

TO STUDY THE KNOWLEDGE OF ANTIBIOTICS USE
AMONG EMPLOYEES WORKING IN HEALTH-IT SECTOR

Dissertation Submitted to



The IIHMR University, Jaipur

for the partial fulfillment for the award of the degree
of Master of Business Administration (MBA)

in

Hospital and Health Management

by

Dr. Aishwarya

Under the Supervision and Guidance of

Alok Kumar Mathur

2022

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DECLARATION BY STUDENT

This is to certify that the dissertation titles “ **Knowledge of antibiotics use among employees working in health-IT sector working at the Hive, Bangalore**” and submitted by **Dr. Aishwariya** , Enrollment no- **IIHMR-U/01/2020-22/1054** under the supervision of **Alok Mathur** for award of MBA in Hospital and Healthcare Management from IIHMR University carried out during the period from April 2022 to June 2022 embodied my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or an other institute or other similar institution of higher learning.



Dr. Aishwariya

30th June, 2022



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Date: 30th June 2022

This is to certify that **Aishwariya**, Student of MBA - Hospital and Health Management at **IIHMR, Jaipur** has successfully completed 03 (Three) months internship with our company from 1st April 2022 to 30th June 2022.

During this period of internship, her performance was good.

We wish her every success for the future.

Regards,
For **ExpressRCM Private Limited**

A handwritten signature in black ink, appearing to read 'Anil yadav'.

Authorized Signatory

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List of Abbreviations

1. AMR-Antimicrobial resistance
2. AR-Antibiotic resistance
3. DNA-Deoxyribonucleic acid
4. MNC-Multi National Corporation
5. HL-Health literacy
6. Abs- Antibiotics

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Chapter 1. Introduction

“Antibiotics are medicines that fight infections caused by bacteria in humans and animals by either killing the bacteria or making it difficult for the bacteria to grow and multiply.”(1) With the invention of semi-synthetic drugs in today’s era, the term “ antibiotics” has been replaced with antimicrobials. These antimicrobial substance become active against bacteria by either inhibiting the growth or killing the bacteria. Antibiotics have not always been as user-friendly as they are now. The earliest antibacterial compounds like mercury and arsenic were not just harmful for the bacteria but also had a drastic effect on the human body. With extensive testing and approval procedures, antibiotics were moved from laboratory into genral clinical use.

- History of antibiotics:

The ancient Chinese utilised antibiotics for the first time almost 2,500 years ago. Moldy soybeans were discovered to have medicinal virtues by the Chinese, who used them to cure furuncles (pimples), carbuncles, and other illnesses. Molds and plants were employed to cure diseases by prehistoric civilizations, including the Egyptians and Greeks, since these organisms generate antibiotic compounds. Two German researchers, Rudolph Emmerich and Oscar Löw discovered pyocyanase, the first antibiotic, from the growth of *Pseudomonas aeruginosa*, in the late 1890s. The first antibiotic, pyocyanase, generated from the growth of the bacteria *Pseudomonas aeruginosa*, was discovered in the late 1890s which were administered against diseases like typhus fever and cholera..

Antibiotics transformed medicine in the twentieth century. Paul Ehrlich produced Salvarsan, an arsenic-based medication, which was used against the bacteria which causes syphilis- *Treponema pallidum*. This finding set the groundwork for future antibacterial agent research. Alexander Flemming discovered Penicillin which was a miracle drug, found in the year 1928. Following this, Bayer and his research team discovered the first sulphonamide, prothosyl, in the year 1932, which was taken up by Gerhard Domagk in demonstrating the efficiency against very serious bacterial illnesses. Penicilin was first used by doctors in the year 1946 It is regarded a "child of the war" since substantial study and monitoring were conducted before its creation during the Second World War. Penicillin's

discovery was hailed as a contemporary marvel since it could heal all forms of illnesses produced by staphylococci and streptococci.

By the end of the 1940s and early 1950s, the use of streptomycin and tetracycline became prevalent, and this period became helpful for the antibiotic chemotherapy became generally tolerated in clinical practise. These medicines worked against a variety of harmful bacteria, including *Bacillus tuberculosis*.

For the first time, there was scientific interest in the presence of medications, particularly hormones, in the environment in the 1970s.

Other compounds, such as analgesics, anti-rheumatic medicines, and antibiotics, have been added to the research lists since the mid-1990s.

- Antibiotic resistance:

It occurs when bacteria change in response to the use of the medicines. (2) It develops when the microbes alter their genetic makeup to protect against the antimicrobial effects.

