needed to further examine beliefs towards eHealth communication or using Internet and social media as a potential platform for health communication. Furthermore, research to explore culture and societal factors, preferred design features, and delivery channels are important for addressing the current knowledge gap and for developing tailored eHealth communication programs for older adults across the borders.

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Table 1: Internet utilization by participants' age groups (40-49 years vs. 50-64 years)

	Age	
	40-49 years	50-64 years
	N (%)	N (%)
Ever online		
Yes	323 (84.8%)	82 (60.3%)
	$X^2_{(1)}$=35.40; p<.001**	
Online location		
Home	216 (56.4%)	88 (65.7%)
Work	127 (33.2%)	20 (14.9%)
Other	40 (10.4%)	26 (19.4%)
	$X^2_{(2)}$=19.30; p<.001**	
Online freq.		
Everyday	203 (52.7%)	47 (32.8%)
3-5 days / wk	85 (22.1%)	18 (13.7%)
1-2 days / wk	41 (10.6%)	23 (17.6%)
Less frequent	56 (14.5%)	47 (35.9%)
	$X^2_{(3)}$=37.57; p<.001**	
Online duration		

<1 hr / day	109 (28.9%)	71 (54.2%)
1-2 hr / day	157 (41.6%)	42 (32.1%)
3-5 hr / day	75 (19.9%)	7 (5.3%)
>=6 hr / day	36 (9.5%)	11 (8.4%)
	$X^2_{(3)}$=32.71; p<.001**	

Notes:

NS= statistically non-significant (p>.05)

** $p \leq .01$; * $.01 < p < .05$

Table 2: Online health information (OHI) utilization by participants' age groups (40-49 years vs. 50-64 years)

	Age	
	40-49 years	50-64 years
	N (%)	N (%)
Ever seek OHI		
Yes	298 (77.8%)	79 (56.4%)
	$X^2_{(1)}$=27.29; p<.001**	
OHI usefulness		
Very useful	123 (32.3%)	42 (30.9%)
Somewhat useful	232 (60.9%)	76 (55.9%)
Not useful	26 (6.8%)	18 (13.2%)
	NS	
Discussed OHI with others		
Yes	228 (59.5%)	68 (48.6%)
	$X^2_{(1)}$=5.01; p=.016*	
Changed behaviors due to OHI		
Yes	259 (67.8%)	72 (52.2%)
	$X^2_{(1)}$=10.70; p<.001**	
Made treatment decision from OHI		

Yes	198 (52.1%)	62 (44.9%)	
		NS	
Discussed OHI with doctors / nurses			
Yes	188 (49.3%)	54 (38.8%)	
		$X^2_{(1)}$=4.51; p=.021*	
Importance of life with the Internet			
Very important	201 (52.9%)	52 (40.3%)	
Not very important	124 (32.6%)	42 (32.6%)	
Can live without	55 (14.5%)	35 (27.1%)	
		$X^2_{(2)}$=11.80; p=.003**	

Notes:

NS= statistically non-significant (p>.05)

** $p \leq .01$; * $.01 < p < .05$

Table 3: Multiple logistic regression analyses of Internet utilization and online health information utilization by age, gender, education, and worksite

DV [a] IV [b]	Age [c]	Gender [c]	Education [c]	Site [c]	Model Statistics
Ever online (Yes)	OR=2.86** [1.75, 4.69][e]	OR=1.97** [1.17, 3.32]	OR=6.26** [3.41, 11.49]	ns [d]	$X^2_{(4)}$=91.8**; 80.0% correct
Online location (Home)	ns [d]	ns [d]	ns [d]	OR=.313** [.21, .47]	$X^2_{(4)}$=46.8**; 64.4% correct
Online Frequency (Everyday)	OR=1.87** [1.18, 2.97]	OR=2.19** [1.43, 3.34]	OR=3.57** [2.43, 5.25]	ns [d]	$X^2_{(4)}$=82.6**; 67.3% correct
Online Duration (>=1hr / day)	OR=2.24** [1.44, 3.48]	ns [d]	OR=2.73** [1.81, 4.12]	OR=1.64* [1.10, 2.49]	$X^2_{(4)}$=62.8**; 68.9% correct
Ever seek online health info. (OHI) (Yes)	OR=1.85** [1.18, 2.90]	ns [d]	OR=3.99** [2.49, 6.41]	ns [d]	$X^2_{(4)}$=63.9**; 73.7% correct
Usefulness of OHI (Very useful)	ns [d]	ns [d]	OR=1.52* [1.03, 2.24]	ns [d]	ns [d]
Discuss OHI with others (Yes)	ns [d]	ns [d]	OR=1.65** [1.14, 2,39]	ns [d]	$X^2_{(4)}$=13.1**; 60.0% correct
Changed behaviors due to OHI (Yes)	OR=1.79** [1.16, 2.75]	ns [d]	OR=1.93** [1.30, 2.85]	ns [d]	$X^2_{(4)}$=26.5**; 66.0% correct
Made treatment decision from OHI (Yes)	ns [d]	OR=1.84**	ns [d]	ns [d]	$X^2_{(4)}$=15.1**; 57.6% correct

		[1.24, 2.72]			
Discussed OHI with Dr./Ns. (Yes)	OR=1.67** [1.10, 2.55]	ns [d]	ns [d]	ns [d]	ns [d]
Importance of life with the Internet (Very important)	ns [d]	OR=2.06** [1.36, 3.12]	OR=3.32** [2.26, 4.89]	ns [d]	$X^2_{(4)}$=63.3**; 66.0% correct

Notes:

[a] DV – dependent variables.

[b] IV: independent variables.

[c] Reference groups: Age (50-64 Years), Gender (Female), Education (<College), Site (Traditional industry company).

[d] ns: statistically non-significant.

[e] OR=Odds ratio, 95% Confidence Intervals = [95% C.I.].

** $p \leq .01$; * $.01 < p < .05$