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Analysis of Antivirus Software Usage among Organizations in Niger State

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ABSTRACT
The use of computers and the internet in many organizations is growing rapidly. Many organization systems are prone to viruses due to their usage of the internet and other external drives, which can easily transmit viruses. We aim to assess the proportion of organizations with updated anti-virus software in Tafa L. G. A Niger and to determine the common virus among the organizations. We used a good structure questionnaire to conduct a cross-sectional survey among 60 organizations in Tafa L. G. A. Niger state. Sixty organizations were surveyed; fifteen (25%) were in educational organizations, eight (13.3%) were in business organizations, nine (15%) were in religious originations, five (8.3%) were in political organization, eleven (18.3%) were government organization and twelve (20%) were in private organization. Thirty-eight (63.3%) organizations surveyed reported failure to secure their systems by regularly updating their antivirus software against virus threats in contrast to twenty (36.6%). The top three reported computer virus infections in organizations in Tafa L. G. A. were: ***Trojan horse****, 20 (33.3%),* ***Brontok worm****, 15(25.0%), and;* ***Ravmon log.exe,*** *6(10.0%). 10(16.6%) organizations whose computers were recently infected could not remember the name of the virus. The top-three anti-virus software in use by organizations in Tafa L. G. A. included: MacAfee antivirus, 30 (50.0%); Kaspersky antivirus, 10 (16.6%); and Norton antivirus 10 (16.6). The common barrier by most organizations in updating their computer is: Busy schedule 20(33.3%), Lack of knowledge about antivirus updating 25(41.6%), high cost of genuine antivirus software 15(25%) were barriers to updating antivirus software. Anti-virus software should be regularly updated among organizations due to the increase of the virus in many external drives and the internet. Organizations should be careful in making use of external drives and should be careful in downloading information from the internet with an unknown source to avoid the downloading virus.*

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INTRODUCTION

Viruses are programs or codes which affect and damage the computer system by replicating itself. They are downloaded into the computer system without the knowledge and permission of the computer user. Virus attacks the system files and documents. Viruses include Worm, Trojans, and A typical computer virus also known as a file virus attach itself to a file or program which enables it to travel from one computer to the next, leaving infections in its wake. (Laabes E. P., Nyango, Ayedima, & Ladep, 2010).The typical computer virus would attach itself to an executable program so that it can spread once the program runs; thus, the continuing spread of a virus solely depends on human action (e.g., a mouse click). Other sources of infection include external hard drives, flash

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drives, floppy disks, and compact disks. Aggrieved employees may also post viruses on an organization's local intranet. In contrast, a *worm* does not depend on human action to spread because it utilizes a computer's file and information transport system to travel unaided. What makes a worm lethal is its ability to replicate itself on a computer, so that it sends multiple copies of itself to any other computer with which its host communicates. In this fashion, a single worm can cripple several vulnerable computer networks. A *Trojan horse*, like a worm, represents another virus sub-class, which masquerades as a desirable or legitimate software or file from a reliable source, but which inflicts damage once opened. An additional feature of a Trojan horse is its ability to create a backdoor on a computer, allowing malicious software to collect personal information such as passwords, bank accounts, and credit card information. Unlike typical viruses or worms, a Trojan horse does not replicate itself or infect other files. (Fred, 1983). A combines the features of all virus subclasses, capitalizes on all vulnerabilities, spreads through multiple routes, and causes multiple harmful effects. All malicious software is referred to as *malware*, with viruses being the most common. Spyware refers to seemingly innocent software that embeds itself into a computer's browser and collects personal information such as emails, passwords, and bank account or credit card details which it sends to a third party. A *Rootkit* is a special type of spyware in which a hacker takes control of a computer, and uses it to infect other computers. (Laabes E. P., Nyango, Ayedima, & Ladep, 2010)

Anti-virus software is a program designed to conduct periodic checks on a computer, to remove the most common types of viruses (Henry, 2013). Software developers continuously update their programs to counter the never-ending computer security threats. The development of anti-virus programs began in 1987 when the Internet precursor, Advanced Research Project Agency Network (ARPANET), a large network of computers belonging to the US Department of Defense, was infected by a virus. Since then, many anti-virus software programs have been developed and made available to computer users worldwide. In Nigeria, most genuine anti-virus programs can only be obtained via online purchase; a situation made more precarious by non-availability and in some cases non-acceptance of credit cards from Nigeria. The free downloads available online do not contain most of the security features (add-ons) that come with the commercial packages. All anti-virus programs require updating regularly as new malicious threats are continuously emerging a ponderous requirement in Nigeria, owing to erratic and mostly crawling internet networks.