AMR is the larger umbrella wherein antibiotic resistance is a subset. Usually the mechanism follows where the bacteria tends to develop resistance against the antibiotics. This happens when the bacteria develop the capability to defeat the drugs which were desgined to stop the growth and kill the causative agent. That means the germs are not killed and continue to grow. It is the bacteria which becomes antibiotic-resistant and not the human or the animal. Such bacterial infections are difficult to treat in comparison to the non-resistant bacteria which in turn raises medical cost, increasing the hospital stay, and also increases the chances of mortality.

Antibiotic resistance is emerging at a daunting rate worldwide. With every passing day, bacterial infections are growing and producing newer resistance mechanism which is threatening the health of every indivitual across the globe to treat common illnesses. There existence is rapidly spreading through infections like pneumonia, tuberculosis, gonorrhoea, and foodborne diseases, and antibiotics have started to become less effective towards their treatment , making it more difficult for curing.

The phenomenon of bacterial antibiotic resistance occurs naturally. Although, our actions can hasten the process of development and spread of the resistance. This occurs when physicians overprescribe antibiotics or when people do not complete their antibiotic course due to symptomatic relief , due to lack of infection control and maintainance of hygiene in the surroundings or when individuals travel the globe spreading resistant bacteria..

- How does AMR spread?

Bacteria can spread between people via the following routes:

1. Through direct communication (touching)
2. Exposure to bodily fluids through coughing and sneezing (such as close personal contact).
3. Surface contamination: Bacteria can survive for long periods of time on surfaces. When you touch everyday objects, you can pick up bacteria.
4. Food contamination: When you handle, prepare, or eat food contaminated with harmful bacteria, you may be exposed to bacteria.
5. Animals: Bacteria can spread from animals to humans through direct contact.

- What factors contribute to antibiotic resistance?

1. Antibiotic overuse: Taking antibiotics when they are not required contributes to antibiotic resistance. For example, individuals take antibiotics for runny nose without knowing that antibiotics do not affect viruses, and runny nose and symptoms of cold are caused by virus. Also bacterial ear infections are improved without having antibiotics but people prefer to eat antibiotics for symptomatic relief but tend to leave the course inbetween as soon as there symptoms are relieved..
2. Antibiotic misuse: Bacteria have the ability to change as they multiply(mutate) leaving no opportunity to proliferate in the host. Thus if one fails to take a medicine for a day (or several days), cease therapy too soon, or use the wrong medicines, the bacteria gets its environment to grow , thus increasing the chances of AMR.
3. Self medication: Another factor triggering AMR is self medication. It happens when an individual consumes medication without consulting a physician but rather taking a suggestion from a friend or family member who does not have a certified medical degree ,regarding the illness. This is one of the most important reasons why people suffer from AMR. This causes wrong intake of antibiotics which might hamper the health of the person, worsening it than healing it.
4. Food production:
 - Antibiotics are given to various animals as growth supplements and also prophylactically to reduce the chances of infection. Under the food chain cycle , the

animal goods and products that we consumes transfer the resistant bacteria strains onto the humans which inturn triggers the disease transmission.

- Also the use of pesticides done to protect crops from insects and plants affect humans. However antimicrobial pesticides are employed in some circumstances to defend against bacteria, viruses, fungus, algae, and protozoa. The usage of numerous pesticides in an effort to increase agricultural productivity has resulted in many of these microorganisms developing resistance to these antimicrobial agents.
5. Mutation: Spontaneous resistance occurs when a bacterium's genetic makeup (DNA) changes or modify on its own. The antibiotic does not identify the resistant bacterium as an external body and thus cannot prevent the growth of the infection in the body as efficiently as it should. Thus, this change in the structural makeup of the bacteria prevents and helps it combat the effects of the antibiotics.
 6. Transmitted resistance: Every person has the capability to spread the resistant bacterial strain from person to person thus making it difficult to cure it through antibiotics. Everytime the resistant bacteria finds a suitable host it tends to grow stronger against antibiotics effects thus making it impossible to treat the patient.
 7. Environmental pollution: Antibiotics can be exposed to bacteria in the environment through improper disposal of unused or expired medication or untreated waste from the pharmaceutical manufacturing enterprises and hospitals and clinics which leads to resistance of the bacteria.
- Overuse of antibiotics has been linked to a number of health risks.
 1. Antimicrobial resistance is on the rise.
 2. More serious diseases are becoming more prevalent.
 3. Increase in the duration of the illness
 4. Complications are more likely to occur.
 5. The mortality rate is rising.
 6. Costs of healthcare are rising.
 7. Increased risk of negative outcomes, some of which are life-threatening
 8. Infectious infections are causing an increase in re-attendance.
 9. Increased medicalization of infectious diseases that are self-limiting

