

# The Impact of Age on the User Habit and Awareness of Personal Information Protection

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## ABSTRACT

With the rapid development and data circulating on the Internet, some information crimes have emerged. User awareness and behavior play a major role to ensure information security and provide maximum security.

In addition, although the literature provides studies on information security teaching curricula, there is a few evidence of the effect of age on information security in Saudi Arabia. Therefore, this study investigates the effect of age and its relationship to the user's security awareness. A survey of 106 participants from educational departments was done for this reason. It's interesting to note that the findings showed that age has a partial influence on computer, web, and email security crimes.

## General Terms

K knowledge of Cybercrimes.

## Keywords

Information Security, Security awareness, Age, password security, email security

## 1. INTRODUCTION

Information security is vital for all individuals, organizations, and society as a whole because information security is the basis of most daily activities. With the rapid development of technologies and the spread of various means of communication throughout the world and the creation of greater connectedness among persons, finance, and business, there is an urgent need to understand what information security is and how to protect individuals and organizations from information risks. Information security means protecting data from misuse, unauthorized access, disclosure, disruption, modification, reading, inspection, recording, or destruction [1]. Recently, it has become necessary to focus on protecting privacy and increasing the level of security. One of the frequent problems with people's cybersecurity assurance is their inappropriate online behavior. In fact, because of the many errors, people make online, some studies have labeled humans as the primary weak link in cybersecurity [2]. Simple errors like using a virus-infected pen drive or opening questionable email attachments (which may be in executable file formats) or even clicking a malicious phishing link that was distributed through social media groups. Identifying users who are more vulnerable to risk and cybercrime requires the ability to understand how personal differences among internet users influence their cybersecurity behaviors. This knowledge is crucial for organizations, institutions, security practitioners, and researchers. Previous studies showed that there are many factors that have a clear impact on the level of people's awareness of the security problems they may be exposed to and ways to protect their personal information, the most important of these factors are gender, age, education level, and others [3],

[4]. Moreover, older people have been specially targeted by cyber criminals [5]. One of the most vital components of assuring security in information technology is user awareness and habits regarding sensitive information [6]. In addition, there is a significant impact of education level on all security issues in computer, web, and email usage [6],[7]. Other authors built systems to help social network users to improve the idea of using different applications from one

Appropriate platform to increase their awareness about cyberattacks [8]. Others [9] tried to predict self-disclosure along with demographics (age and gender) on cybersecurity awareness. In today's digital age, personal information protection has become a critical concern for individuals of all ages. The increasing reliance on technology and the proliferation of online platforms have raised questions about the impact of age on user habits and awareness regarding personal information protection. This literature review aims to synthesize existing research findings to shed light on this important topic. [10] Explored the influence of social media platforms on awareness of public health behavioral changes and public protection against COVID-19. Their study revealed that the use of social media platforms can positively influence awareness in these areas. This finding implies that individuals, regardless of age, can leverage social media platforms to enhance their understanding of personal information protection and adopt appropriate behaviors. [11] examined the drivers of intentions to use mobile applications for restaurant searches and/or reservations (MARSR). They identified several factors that influence users' intentions, including habit, perceived credibility, hedonic motivation, price-saving orientation, effort expectancy, performance expectancy, social influence, and facilitating conditions. Moreover, habit, facilitating conditions, and intentions to use were found to be significantly related to actual use. This suggests that individuals, irrespective of age, can develop habits and utilize mobile applications to enhance their awareness and protection of personal information. [12] assessed healthcare workers' knowledge, attitude, and practice regarding personal protective equipment (PPE) for the prevention of COVID-19. They found that healthcare workers had an overall good knowledge and a positive attitude but poor practice regarding PPE. Although this study focuses on healthcare workers, it highlights the importance of bridging the gap between knowledge and practice in personal information protection for individuals of all ages. [13] investigated the impact of users' security awareness on desktop security behavior using the Protection Motivation Theory (PMT) perspective. They found that security awareness significantly affects perceived severity, response efficacy, self-efficacy, and response cost. Furthermore, constructs in the coping appraisal process, except response cost, significantly impact recommended security behavior. This suggests that individuals with higher security awareness are more likely to engage in secure behaviors to protect their personal information. While the provided research findings offer valuable insights into the