Many organizations and enterprises in Nigeria have undergone a rapid transformation with the advent of computers and the internet. Business owners now make use of computer systems to keep a proper record of their data and other important information. Many organizations are taking advantage of the internet to make advertisements and get relevant information to promote their organization. (Mehta, 2008) However, as the use of computer system and the internet increase in any organization, the risk of being affected by the virus also increase, these have led to the loss of many organizational data and another relevant document. Because of the increase of viruses on daily basis, many powerful Antivirus software has been made available to secure data and important documents on the computer. Antivirus software also detects and deletes the virus in the computer system. In this paper, a critical analysis was carried out in Tafa L. G. A., Niger state; from 2020 - 2021 to know the rate at which organizations secure their data and relevant document against system viruses.

REVIEW OF RELATED WORKS

Computer crime losses to US businesses exceeded $137 million in 1997, which is a 30% increase from 1996. US business firms that were recently surveyed indicated that virus attacks were highly visible (70% of the respondents indicated being victimized). Loses to virus attacks were determined to be 15% of total computer loss. Virus threats were among the top 4 areas of business computer crime loss, followed only by financial fraud, telecommunications fraud, and the theft of proprietary information (Computer Security Institute); The Analysis was carried out by (DiDio, 1998). The analysis shows the level of damages that has been caused by virus attacks

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on many business organizations in the US between the years 1996 to 1997.

The National Computer Security Association (NCSA) estimates that a typical virus attack costs an average of almost $8400 to correct. Recently a financial institution reported that a virus attack cost the firm $2.3 in lost transactions in three days. Increased virus attacks and infestations have challenged existing antivirus software products to stem the tide. Antivirus software vendors (F-Prot)constantly upgrade and modify their product lines to stay current. New types of anti-virus software are being developed to counter virus threats (David, Cole-Gomolski, DiDio, 1997). (Bontchev, 1998) Discusses the need for exact virus identification and targeting as a method of macro virus defense. The arguments used by (Bontchev, 1998) are (1) misidentification problems (2) Non-removal due to incorrect identification (3) inadequate technical support (4) reporting and monitoring factors (5) reducing the false-positive effect. All support the basis for designing products and processes that are constantly upgraded and refined. Both (Solomon, 1992) and (Nachenberg, 1997) discusses the various types of anti-virus software that are on the market and the trends that appear in reducing virus attacks. The problem of certain virus strains does not display easily detectable code manifestations (Nachenberg, 1997). The needs for an effective assessment of the business damage caused by viruses are not very well understood. The issues about virus cost correction, the ongoing anti-virus strategy of a firm, the overall effectiveness of antivirus software, updated procedures for detection software to be replaced, and the personal cost that is used with virus outbreaks need to be determined.

AIM

The research aims to assess the management use of updated anti-virus software in their organization or enterprise in Tafa L. G. A, Niger state from 2020 - 2021 with the following specific objectives:

1. To determine the proportion of management using updated anti-virus software on their computers;
2. Identify recent and most common virus infections in the organization system and its sources.
3. Identify the top three anti-virus software in use by organizations and barriers in updating antivirus software;

METHODOLOGY

A survey was developed to identify how business firms respond to computer virus threats. Current security practices entail the following activities to reduce the impact of virus presence: (1) management policies, (2) anti-virus software, and (3) backup procedures. (Gerald and Albert) Questions addressing how business combines these three techniques to mitigate virus threats need to be understood, as well as a method to determine the effectiveness of a particular procedure. The effectiveness of these practices has to be measured against the cost of implementation and the damage that may be incurred from a virus episode. It was necessary to create a survey method to identify these trade-offs. This survey was developed based on the questionnaire method and analysis responses from the interview, which was randomly carried out among 60 organizations in Tafa L. G. A., Niger State. Respondents were contacted by phone or e-mail. The final version of the survey reflected the comments and suggestions of the security specialists