Chapter 2: Literature review

Table 2.1. Literature review

TITLE	AUTHOR	DATE/ YEAR	OBJECTIVE	FINDINGS
Awareness of Antibiotic Use and Resistance in Jordanian Community(3)	Derar H. Abdel-Qader ¹ , Abdullah Ibassam ² , Najlaa SaadiIsmael ³ , Asma' A. El-Shara' ³ , Aisha Shehri ⁴ , Fahdah Shuqair Almutairi ⁴ , Dalal M. Al-Harbi ⁴ , Muna Mohammed Al Zahrani ⁴ , Li-Chia Chen ⁵ , Nadia Al Mazrouei	September 30, 2020	The main objective of the study was to analyse the level of awareness, attitude, and understanding concerning antibiotic usage and AR in Jordan's affluent and impoverished districts.	“The questionnaire was completed by 620 homeowners (310 per region). Pharmacists were viewed as major influencers on householder decisions, with 80.32 percent of individuals who took antibiotics in the previous year taking it directly from the pharmacy. The Jordanian population has a limited awareness of antibiotic usage, with just 14.2 percent of the respondents in West Amman while 2.9 percent in East Amman disagreeing with the statement Antibiotics work on most coughs and colds.

				West Amman residents had a much better understanding of AR than East Amman residents; 82.3 percent of West Amman respondents agreed with the statement- Antibiotic resistance occurs when bacteria change in some way that reduces or eliminates the effectiveness of the antibiotic, in comparison to 31.9 percent of East Amman respondents.”
Is health literacy associated with antibiotic use, knowledge and awareness of antimicrobial resistance among non-medical university students in Egypt? A cross-sectional study. (4)	Aya Mostafa,Abdurrahman Abdelzaher Salma Rashed, Salma I AlKhawaga Shadwa K Afifi, Shaimaa AbdelAlim, Shaimaa A Mostafa, Taha A Zidan	March 1, 2021	The purpose of this study is to look at the levels of literacy about health and its relationship to antibiotic usage, its knowledge, and antibiotic resistance awareness among Egyptian university students.	“Only 1% of participants had adequate HL. Antibiotic knowledge was lacking in 79.7% of pupils. 39.9% of students reported consuming antibiotics without getting it prescribed by a physician in the previous month. 92.2 percent of students were unaware of

				antibiotic resistance, while 30.6 percent had heard the term antimicrobial resistance.”
Public Health Literacy, Knowledge, and Awareness Regarding Antibiotic Use and Antimicrobial Resistance during the COVID-19 Pandemic: A Cross-Sectional Study (5)	Suhaib M. Muflih ^{1,*} , Sayer AlAzzam ¹ , Reema A. Karasneh ² , Barbara R. Conway ^{3,4} and Mamoon A. Aldeyab ³	13 September 2021	The study was conducted to investigate the general public about the knowledge and awareness of antibiotics and antibiotic resistance in Jordan during the COVID-19 epidemic.	“More than half of the participants, according to the data, were well-versed in antibiotic usage and resistance. Antibiotics and antibiotic resistance were better understood by those with sufficient health literacy. The great majority (88.5 percent) knew at least one antibiotic resistance phrase; nonetheless, 53.2 percent thought antibiotic resistance was an issue in other countries. The participants in this study reported mistakenly utilizing antibiotics to treat sore throats, colds, and flu. The participants were well-versed with antibiotic resistance

				solutions and their health consequences. Antibiotic resistance awareness was shown to be significantly linked with age, education, health literacy, and antibiotic knowledge.”
Antibiotic Use and Resistance Knowledge: Awareness Among the General Public in Jazan, Saudi Arabia(6)	Abdulaziz Jali, Alshomokh Hakami, Najwa Dahas, Mashael Mahnashi, Afnani ddiq, Halimah Alsomaili, Abdulaziz H. Alhazmi	December 12, 2021	The study was conducted to assess Jazan Province's knowledge and attitudes concerning antibiotic usage and resistance.	“According to the results, 543 participants stated, and the majority of them take Abs with a prescription (n = 280; 75%). Around 40% correctly recognised that Abs can only cure bacteria and not viruses, whereas 44% rejected that Abs can treat all coughs and common illnesses. Then, when it came to resistance knowledge, we discovered that those who had heard of Abs resistance comprised more than half of the participants (56 percent) and had superior information about Abs use.