impact of age on user habits and awareness of personal information protection, there are still some knowledge gaps that warrant further investigation. Future research could explore the specific role of age in shaping security awareness, behavior, and attitudes towards personal information protection. Additionally, studies could delve into the effectiveness of different educational interventions and awareness campaigns targeted at different age groups to enhance personal information protection practices. The previous literature review highlights the significance of age in shaping user habits and awareness of personal information protection. The findings suggest that security awareness, social media platforms, mobile applications, and knowledge gaps; all play a role in influencing individuals' behaviors and attitudes towards personal information protection. Further research is needed to deepen our understanding of these dynamics and develop targeted interventions to promote effective personal information protection practices across different age groups. As the increase of cybersecurity crimes and attacks there is still the need for several investigating studies and solutions to increase the awareness about the attacks.

## 2. MEHODOLOGY

The primary objective of the current study is to conduct a statistical analysis to determine how age, an independent (decision) variable, affects the user's habit and awareness regarding personal information when using computers, web services, and e-mail. The purpose of the research model is to provide the answer to the following primary question:

- Does age have an impact on user habit and awareness regarding personal information when using information and communication technologies (ICT)?

The dependent variables were categorized for this purpose into ten main empirical factors:

1. Previous knowledge of Cybercrimes & Information Security.
2. Password type.
3. Using names and birthdays as a password.
4. Changing Passwords.
5. Sharing Passwords with Others.
6. Having Antivirus Software.
7. Updating the Software.
8. Opening Links without inspecting.
9. Answering messages which ask for bank information for update purposes.
10. Security issues.

In this direction, the following hypotheses have been tested:

- Age and user habit & awareness regarding personal information when using (ICTs).

Hype. Definition:

H1 There is a significant association between Age and Previous knowledge of Cybercrimes & Information Security.

H2 There is a significant association between Age and choosing password types.

H3 There is a significant association between Age and choosing weak password types.

H4 There is a significant association between Age and changing passwords.

H5 There is a significant association between Age and sharing Passwords.

H6 There is a significant association between Age and having Antivirus Software.

H7 There is a significant association between Age and updating the Software.

H8 There is a significant association between Age and opening Links without inspection.

H9 There is a significant association between Age and answering malicious messages which ask for bank information.

H10 There is a significant association between Age and Security issues.

## 3. DATA GATHERING

We sent out an online survey to a number of employees of Sarat Abidah Education department, Asser region Saudi Arabia. The survey was randomly sent via online mediums such as email and WhatsApp groups, among others. A total of 106 respondents were gathered, however, only 80 were eventually used for the final analysis. This was due to issues of redundant and double entry as this was detected via our online system.

The distribution among the participants with respect to age groups and positions level was normal. Among the 80 valid respondents for the age distribution, 1 responder was below the age of 25, 36 responders were between 25 and 35, 39 responders were between 36 and 45 while the remaining 4 were above the age of 46; In respect of their position levels, 61 of the participants were teachers, 11 were Educational Supervisors, 3 were School managers while the remaining 5 participants are uncategorized.

There are twelve items in the questionnaire, and each one indicates a discrete variable as listed in Table 1. This study suggested independent variable which are "Age", and the dependent variables are "Awareness", "Password\_type", "Weak\_password", "Password\_changing", "Password\_sharing", "Antivirus\_SW", "SW\_updating", "Links\_opening", "MaliciousMsg\_answr", and "Security\_issues".

In the results section, this will be shown more clearly. Each participant received enough information on the purpose of this study as well as the steps involved in participating.

