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# VARIOUS OUTLETS ARE THE POTENTIAL SOURCE OF BACTERIAL INFECTIONS THROUGH THE PAKISTAN CURRENCY NOTES

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**ABSTRACT**

**Introduction:** There was several study and report of occurrence of microorganisms, in particular bacteria on cash banknotes and coins. One of the main source of pathogenic or food poisoning is because of pathogenic bacteria the people commonly carry these bacteria in their nose, mouth, wounds, and intestine, and on their skin. Modern bank notes are made up of special blend of 75% cotton and 25% of linen with small segment of fiber so paper money is something of a in isomer, this formation is of paper money is the potential source ,substrate for the growth of the bacteria. As the changes of the hand for the handling of money from the valet, from the underneath of breezier, from the socks causing the carrier of the microorganisms. While from different locations| outlets we buy day to day commodities we transfer these microorganisms from one location to another location and transferring diseases specially to the debilated patients and immune compromised patients who are at high risk and vulnerable to get disease. The average life span .of low denomination paper banknotes is about 24 months some claims.

**Methodology:.** In this total study 720 samples were taken from different locations of currency of different denominations i.e. from Bank counter 243 sample were taken, ,from, ATM Machine 50 samples were taken from Food seller were 94 samples were taken , from Medical store 35 samples were taken ,from ,Milk seller 92 samples were taken. from Grocery shop 63 samples were taken, from, Meat shop 80 samples were taken from Road side mechanic 36 samples were taken, from Bus conductor 4 samples were taken and from Beggars 23 sample were taken while study period was from 4.3. 2010 to 31.1. 2011 all the specimens were processed according to standard methods. All the samples were collected in sterile condition and microorganism were isolated according to standard method of BMSI and Laboratory of Jinnah Post Graduate Medical Centre Karachi.

**Results:** This study observed on 720 samples were taken from different locations i.e. from Bank counter 243 and 68 microorganisms were isolated, from 50, ATM Machine 50 samples were taken and 0% microorganism were found, from 94 food seller 94 samples were taken 74 microorganisms were isolated, from Medical store 35 samples were taken 24 microorganisms were isolated , from , Milk seller 92 samples were taken 74 microorganisms were isolated. from Grocery shop 63 samples were taken 38 microorganisms were isolated, from, Meat shop 80 samples were taken 55 microorganisms were isolated, ,from Road side mechanic 36 samples were taken 24 microorganisms were isolated, from Bus conductor 4 samples all samples were positive for isolates and from Beggars 23 sample were taken 19 microorganisms. were isolated.

**Conclusion:** This study observed that the currency circulating in Pakistan is the strong source of the pathogens even the Mycobacterium Tuberculosis and suggested that the people of Pakistan are at the great risk regarding the health point of view.

**Key words:** Location , Bank notes , Pakistan Currency, Microorganism

## INTRODUCTION

Food poisoning is increasing worldwide, although it is e A classic characteristic of human parasitic and bacterial agents is the evolution of routes for transmission to susceptible hosts. The environment plays a critical role in transmission to humans, with many environmental materials serving as vehicle. [14]

. The surface of paper bank notes is not smooth, but irregular, and can harbor many different types of microorganisms. The two main factors that determine the occurrence of bacteria on currency are (i) the material that the bank notes are made from and (ii) the age of the bank note. Bacteria have enormous capabilities to allow them to survive in adverse conditions. Two of the most important strategies for survival are their ability to adhere to surfaces and the ability to form bio films (multicellular aggregates). Members of some genera, such as Bacillus, may form spores and can survive attached to bank notes for many years. Formation of a bio film or a spore is controlled by genetic activity.[14]

Suggested that only 10% of cases are reported – just the tip of the iceberg. Bank notes play a major role in transmission of pathogenic bacteria. Some mathematical models have been developed for help to understand the movements of currency and how this might contribute to the global spread of disease. People commonly carry these bacteria in their nose, mouth, wounds, and intestines, and on their skin. There are several reports of the occurrence of microorganisms, in particular bacteria, on cash bank notes and coins. A study in the US showed that only 6% of bank notes tested were free from microbial contamination. [14]

The climatic and environmental conditions of the tropics favor the thriving of many pathogenic microorganisms, and in the face of underdevelopment, inadequate water and sanitation, crowded living conditions, lack of access to health care, and low levels of education, a greater proportion of the populace, particularly the poor, become highly susceptible to infection and disease.[1].