				Furthermore, more than half of people who had heard of Abs resistance properly identified the antibiotic susceptibility test, and almost two-thirds could answer questions concerning Abs resistance.”
A public awareness study about antibiotic consumption habits and antibacterial resistance in north-eastern region of Cyprus(7)	Mehmet Ilktac ¹ , Mohamad Tamim Tarabishi ¹ , Pembe Ozbirtan ¹ , Canan Gulcan ¹ , Gulden Celik ²	25 April 2020	The proposed study sought to assess residents' awareness of antibiotics and the problem of antibiotic resistance in the north-eastern area of Cyprus.	“In all, 47.9 percent (336/701) of those surveyed had used antibiotics in the previous six months. Approximately 70% of those surveyed were found to have intermediate/high knowledge of antibiotic usage. In all, 66 percent of the public had heard of antibiotic resistance, with 64 percent having intermediate awareness of the subject. University graduates were more likely than elementary school graduates to have heard the term antibiotic resistance.”

A survey of public knowledge and awareness related to antibiotic use and resistance in Sweden (8)	Malin André, Åsa Vernby, Johanna Berg, Cecilia Stålsby Lundborg	01 April 2010	To investigate the general public's understanding of antibiotic therapy and awareness of antibiotic resistance in Sweden.	“74.7 percent of the population responded. Antibiotics heal common colds faster, according to 19.1 percent of respondents; this perception was stronger in those who had not previously received antibiotics. A large majority, 80.7 percent, believed that microorganisms may develop drug resistance. Trust in physicians was strong, with 87.0 percent of respondents trusting the doctor not prescribing an antibiotic over the doctor providing an antibiotic (81.0 percent). The respondents expressed some uncertainty about the meaning of the phrases bacteria and viruses in connection to the prescription decision.”
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- **Rationale:**Antimicrobial resistance is a global health concern that has been exacerbated by antibiotic misuse. It is the underlying cause of major infections, complications, prolonged hospital stays, and higher mortality. New resistance mechanisms are evolving and spreading throughout the world, posing a danger to the way of treating common infectious diseases among working individuals, as their stress rate is very high with respect to their work. Thus they are more prone to getting sick and misusing antibiotics for their rescue. Therefore it is essential to understand and assess the knowledge regarding antibiotic use and its resistance among working professionals.
- **Aim of the study:** The fundamental focus of the research is to analyse the knowledge of antibiotic usage among working professionals in the health IT industry.
- **Objective of the study:**
To evaluate the knowledge of employee working in healthIT sector about antibiotics usage.

Chapter 3: Study Methodology

- **Research design:** The study conducted is a cross-sectional, descriptive research was conducted to evaluate personnel working in the health IT sector's awareness of antibiotic usage and antimicrobial resistance.
- **Study Setting:** The Hive, VR Bengaluru, Whitefield, Bangalore , Karnataka
- **Study population:**
 - Inclusion criteria: All employees from five multinational corporations (MNCs) from diverse health IT businesses who operate on the office premises and are willing to participate in the study.
 - Exclusion criteria: Non co-operative participants will not be included in the study
- **Study duration:** The research was performed over a three-month period, from March 2022 to June 2022.
- **Technique used for Sampling:** Convenience sampling
- **Sample Size:**

The sample size (n) is calculated according to the formula: $n = \frac{z^2 * p * (1 - p) / e^2}{1 + (z^2 * p * (1 - p) / (e^2 * N))}$

Where: $z = 1.28$ for a confidence level (α) of 80%, p = proportion (expressed as a decimal), N = population size, e = margin of error.

$z = 1.28$, $p = 0.5$, $N = 250$, $e = 0.05$

$n = \frac{1.28 * 0.5 * (1 - 0.5) / 0.05^2}{1 + (1.28 * 0.5 * (1 - 0.5) / (0.05^2 * 250))}$

$n = 100$

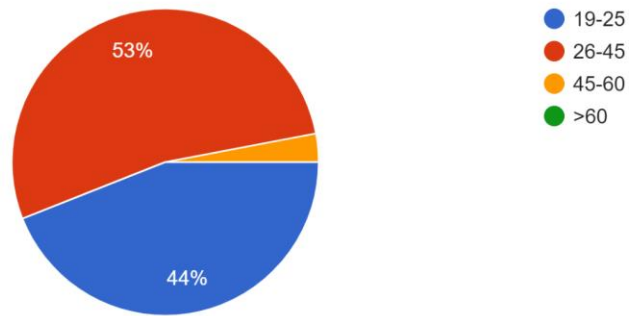
The sample size of 100 employees was considered.