**Table 1 Summary of research Questions and variables**

#	Variable	Definition	Range of values

1	Age	What is your age?	<25, 25-35, 36-45, >46
2	Position_level	What is your occupation?	educational supervisor, school manager, teacher, other
3	Awareness	Do you have Previous knowledge of Cybercrimes & Information Security?	Yes, NO
4	Password_type	What is the combination of your passwords?	“Letters Only”; “Lowercase Letters and Numbers”; “Uppercase & Lowercase Letters Only”; “Uppercase, Lowercase Letters and Numbers”; “Uppercase, Lowercase Letters, Numbers & Symbols”
5	Weak_password	Do you use names and birthdays as a password?	Yes, No
6	Password_changing	How Often do you change your passwords?	Weekly, Monthly, Yearly, Never
7	Password_sharing	Do you share your passwords?	Yes, No
8	Antivirus_SW	Do you have Antivirus software?	Yes, No, Don’t know
9	SW_updating	Do you Update software?	Yes, No, Don’t know
10	Links_opening	Do you open Links without inspection?	Yes, No, Only trusted People
11	MaliciousMsg_answr	Do you Answer messages which ask for bank information for the update purpose?	Yes, No, Sometime
12	Security_issues	Have you ever experienced any cybercrime or security issues?	Yes, No

## 4. DATA ANALYSIS

The Chi-Square test was used to assess ten hypotheses (H1-H10) about how age factor affects the usage behavior of users and security awareness for computer, web, and email services. To determine whether there is a relationship between the rows and columns in a contingency table, the chi-square test statistic is applicable [7],[8]. Also, it should be obvious that the Chi-square test only provides information on the likelihood that a data distribution is independent. Therefore, after we discovered that there was a relationship between two variables, we could look at alternative approaches to determine how much they were related [9], [10], [11], [12], [13].

### 4.1 Results and findings

First of all, the survey results are initially reported using descriptive analysis. Then, test findings for the tested hypotheses by using Chi-Squared Test are presented after this.

#### 4.1.1 Descriptive results

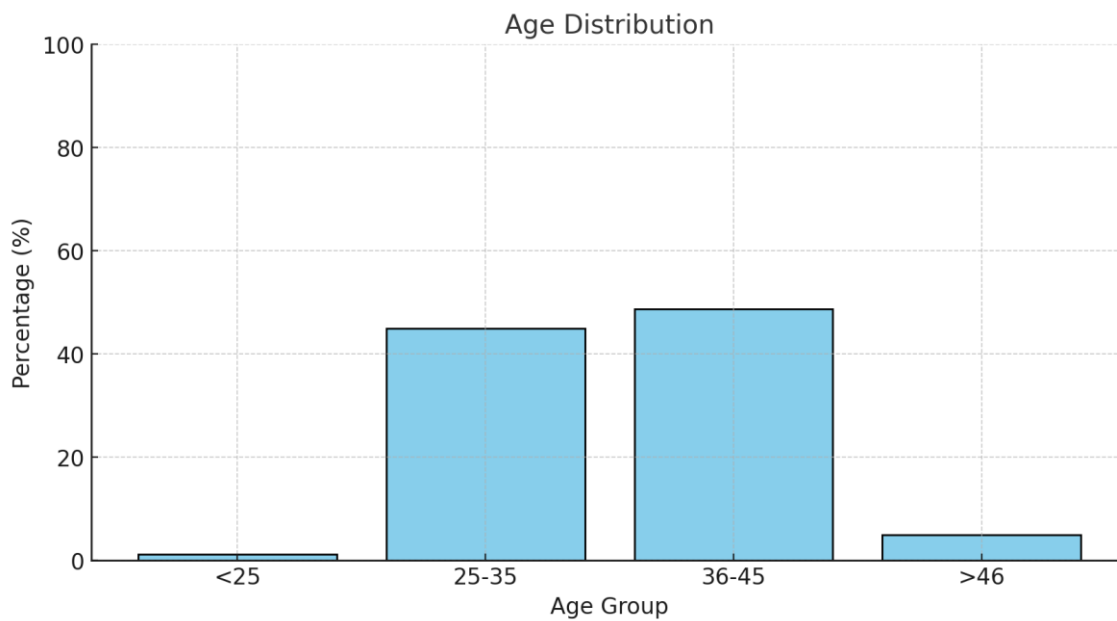
Table 2 provides the background information of the respondents. All respondents are female since the study focuses on the female section of Sarat Abidah Education department. Moreover, most of the respondents’ age varies between 25 and 46 and this is normal since we conduct the research in the educational department and this is the dominant age of most of the employees there. As a result, we considered the respondents who are between 25 and 35 years old as the younger group while the older group is between 36 and 45 years old. In this survey, 33.3% of the younger respondents reported that they have no previous knowledge of Cybercrimes & Information Security compared with 51.3% of the older respondents. Also, 27.78% of the younger group uses a strong password type compared with 15.38% of the older ones. However, 38.9% of the younger respondents reported the use of names and birthdays as passwords compared to 35.9% of the older group. Also, 63.89% of the younger group never changes passwords compared to 61.54% of the older ones. 11.11% reported the sharing of passwords and this percentage was for younger employees while 17.95% of the older ones shared their