Bacterial cells on bank notes are measured by the number of colony forming units (c.f.u.) per cm2 of bank note. A banknote may contain up to 106 c.f.u. cm-2, whilst a coin may have up to 103 c.f.u. cm-2. Studies have shown that polymer based bank notes often have a relatively low bacterial count compared with the cotton based paper bank notes. This may be due to various physicochemical parameters of polymers. Bank notes may be categorized as mint (new or recently produced and obtained directly from the bank), clean (clean appearance without obvious damage) and dirty or mutilated (damaged, soiled, held together with sellotape). Irrespective of whether it is polymer based or cotton based, more bacteria are likely to be recovered from a dirty banknote than a clean or mint note. A mint banknote would normally contain no or only a negligible number of bacteria. However, by the time it has passed through at least four passing from hand to hand among all classes of the people, it would be strange indeed, says the Lancet, if money, and especially paper money, did not in its transit become from time to time the vehicle of infectious disease. Even the crisp “five” of the Bank of England no doubt has often borne the germs of fever in its folds, and how much more, then, the greasy, discolored, and well thumbed one pound note, or the paper fraction of some foreign currencies. Higher values have here a distinct advantage. Less common, less in keeping of the overcrowded poor, less handled and soiled, therefore they may perhaps in many cases run their circuit without having done much mischief [21]

Transfer from hand to hand among all classes of the people, it would be strange indeed, says the Lancet, if money, and especially paper money, did not in its transit become from time to time the vehicle of infectious disease. Even the crisp “fiver” of the Bank of England no doubt has often borne the germs of fever in its folds, and how much more, then, the greasy, discolored, and well thumbed one pound note, or the paper fraction of some foreign currencies. Higher values have here a distinct advantage. Less common, less in keeping of the overcrowded poor, less handled and soiled, therefore they may perhaps in many cases run their circuit without having done much mischief (London Globe, 1891).

The microorganisms isolated from the notes were Escherichia coli (80%), Aerobacter (59%), Salmonella (40.9%), yeast cells (36.4%), Streptococcus faecalis (31.8%), Staphylococcus aureus (27.3%) and coagulase negative staphylococci (18.2%). Contamination was significantly correlated with the denomination of the notes (r=-0.304; p=0.019). Lower denomination notes were more contaminated than higher denomination notes (x2=34.036; p=0.03). Dirty and tattered notes had more contaminants than cleaner and newer notes (x2=11.324; p=0.01). This study has demonstrated that naira notes could be sources of contamination by microbial pathogens.[15]

Contamination of objects by pathogenic microorganisms is of much public health concern as contaminated materials can be sources of transmitting pathogens. Items that are passed from hand to hand are likely to be contaminated with disease causing microorganisms especially if handled with unclean hands, or kept in dirty surroundings. Paper money, therefore presents a particular risk to public health, since communicable diseases can spread through contact with fomites.[6,410; 18 ,19.21,]. Although paper money is impregnated with disinfectant to inhibit microorganisms, pathogens are isolated from currency notes and coins.20, Studies in different parts of the world have reported high rates of microbial contamination.

The possibility that currency notes might act as environmental vehicles for the transmission of potential pathogenic microorganisms was suggested in the 1970s.[1]

The average U.S. Dollar, for instance like most currency notes worldwide lasts a mere 18 months. Paper currency also provides a large surface area as a breeding ground for pathogens.[2]

In most parts of the developed world, there is a popular belief that the simultaneous handling of food and money contributes to the incidence of food related public health incidents.[4] .

Over the last two decades, data indicating that simultaneous handling could indeed be a cause of sporadic foodborne illness cases have accumulated from studies of the microbial status and survival of pathogens on coins and currency notes in Turkey .[5]

. The possibility of currency contamination with microorganisms has also been observed among food handlers. An assessment of the public health risk associated with the simultaneous handling of food and money in the food industry in Australia.[24]

Suggested that without hygienic intervention, human occupational activities, especially those involving simultaneous money handling, could introduce the risk of cross contamination to foods.[4]

. Money in the form of notes or coins is handled by everyone, and dirty money (money contaminated with pathogenic microorganisms) is always in circulation. [21]

Microorganisms on the skin can be transferred from cashiers, sales people and the general public to the currency notes that they

handle. Contamination from the anal region, wounds, nasal secretions and aerosols generated by sneezing and coughing are potential sources of transfer of microorganisms to currency notes during handling. Staphylococcus epidermidis, Pseudomonas aeruginosa and Klebsiella aerogenous have been reported to survive well on the skin and are known to be transferred from fabrics to hand as well as from hand to fabrics.[5].