- **Data type:** Primary data was collected for the study.
- **Method of data collection:** The data was collected through a self-administered questionnaire which consisted of 3 sections. The introductory section consisted of socio-demographic questions, the subsequent sections comprised of knowledge based questions about antibiotics and its use and antimicrobial resistance.
- **Data analysis:** The responses were collected and cleaned and screened using MS-Excel. Graphical representations were used for depiction of correlations.

Chapter 4: Results

Figure 4.1. Age of the respondents

Age (In years)
100 responses



Interpretation: Out of the 100 respondents, 53% were of the age group 26-45 years while 43% were of the age group 19-25years.

Table 4.1. Relation of Age-Sex of the respondents

Age (In years)	Female	Male
19-25	15	29
26-45	18	35
45-60	0	3
Grand Total	33	67

Interpretation: From the total of 100 respondents, 67% were male out of which 35% were of the age group 26-45 years which accounted the major respondents while 29% of the respondents were aged between 19-25 years and 3% of the respondents were aged between 45-60 years. Females accounted 33% of the respondents out of which 18% and 15% were of the age group 26-45 years and 19-25years respectively.

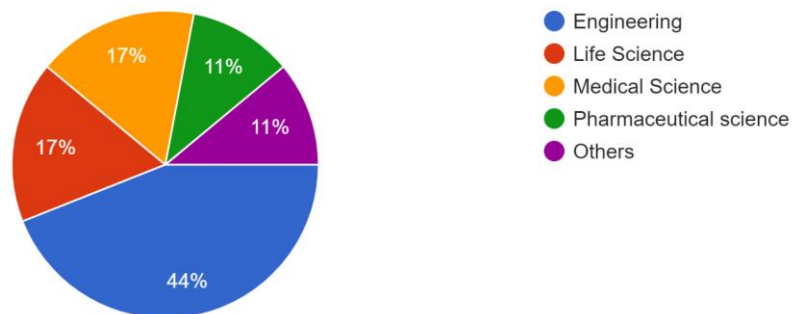
Table 4.2. Relation of Marital status-Family structure of the respondents

Marital status	Joint family	Nuclear family	Single Parent Family
Divorced	1	0	0
Married	10	15	1
Un-married	15	45	13
Grand Total	26	60	14

Interpretation: From the total of 100 respondents, 60% of them live in a nuclear family, out of which 45% are unmarried while 15% are married. Following this , 26% of the total respondents live within a joint family while 14% lived with single parent family.

Figure 4.2. Educational background of the respondents

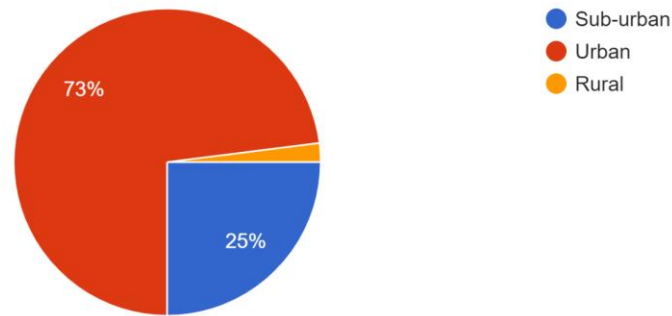
Educational background
100 responses



Interpretation: Out of the 100 respondents, 89% of them have a sciences background which includes life sciences, medical sciences, pharmaceutical and engineering background while 11% accounted for others.

Figure 4.3. Area residence of the respondents

Area Residence
100 responses



Interpretation: From the total of 100 respondents, 73% of the respondents lived in urban areas while 25% of the respondents lived in sub-urban areas and 2% lived in rural areas.

Table 4.3. Relation of Annual income-Type of employment of the respondents

Annual Income	Unemployed	Working- Full time	Working- Part time
<1,60,000		4	
1,60,000-3,00,000	1	29	2
3,00,000-10,00,000		49	
10,00,000-20,00,000		14	
>20,00,000		1	
Grand Total	1	97	2

Interpretation: Out of the total 100 respondents, 97% are working full time in healthIT firms, out of which the major proportion of the respondents(49%) are earning an annual income of 3,00,000-10,00,000 while 33% are earning less than 3,00,000 annually and 15% are earning more than 10,00,000 annually.