From the responses, obtain from the questionnaire; Sixty organizations were surveyed; fifteen (25%) were in educational organizations, eight (13.3%) were in business organizations, nine (15%) were in religious originations, five (8.3%) were in political organization, eleven (18.3%) were government organization and twelve (20%) were in private organization. Out of Fifty (83.3%) organization that makes use of computers; forty (66.6%) make use of laptop and ten (16.6%) make use of desktop computers. Out of forty (66.6%) that make use of the database, thirty-five (58.3%) make use of Microsoft access, and five (8.3%) Microsoft excels to store their data. Thirty-eight (63.3%) organizations surveyed reported failure to secure their systems by regularly updating their antivirus software against virus threats in contrast to twenty (36.6%). Table 1 below shows

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responses of 60 organizations in Tafa L. G. A. to questions on basic computing.

Table 1: show responses of 60 organizations to questions on basic computing

QUESTIONS:	**Response: No (%)**	**95% Confidence Interval**
Make use of a computer?		
Yes	50(83.3)	78.2 – 85.0
NO	10(16.6)	10.2 – 20.5
Does your organization have database software that contains data of customers?		
Yes	40(66.6)	50.2 – 75.5
NO	20(33.3)	25.5 – 40.3
Heard of computer viruses?		
Yes	35(58.3)	44.3 – 65.0
NO	25(41.1)	36.4 – 48.7
Have your organization lost customers' data before due to a virus?		
Yes	45(75.0)	66.6 – 85.0
NO	15(25.0)	15.2 – 30.5
Able to clean recent virus infection?		
Yes	22(36.6)	20.1 – 45.8
NO	38(63.3)	45.5 – 70.0
Use an external storage drive?		
Yes	55(91.6)	85.4 – 99.0
NO	5(8.3)	4.0 – 12.8
Trained workers on hardware repair & maintenance?		
Yes	10(16.6)	13.4 – 20.0
NO	50(80.6)	71.3 – 87.0
Browse the internet with a firewall?		
Yes	50(83.3)	78.2 – 85.0
NO	10(16.6)	10.2 – 20.5
Use updated antivirus		
Yes	22(36.6)	32.3 – 40.3
NO	38(63.3)	52.3 – 70.0

From table 1 above Our survey show that 45(75.0) organization systems have been affected by the virus, 22(36.6%) organization system have updated antivirus software and 38 (63.3%) organization system do not have updated antivirus software in Tafa L. G. A. Niger state.

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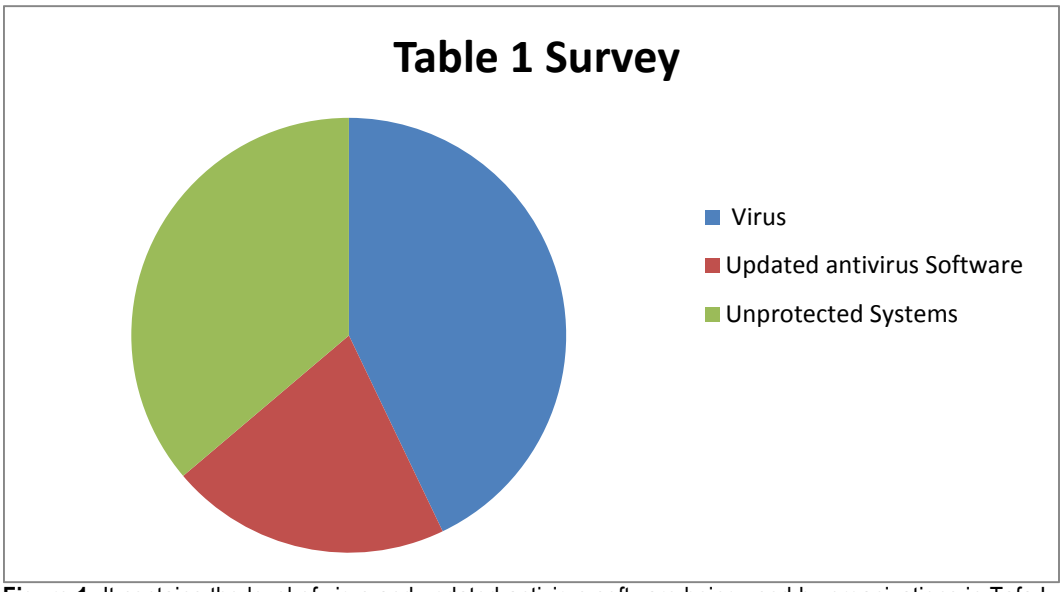

Figure 1: It contains the level of virus and updated antivirus software being used by organizations in Tafa L. G. A. Niger state.