passwords. In addition, 27.77% of the younger respondents do not know if they have antivirus software or they actually do not have it at all compared to 43.59% of the older respondents. For the updating software, 33.34% of the younger ones reported “do not know” or “No” updating for the software compared to 48.72% of the older ones. Moreover, the percentage of younger respondents who open links without inspection is 38.88%

compared to 69.24% of the older respondents. For Answering messages which ask for bank information for the update purpose, 7.69% of the older group reported “sometimes” they answer it, while no one of the younger respondents answered this kind of message. Finally, 2.78% of the younger respondents reported security issues compared to 7.69% of the older ones. Results are provided in Table 2, Figure 1 & 2 below;

**Table 2 Profile of respondents**

Age	Count	Percent	Position level	Count	Percent
<25	1	1.25	Teacher	1	1.25
>46	4	5.00	educational supervisor	11	13.75
25-35	36	45.00	Other	5	6.25
36-45	39	48.75	school manager	3	3.75
			Teacher	60	75.00
N=	80		N=	80	



**Fig 1. Age distribution**

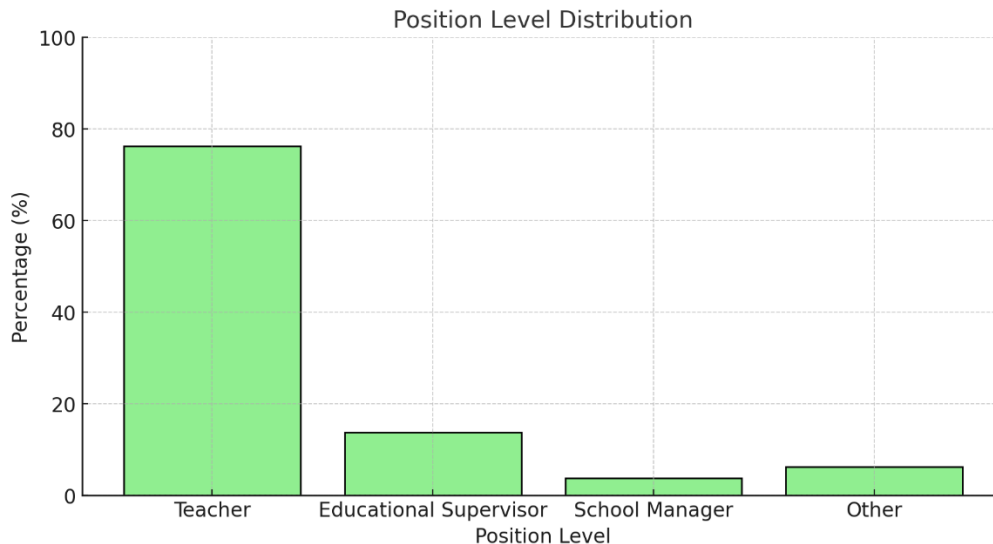


Fig 2. Position level distribution

#### 4.1.2

#### 4.1.3 Test results

The Chi-Square test results for all hypotheses is illustrated in Table 3. For the first hypothesis, there is only one degree of freedom at 5% of significance level; The Chi-Square ( $\chi^2$ ) critical value is 3.841 and the chi-square statistic value is 2.4653. The p-value is .116383. The result is not significant at  $p < .05$ , which means there is no significant association between Age and Previous knowledge of Cybercrimes & Information Security.

In the second hypothesis, a chi-square test of independence showed that there is no significant association between Age and choosing password types; because the chi-square statistic value is 4.5387 which is smaller than the ( $\chi^2$ ) critical value with 3 degrees of freedom (7.815). The p-value is .208865. So, the result is not significant at  $p < .05$ .