According to Dr. Peter Ender, lead researcher, sixty four (94%) of the bills were contaminated with bacteria known to cause either serious or mild illness. Five bills (7%) were found to be contaminated with bacteria which can cause infections in healthy people. Those bacteria included Staphylococcus aureus and Klebsiella pneumonia, both of which can cause pneumonia and blood infections. Fifty nine bills were contaminated with bacteria that are usually harmless in healthy individuals, but can still trigger serious illness in those with depressed immune systems, such as people undergoing various types of medical treatment or those with HIV. (i) However, Ender stressed that real health risks to the average consumer are pretty low, adding that US dollar bills may be no more or less covered in microbial go than, say, doorknobs, pens, or computer keyboards. But he points out that US currency, especially 'finds its way into all areas of the world'. "With the rapid dissemination of money in the era of drug-resistant bacteria, perhaps a resistance clone could be spread from one geographic location to another.[16]

## METHODOLOGY

Total 720 samples were taken and divided in 20 of mint currency, 20 of clean currency and 20 of dirty mutilated currency from All the denomination currency of Pakistan circulating. In Pakistan. RS.5000 |,Rs1000 |Rs500 |Rs500 |Rs50 |Rs20 |RS10 |,Rs5 |.Rs5 | (coin), Rs.2 |,Rs.2 | (coin) Rs.1 (Silver coin),RS 1(brass coin). The samples was collected From different locations i.e. from Bank counter, ATM mechanic, Medical Food seller, Milk seller, Grocery store, Meat shop, Road aside mechanic, Bus conductor, and from the, beggars. All the samples were collected in sterile condition and processed according to the standard methods in the BMSI (Basic Medical Sciences Institute) Laboratory at (JPMC Karachi).

**Coagulase test by tube method**

This test was used to differentiate Staphylococcus aureus which produces the enzyme coagulase from other Staphylococcal species which do not produce coagulase.

**Principle**

Coagulase carries plasma to clot by converting fibrinogen to fibrin. Two types of coagulase are produced by most of the strains of Staphylococcus aureus. Free coagulase which converts fibrinogen to fibrin by activating a coagulase reacting factor present in plasma. Free coagulase is detected by clotting in the tube test. Bound coagulase (clumping factor) which converts fibrinogen directly to fibrin without requiring a coagulase reacting factor, it can be detected by clumping of bacterial cells in the rapid slide test.'

**Required**

(EDTA Ethylinediaminetetra-acetic acid), Anticoagulant, Human plasma (preferably proved and previously HIV and hepatitis tested) or rabbit plasma the plasma should be allowed to warm at room temperature before being used.

Tube test method (detect free coagulase)

Take 3 small test tube and label T=Test organism (18-24 hours nutrient broth culture).

Pos= Positive control (18-24 hours Staphylococcus aurous nutrient broth culture).

Neg=Negative control (sterile nutrient broth).

With pipette 0.2 ml of plasma into each tube.

Add 0.8 ml of the test broth culture to tube T.

Add 0.8 ml of Staphylococcus aureus culture to the tube labeled Pos.

Add 0.8 ml of sterile nutrient broth to the tube labeled Neg.

After mixing gently, incubate the three tubes 35-37ºC. Examine for clotting after 1 hour if no clotting has occurred examine after 3 hours. If the test is still negative leave the tube at room temperature over night and examine again.

NOTE: When looking for clotting tilt each tube gently.

**Result:**

Clotting of tube contents or fibrin clot in tube – Staphylococcus aureus.

**Identification of Staphylococcus epidermidis**

Isolates were inoculated in urea broth for 24 hours at 37°C turned in pink color shows urease positive. Isolate were inoculated on Muellar- Hinton agar by making lawn, novobiocin disc was applied and plate was incubated at 37°C for 24 hours. The result was sensitive to Novobiocin by forming zone of inhibition. Isolates were inoculated in Nitrate broth for 24 hours at 37°C turned in red color shows Nitrate positive. ? Isolates were inoculated on agar media containing maltose sugar for 24 hours at 37°C, yellow color of medium shows maltose positive. ? Isolates wereinoculated on agar media containing trehalose sugar and were incubated for 24 hours at 37°C medium was colorless. No color change shows trehalose negative. Resulting the isolates were Staphylococcus epidermidis9

Oxidation fermentation (OF) medium, sterile paraffin oil (liquid paraffin).

**Method**

By using the sterile straight wire, inoculate the test organism to the bottom of two bottles (or more if testing several carbohydrates) of sterile of medium use a heavy inoculums.

Cover the inoculated medium in one of the tubes (or one from each carbohydrate pair) with a 10mm deep layer of sterile paraffin oil or molton wax.

Incubate the tubes at 35-37ºC for up to 14 days. Examine daily for carbohydrate utilization showing the acid production.

**Result**

| | Open tube | Sealed tube | Interpretation |
|---|---|---|---|
| 1. | Yellow | Green | Oxidative organism |
| 2. | Yellow | Yellow | Fermentative organism |
| 3. | Green or blue | Green | Non utilization of carbohydrate |

Control

cFermentative control E.coli (cheesbrough 2005)

Control Pseudomonas aeruginosa

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Oxidative. Identification of Salmonella

The isolates which were pale yellow or nearly colorless, 1-3 mm in diameter and were easily distinguished from the pink red colonies fermenting commensals.