Types of Recent and Common Virus Infection in Organization

From the responses obtained from the questionnaire, the top three reported computer virus infections in organizations in Tafa L. G. A. were: **Trojan horse**, 20(33.3%), **Brontok worm**, 15(25.0%), and; **Ravmon log.exe,** 6(10.0). 10(16.6) organizations whose computers were recently infected could not remember the name of the virus. The top-three sources of organization virus infection were: internet, 20(33.3), offline computer, 10(16.6); and; flash drives, 10(16.6). Table 2 describes the different types of virus infections including their sources and the 'vectors' responsible for transmission. The reported effects of virus infection on organization computers in Tafa L. G. A. included: operating system malfunction, 20(33.3%); hanging and slowing, 15 (25.00%), and; data loss, 6 (10.0). 10 (16.6) organizations (10.8%) reported no untoward effects following PC infection.

Table II: Recent and most common virus infections in organization computers and their sources.

Recent virus infection No (%)	Source of infection No (%)	Vector of transmission No (%)
Dont know 10 (16.6)	Don't know 30 (50.0)	Flash drive 30 (50.0)
Trojan horse 20 (33.3)	Off line computer 10(16.6)	External hard drive 20 (33.3)
Brontok worm 15 (25.00)	Internet 20(33.3)	Floppy disk 10 (16.6)
Ravmonlog.exe+ Trojan horse 6 (10.0)	Flash drive 10(16.6)	
Trojan horse + Brontok worm 5 (8.3)		
Trojan Shipli + W32.rungbu 4(6.6)		

Types of Anti-Virus Software in Use by Organizations

The top-three anti-virus software in use by organizations in Tafa L. G. A. included: MacAfee antivirus, 30 (50.0); Kaspersky antivirus, 10 (16.6); and Norton antivirus 10 (16.6); Several organizations, 30(50.0%) obtained antivirus from free downloads, 2 (3.3) obtained anti-virus software from a vendor, 8 (13.3) obtained antivirus from gift and 20 (33.3) purchased anti-virus software online.

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Table 3 shows the reported types of anti-virus software in use, how these were obtained, and what software organization to use.

Table III: the reported types of anti-virus software in use

Anti-virus in use No (%)	How Anti-virus obtained No (%)	Preferred Anti-virus No (%)
MacAfee 30 (50.0)	Free download 30(50.0)	MacAfee 30(50.0)
CAAnti-virus 2 (3.3)	Software Vendor 2(3.3)	Kapersky 10 (16.6)
Avast 3 (5.0)	Online purchase 20(33.3)	Norton 10 (16.6)
Kapersky 10 (16.6)	Free gift 8(13.3)	
Panda 5 (8.3)		
Norton 10 (16.6)		

Types of Barrier in Updating Antivirus Software

The barriers by most of the organizations in updating their computer are: *Busy schedule 20(33.3%),* Lack of knowledge about antivirus updating 25(41.6%), high cost of genuine antivirus software 15(25%) *were barriers to updating antivirus software. They are:*

1. Busy schedule 20(33.3%),
2. Lack of knowledge about antivirus updating 25(41.6%),
3. High cost of genuine antivirus software 15(25%)