Also, a chi-square test of independence was performed to examine the relation between Age and choosing weak password types. The relation between these variables is insignificant, the chi-square statistic is 0.0716. The p-value is .789016. The result is not significant at  $p < .05$ . As a result, we failed to reject the null hypothesis.

Regarding the assumption of association between Age and changing passwords, we failed to reject the null hypothesis and accept the alternative one since the chi-square statistic is 2.1936 and the p-value is .403019.

Therefore, the result is not significant at 5% of the significance level.

For the fifth hypothesis, there is one degree of freedom at 5% of significance level; the ( $\chi^2$ ) critical value is 3.841 and the chi-square statistic value is 0.6993. The p-value is .116383. The result is not significant at this level of significance, this means

there is no significant association between Age and password sharing.

In the sixth hypothesis, a chi-square test of independence showed that there is no significant association between Age and having Antivirus Software; because the chi-square statistic value is 4.5387 which is smaller than the ( $\chi^2$ ) critical value with 2 degrees of freedom (2.3465). The p-value is .30936. So, the result is not significant at  $p < .05$ .

Moreover, a chi-square test of independence was performed to explore the relationship between Age and Software updating. The association between these variables is insignificant, the chi-square statistic is 3.2084. The p-value is .201054. The result is not significant at  $p < .05$ . As a result, we failed to reject the null hypothesis.

However, it is interesting to find that Age and opening Links without inspection are associated together. The ( $\chi^2$ ) Statistic Value (7.2434) is greater than the ( $\chi^2$ ) Critical Value (5.991) which is referred to as dependency. Additionally, the P-value is .026737 which is less than the significance level at .05; As a result, we can safely accept the alternate hypothesis and reject the null hypothesis at 95% confidence level.

For the alternate hypothesis of an association between Age and answering malicious messages which ask for bank information, we failed to reject the null hypothesis and accept the alternative one because the chi-square statistic is 1.6827, as well as the p-value, is .194567. Hence, the result is not significant at 5% of the significance level.

Finally, for the H10 assumption of the relation between Age and Security issues, we failed to prove this hypothesis because of the p-value (.343987) which is more than the significance level at .05 as well as the lower ( $\chi^2$ )

Statistic Value (0.8955).

Table 3 Chi-Square Test results against groups of age

HYPOTHESIS	INDEPENDENT VARIABLE	DEPENDENT VARIABLE	DEGREE OF FREEDOM	(X2) CRITICAL VALUE	(X2) STATISTIC VALUE	P-VALUE
H1	Age	Awareness	1	3.841	2.4653	.116
H2	Age	Password_type	3	7.815	4.5387	.208
H3	Age	Weak_password	1	3.841	0.0716	.789
H4	Age	Password_changing	2	5.991	2.1936	.33
H5	Age	Password_sharing	1	3.841	0.6993	.40
H6	Age	Antivirus_SW	2	5.991	2.3465	.309
H7	Age	SW_updatig	2	5.991	3.2084	.20
<u>H8</u>	<u>Age</u>	<u>Links_opening</u>	<u>2</u>	<u>5.991</u>	<u>7.2434</u>	<u>.026</u>
H9	Age	MaliciousMsg_answer	2	5.991	1.6827	.19
H10	Age	Security_issues	1	3.841	0.8955	.34

## 5. CONCLUSION

This paper presents the findings of a survey conducted among the participants from the educational department in Saudi Arabia. The results show in general that age may have a role in the security of personal information. Since the age had some significant impact on awareness of information security, efforts should also be directed towards increasing the awareness level of employees in the educational departments in parallel to rapidly changing technology via seminars, conferences, and Training in a practical way, as they deal with sensitive data and information, and raising their awareness will contribute to raising awareness of those who deal with them, whether their families, students, and co-workers.

There are some limitations to this study. The number of participants was not very sufficient, and the sample was limited to a certain group in a particular sector and did not include different segments and a larger number of the community. The expansion of the increase in the number and diversity of groups will have a greater impact on the results of the study. Other factors that may have an impact, such as gender, educational level, and income, should also be investigated.

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