

THE PREVALENCE OF MICROBIAL COLONIZATION AND ANTIBIOTIC SUSCEPTIBILITY PATTERN ON AUTOMATED TELLER MACHINES (ATMs) IN QASSIM REGION, KSA

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Background

- ❖ Increased usage of ATMs by people lead to harbor them with a high number of bacteria on their surfaces. Hand-borne transmission through ATMs is one of the most important ways to spread the infectious agents in the community (1).
- ❖ The pathogenic and non-pathogenic microbes can colonize the metallic surfaces of ATMs (2).
- ❖ Many pathogenic microbes including *E. coli*, *S. aureus*, *B. subtilis*, *Pseudomonas* spp. and *Salmonella* spp. have been isolated from ATMs (2).
- ❖ The antibiogram results showed that different susceptibility patterns to many types of antibiotics (3).
- ❖ Most of banks has no guidelines or facility to ensure hygienic use of ATMs.
- ❖ The aim of this study was to determine the prevalence of the microbial colonization on ATMs and its antibiotic susceptibility pattern.

Methods

- ❖ This study included 33 samples collected from screens and keypads of ATMs belong to 6 different banks among Qassim region, Saudi Arabia.
- ❖ Samples collection was performed using sterile swab, which applied into a sterile broth in order to enhance microorganism growing. The swabs were transported to the laboratory for processing.
- ❖ Each sample was cultured onto blood agar and MacConkey agar and incubated at 37° C for 24 h. Initial identification was performed through colony morphology and Gram stain. Significant cultures were further characterized using different biochemical tests including API20E.
- ❖ Non-identified isolates were further analysed using Siemens MicroScan in order to identify unknown microorganisms and to evaluate antibiotics susceptibility patterns

Results

- ❖ All 6 banks ATM were found to be colonized with various types of microorganisms.
- ❖ Twenty-two (N=22) bacterial strains were successfully isolated from all 6 banks, with a total of 84 isolates (Figure 1). *A. fumigatus* was also isolated 3 times and all from ATMs belong to bank 3.

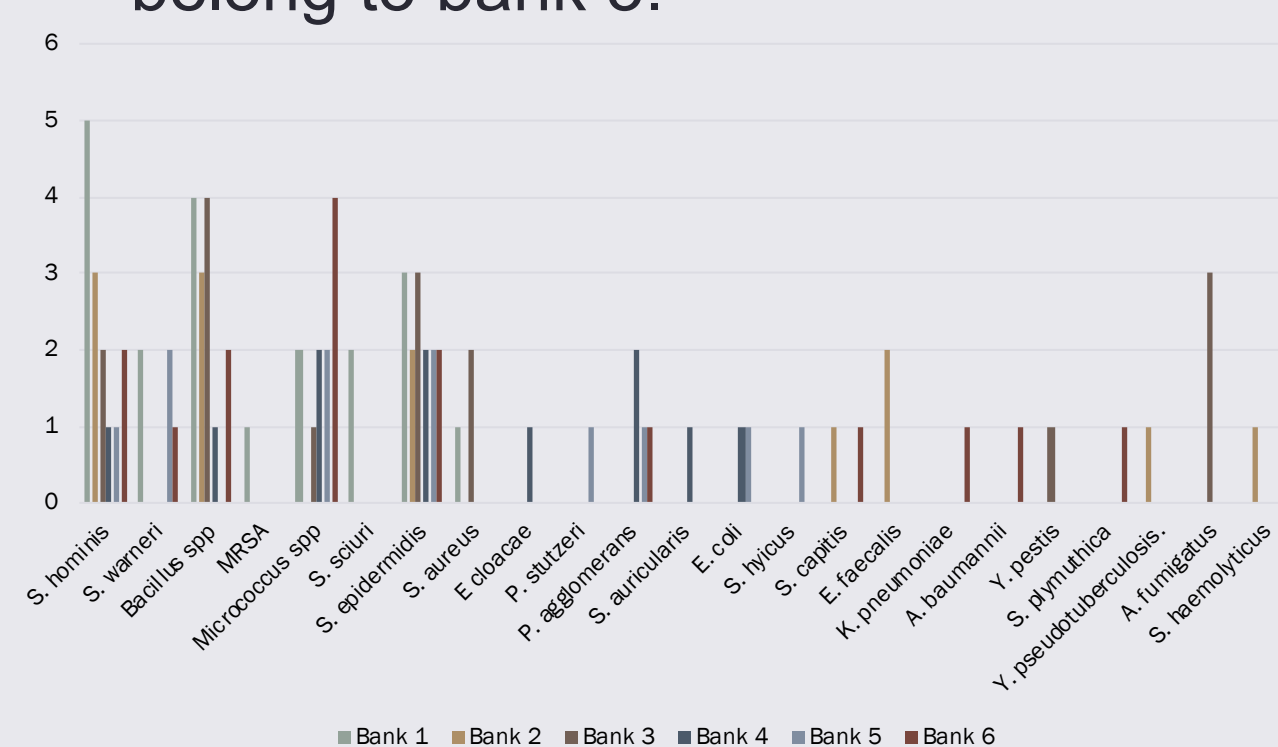


Figure 1: Distributions of microorganisms among the banks.