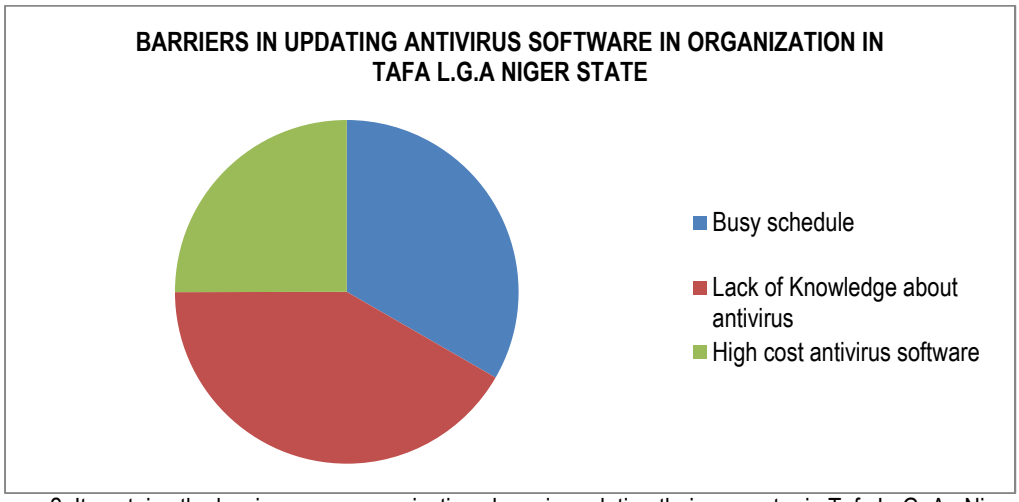

Figure 2: It contains the barriers many organizations have in updating their computer in Tafa L. G. A., Niger state

RESULTS

Characteristics of Subjects

From the responses, obtain from the questionnaire; Sixty organizations were surveyed; fifteen (25%) were in educational organizations, eight (13.3%) were in business organizations, nine (15%) were in religious originations, five (8.3%) were in political organization, eleven (18.3%) were government organization and twelve (20%) were in private organization. Out of Fifty (83.3%) organization that makes use of computers; forty (66.6%) make use of laptop and ten (16.6%) make use of desktop computers. Out of forty (66.6%) that make use of the database, thirty-five (58.3%) make use of Microsoft access, and five (8.3%) Microsoft excels to store their data. Thirty-eight (63.3%) organizations surveyed reported failure to secure their systems by regularly updating their antivirus

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software against virus threats in contrast to twenty (36.6%).

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CONCLUSION

The use of updated anti-virus software is sub-optimal among physicians, implying increased vulnerability to computer viruses. Physicians who routinely browse the internet with a firewall are likely to be more security conscious and to be less susceptible to computer virus infections after they research **Physician use of updated anti-virus software in a tertiary Nigerian hospital**. From our survey, it was concluded that organizations who make use of internet and external drives like flash drive floppy disk, etc are highly prone to virus infection and organizations should have updated antivirus software. We recommend that every organization should have a computer security expert who specializes in securing all the computers in the organization. We also recommend that more antivirus software should be developed to detect the virus in an external drive.

REFERENCES

Bontchev, V. (1998). Macro Virus Identification Problem. Computer & Security , 17 (1), 69-89.

Cyren's Cloud-Based Security services, C. (n.d.). WIKIPEDIA. Retrieved from CYREN: https//en.m.wikipedia.org/wiki/CYREN

DiDio, L. (1998, April 20). Computer Crime Cost on the Rise. Computer World.

Gerald, P., & Albert, K. (1997). The Use And Effectiveness of Anti-Virus Software. Computer & Security,17(1998)589-599 , 17, 589-599.

Henry, A. (2013, December 8). Difference between Virus and Malware (and which to use). Retrieved from life hacker: https//www.lifehacker.com/the-difference-between-antivirus-and anti-malware-and-1176942277

Laabes, E. P., Nyango, D. D., Ayedima, M. M., & Ladep, N. G. (2010). Physician use of updated anti-virus software in a tertiary Nigerian hospital. Nigerian Journal of Medicine, 19 (3).

Mehta, S. (1992). 2007 Anti-virus reviews. Retrieved December 24, 2021, from 6starreviews: http: //www.antivirus-software.6starreviews.com

Mehta, S. (2008). Retrieved October 15, 2008, from computer security: Is anti-virus software enough?: http://www.physiciannews.com.html

Rufai, A., Modi, S., & Wadata, B. (2021). A Survey of Cyber-Security Practices in Nigeria. International Research Journal of Advanced Engineering and Science, 222-226.

Vangie, B. (1996, September 1). WHAT IS A COMPUTER VIRUS? Retrieved from webopedia: https://www.webopedia.com/definitions/virus/asp.

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