Table 4.4. Relation of age and if the respondent have consumed antibiotics.

Age (In years)	Maybe	No	Yes	Grand Total
19-25	3		41	44
26-45	4	3	46	53
45-60			3	3
Grand Total	7	3	90	100

Interpretation: Out of the total respondents of 100, 90% have consumed antibiotics. The major usage of antibiotics was seen among males of the age group of 26-45 years and 19-25 years.

Table 4.5. Annualized intake of antibiotics as per age group

Age group (In years)	2-5 times	More than 5 times	Never	Once
19-25	23	11	2	8
26-45	33	8	4	8
45-60	2	1		
Grand Total	58	20	6	16

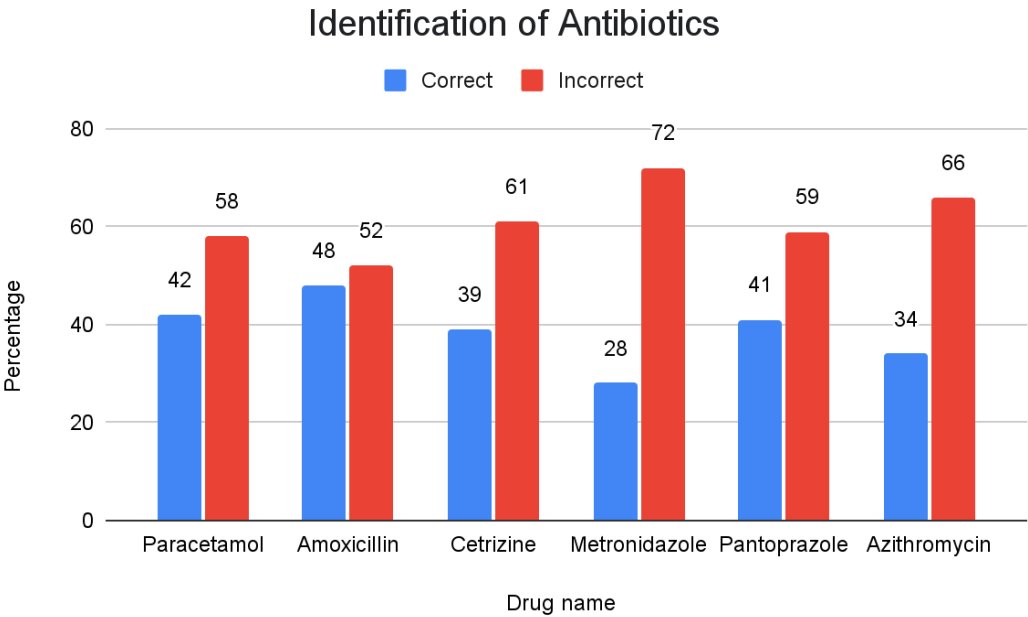
Interpretation: Out of the 100 respondents, 58% of respondents of the across all age groups have consumed antibiotics 2-5 times in the last 12 months while 20% of the respondents have taken antibiotics for more than 5 times.

Table 4.6. Source of antibiotics procured by the respondents

Age (In years)	Consult friends or family	Directly go to a pharmacy	Get checked and prescribed by a doctor	Others
19-25	11	31	2	-
26-45	8	33	10	2
45-60	-	2	1	-
Grand Total	19	66	13	2