- ❖ Bank 1 has the highest bacterial contamination with a percent of 23%. Both bank 3 and 6 have the same percentage, being 18.4%. Bank 2 has 15% of microorganism contamination. The lowest percentage of contamination was in both banks 4 and 5, being 12.6% for each (Figure2).

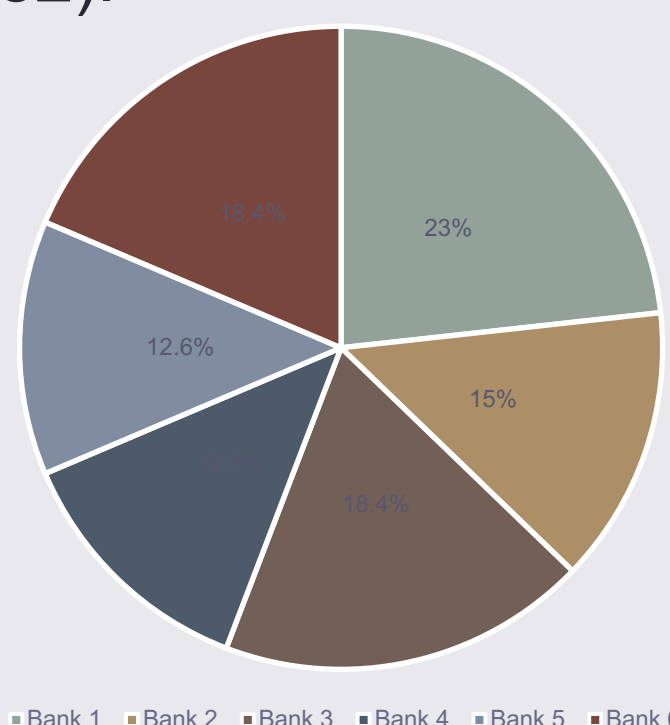


Figure 2; The total percentage of bacterial isolates from ATMs keyboards among 6 banks.

- ❖ Among Gram-positive bacteria, *S. epidermidis* and *S. hominis* strains were found to be resistant to erythromycin. Clarithromycin and tetracycline were found to be resisted by *S. hominis* strains. Azithromycin was also recognized to be resisted by *S. epidermidis* strains (Figure 3).

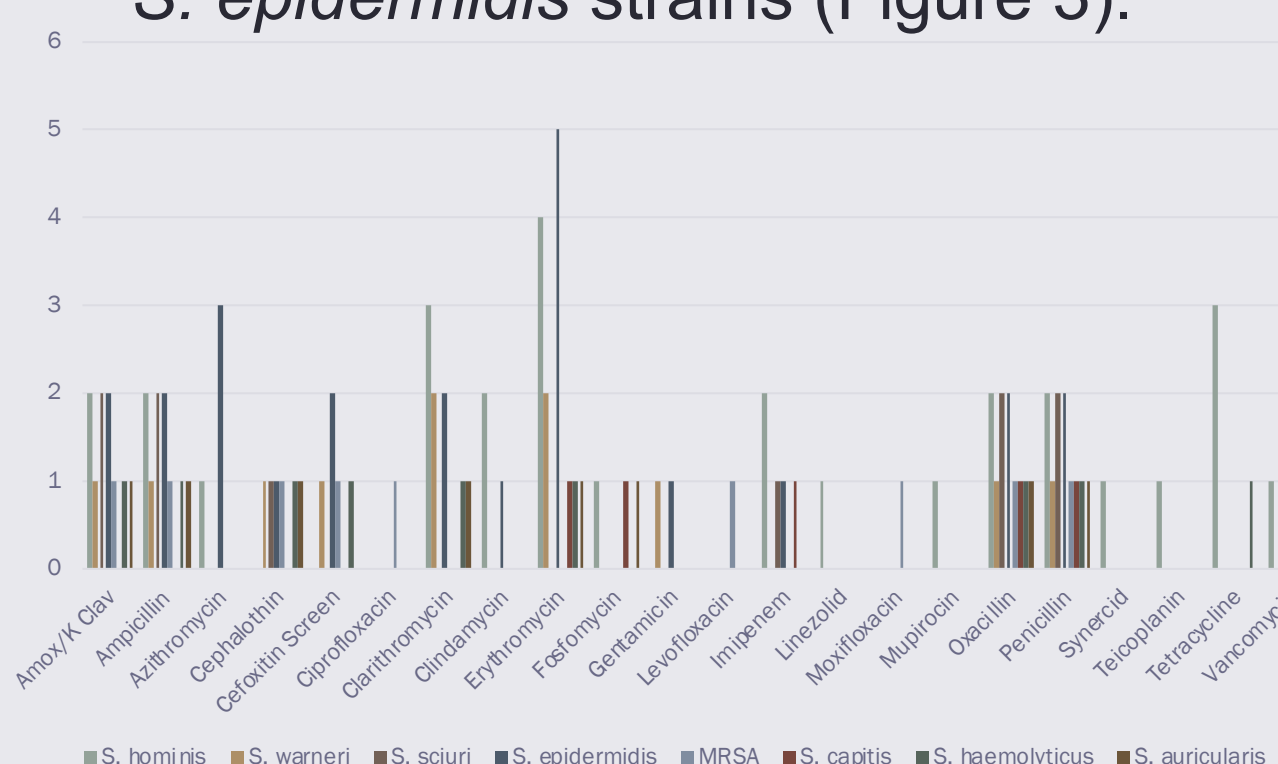


Figure 3: Gram-positive isolated bacteria & their resistance to different antibiotics.