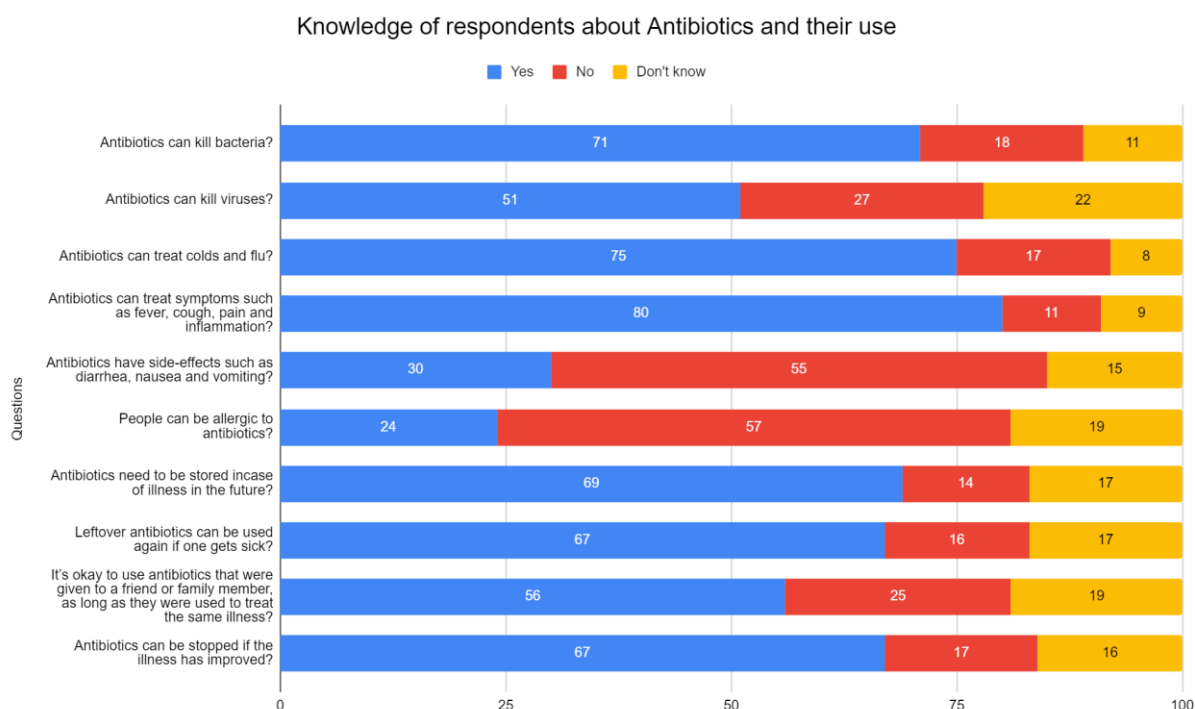
Interpretation: Of the total 100 respondents, 66% of the respondents buy antibiotics directly from the pharmacy. Majority of these respondents are of the age group 19-25 and 26-45 years. Only 13% of the respondents visit a doctor when they fall ill and get the medicine prescribed by the physician.

Figure 4.4. Knowledge of respondents in identifying the antibiotics from the list.



Interpretation: Out of 100 respondents, the relative knowledge about identification of the right was poor as more than 50% of them could not identify the correct antibiotics. 58%, 61% and 59% marked paracetamol, cetirizine and pantoprazole respectively as antibiotics which is an incorrect answer. While on 48%, 28% and 34% knew the correct antibiotics and could rightly answer them as amoxicillin, metronidazole and azithromycin.

Figure 4.5. Knowledge of respondents on antibiotic and their use



Interpretation: The knowledge of respondents about antibiotics and their use is poor as 51% have answered incorrectly about antibiotics kill viruses. 75% respondents incorrectly that antibiotics can be used to treat cold and flu like symptoms like fever, cough, pain and inflammation. 55% of the respondents don't have the knowledge that antibiotics can have side-effects like diarrhea, vomiting and nausea. 57% of the total respondents are unaware that anybody can be allergic to antibiotics. The general knowledge of the storage of antibiotics is weak as 69% of the respondents think its right to store antibiotics for future use while 67% think leftover antibiotics can be reused if one gets sick again. Also, 56% of the respondents feel comfortable using the same antibiotics that were given to friends and family if they have the same illness without getting it checked by a doctor. Further, 67% people have the misconception of stoping the antibiotics course as soon as the symptoms improve and not completing the entire course of antibiotics.

Table 4.7.. Knowledge of respondents on antimicrobial resistance.

Knowledge of antibiotic resistance	Expected answer	Correct answer	Incorrect answer
Antibiotic resistance occurs when your body becomes resistant to antibiotics and they no longer work as well?	True	36	64
When antibiotics are taken for the wrong indication such as incomplete course or lower doses, it can lead to antibiotic resistance?	True	30	70
Overuse of antibiotics can cause antibiotic resistance?	True	30	70
Bacteria which are resistant to antibiotics can be spread from person to person?	True	43	57
If bacteria are resistant to antibiotics, it can be very difficult or impossible to treat the infections they cause?	True	26	74
Antibiotic resistance is an issue that could affect me or my family?	True	28	72

Interpretation: From a total of 100 respondents, the majority of the respondents answered incorrectly depicting their lack of knowledge about AMR.

Chapter 5: Discussion

According to the report, those working in the healthcare IT sector have a limited understanding of both antimicrobial resistance and how antibiotics are used. The use and abuse of antibiotics has resulted in considerable challenges for the field of public health. For the purpose of combating the issue of antibiotic resistance, the frequency of antibiotic use within a certain time frame is crucial. More than 50% of respondents confirmed using antibiotic around 2–5 times in between the last 1 year.. This frequent usage of antibiotics could lead to ineffectiveness of the drug and further lead to ABR, which is particularly significant to public campaigns on antibiotic resistance both because high levels of use contribute to the issue. It has also been seen that majority of the respondents are from science background but while identifying the antibiotics, more than 50% of them could not identify them correctly. Also, nearly 66% prefer to collect the antibiotics from the pharmacy directly without any prescription nor consultation with the doctor.

The insufficiency of awareness about antibiotics and their use is another factor in the overuse of antibiotics. Only 17 percent of respondents overall, regardless of gender, age, educational level, or job, properly responded to the question about whether or not antibiotics may cure viral symptoms including cold, flu, and fever. About 51% of the respondents thought that viruses are susceptible to the effects of antibiotics. More than 50% of respondents thought that it was impossible for someone to be allergic to an antibiotic or have negative effects from taking one. Additionally, 72 percent of the respondents wrongly said that antibiotic-resistant germs can transmit from person to person and afflict anyone of any age group or gender. The majority of respondents felt that there is a larger chance of resistance forming and spreading in a society the more antibiotics are used.

According to the report, more than 60% of respondents understand that its correct to store antibiotics for future use and its ok to obtain antibiotics from a pharmacy without first consulting a physician. Keeping leftover medications resulted in poor adherence to antibiotic therapy and is a key contributor to antibiotic resistance, according to studies. If the antibiotic is not finished owing to symptomatic alleviation, the remaining bacteria might grow and cause antibiotic resistance. Furthermore, because different illnesses can present the same symptoms such as a cold, cough, fever, and so on, leftover antibiotics should not be consumed as they may not treat but rather harm the body. Furthermore, there is a time limit for treating any illness, so if there are any leftover medications, it indicates that the

individual who took the drug did not complete the entire course of the drug and may get AMR in the future. Following that, public knowledge of AMR should be increased to ensure that antibiotics are effective. Individuals must finish the whole course of treatment even if they feel great after half of the course of medicine is finished since it can help avoid AMR.

In the study done on “Antibiotic Use and Resistance Knowledge: Awareness study Among the general public in Jazan, Saudi Arabia”, there was a high level of understanding regarding antibiotics and resistance, with more than half of the respondents accurately knowing about antibiotic resistance and could answer the questions on ARB. This is in contrast to the findings of this study, wherein more than 50% of the respondents had no understanding about what AMR was or how it was produced.

The study done on “Public awareness about antibiotic consumption habits and antibacterial resistance in north-eastern region of Cyprus”, suggested an intermediate knowledge of people about the antibiotic resistance wherein this study had a different notion wherein the knowledge in terms of the usage and the management of leftover antibiotics along with antibiotic resistance seem to be poor among working professionals working in healthIT sector.

Chapter 6: Conclusion

This study has set the groundwork for a better understanding of those working in the health IT sector's awareness of antibiotic usage and resistance. The results of this study are vital as they provide valuable foundation for designing an intervention in the public-health promotion to improve antibiotic knowledge among working professionals, and they will aid lawmakers in crafting and implement appropriate multifaceted interventions aimed at improving careful antibiotic use in the future.

One of the most important worldwide health threats is antibiotic resistance. Anyone, of any age or nationality, can be impacted. Although resistance to antibiotics emerges spontaneously, animal and human antibiotic overuse and misuse facilitates the process. To minimize the effect and spread of resistance, efforts can be made throughout all layers of society, including all the general public, who are positively affected by preventing disease through good hand hygiene and continuous vaccinations, using antimicrobials as and when required which is prescribed by a certified physician, completing the entire course of treatment, and never giving or reusing left-over antibiotics.

There are several initiatives that may be taken right away across the country to achieve the goal of raising antibiotic awareness and preventing the development of ABR. The following are some examples:

i) auditing antibiotic prescriptions; (ii) continual public education programmes to enhance people's awareness of antibiotic usage; and (iii) addressing health care providers such as clinicians, pharmacists, nurses, and midwives to inhibit the administration of antimicrobials without a written prescription..

(iv) Highlighting the importance of healthcare professionals in educating the public about antibiotics and AMR.

(v) Comprehensive supervision of antibiotic administration by the adoption of rigorous legislation for acquiring antibiotics over the counter.

Chapter 7: References

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