Results

- ❖ However, only 9 Gram-negative bacterial strains, being 2 strains of *E. coli*, 4 strains of *P. agglomerans*, *Y. pseudotuberculosis*, *K. pneumoniae* and *E. cloacae* were found to be resistant to 6 different antibiotics (Figure 4).
- ❖ *E. cloacae* was resistant to 4 different antibiotics, being ampicillin, Cefuroxime, Amp/Sulbactam and Cefoxitin

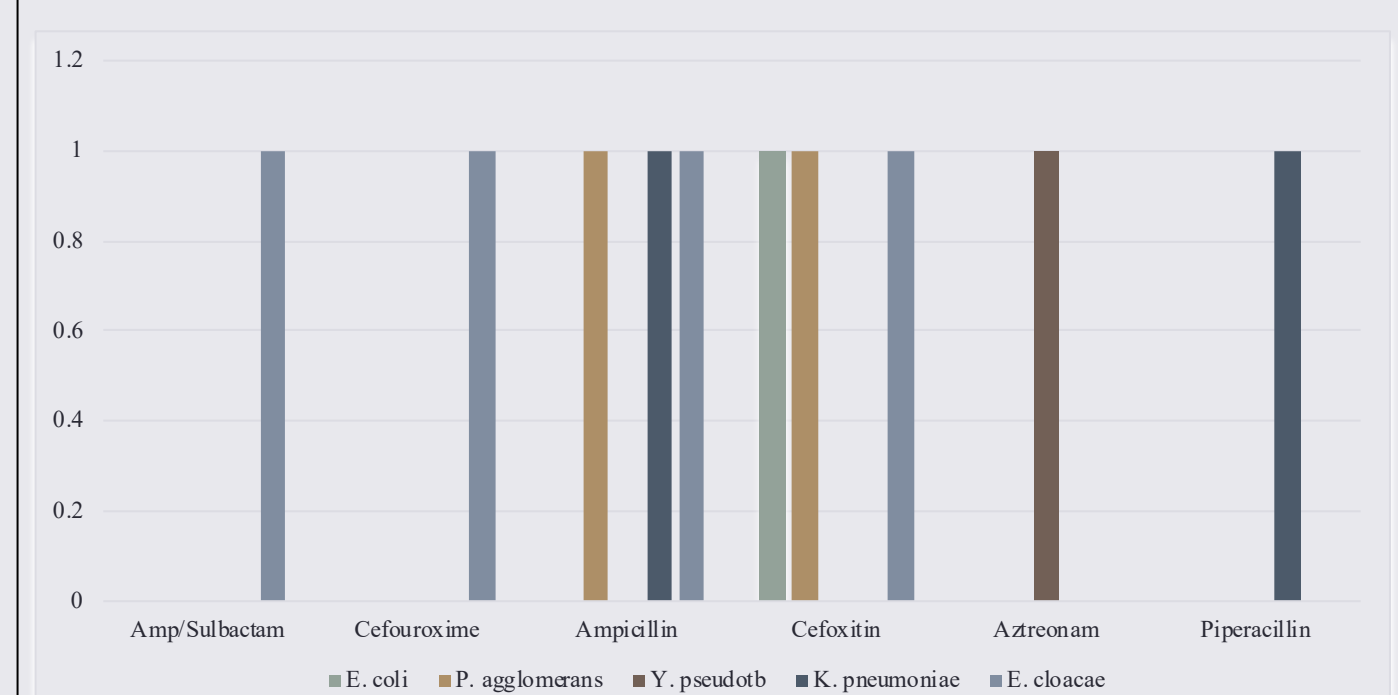


Figure 4; Gram-Negative isolated bacteria & their resistance to different antibiotics.

Conclusion

- ❖ Isolates not reported before like *S. hominis*, *S. warneri*, *S. auricularis*, *S. hyicus*, *S. sciuri*, *S. capitis*, *S. haemolyticus*, *E. cloacae*, *P. stutzeri*, *P. agglomerans*, *S. plymuthica*, *Y. pestis* and *Y. pseudotuberculosis* were successfully isolated in this study.
- ❖ *Y. pestis* and *Y. pseudotuberculosis* must be confirmed using other techniques like PCR and whole genome sequencing.
- ❖ Furthermore, it is highly recommended that ATM users should improve their personal hygiene especially after using the ATM.

References

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