Coliform bacilli e.g. E.coli inoculated for fermenting test (Production of gas and acid in sugar peptone water within 6-7 hours at 37ºC. Isolates were inoculated and indole negative, isolates were inoculated for identification, Gluconate which were not utilized, Isolates were inoculated for urease for produce and urease was not produced, resulting isolates were Salmonella.[9]

Identification of Shigellae

Isolates were inoculated in urea broth (Appendix 5) for an hour at 37ºC, no turning in pink color shows urease negative, isolates were inoculated in indole and, indole negative, isolates were inoculated in glactose broth, growth turn in yellow color, isolates were inoculated for 2 days at 37ºC in lactose . ., isolates were inoculated in sucrose broth for 24 hours at 37ºC, isolates were inoculated in mannitol growth turned in yellow, resulting isolates were Shigella.[9].

Identification of Proteus

Isolates were inoculated in glucose broth, gas production and color changed in yellow isolates were incubated in urea broth color changed in Pink color, and unease were positive, isolates were inoculated in Insole resulting in dole negative observed color changed in light yellow, isolates were inoculated for dextrose oxylation on orinthine broth, isolates were oxylation negative. Isolates were inoculated in TSI, H2S produced gas, and H2S positive, isolates were inoculated on agar gel which was positive gelatin liquefaction occurred hence gel positive. Isolates were inoculated on manose sugar agar growth turned in yellow color hence isolates were manose positive, isolates were inoculated on adonitol growth no change occur in color hence adonitol negative, isolates inoculated on maltose agar media no color change occur hence maltose –ve, isolates inoculated on trehalose agar media growth turned in yellow colour hence trehalalose positive isolates were inoculated on xylose (Appendix I) isolates were xylose positive hence isolates were identified as Proteus mirabilus.[9]

Identification of Klebsiella

Isolates were inoculated on VP which showed positive, isolates were inoculated for lactose fermentation and fermentation occurred by producingand VP positive isolates were inoculated for gas production in glucose, gas was produced, isolates were inoculated in indole negative, urea were positive, isolates were inoculated on citrate which showed citrate positive, isolates were inoculated malonate result was molonate positive, isolates were inoculate in lysine medium for decarboxylation which was positive, isolates were inoculated on KCM medium and confirmed as Klebsiella.[9]

Identification of Sarratia

Isolates were inoculated for lactose which was negative, isolates were inoculated for maltose which was negative, isolates were inoculated for the anositol which was positive, isolates were inoculated for arabinose which was negative, isolates were inoculated for rafinose and was negative, isolates were inoculated for sorbitol which was positive, isolates were inoculated for maltose which was positive and identified as Sarratia.[9]

Identification of Mycobacterium tuberculosis

Amplified sample for the Mycobacterium tuberculosis direct AMTD test, TMA

**RESULTS**

Of the 720 (Table1) samples,243 samples were taken from the Bank counter total 68(28%) microorganisms were isolated including Out of 243 Samples Salmonella were3 (1.23%), Staphylococcus areus were 52(21.3%) ,E.Coli were1(.41%) ,Proteus were 0%, Staphylococcus epidermidis were 12(4.93%) ,Mycobacterium Tuberculosis were 0%, Klebsiella were 0%, Shigella were 0%, Serratus were 0%, Pseudomonas were 0%.Of the 720 samples 50 samples were taken

From the ATM machine non of the microorganism were found (Table1)

OF the 720 samples (Table1) from the Medical store 35 samples were taken total 24(74.3%) microorganisms were found, including Out of 35 samples, Salmonella were 3(8.57%), Staphylococcus areus were 9(25.57%), E.Coli were6(17.14%), Proteus were 0%, Staphylococcus were 6 (17.14%), Mycobacterium Tuberculosis were 0%, Klebsiella were 0%, Shigella were ,

Of the 720 (Table1) samples 94 samples were taken from the Food seller, 66(70.2%), microorganisms were found including Out of94 Samples. Salmonella were37 (39.36%), Staphylococcus aureus were 6(6.38%0, E.Coli were 5 (5.3%), Proteus were 3 (3.1%), Staphylococcus epidermidis were 5(5.43%), Mycobacterium Tuberculosis were16 (17.39%), Klebsella were 1(1%), Sigella were 1 (1%), ,Serratus were 0%, and pseudomonas were 0%

Of the 720 samples (Table1) ,92 sample were taken from the Milk seller 74(80.4%) were for and including Out of 35 Samples.Salmonella were 37 (39.36%), Staphylococcus aureus were 9(9.78%), E.Coli were 9(9.78%), Proteus were 3(8.57%), Staphylococcus epidermis were 5(5.43%), Mycobacterium Tuberculosis were 16(17.39%), Klebsiella were 1(1%), Shigella were 1(1%), Stratus were 0%

Of the 720 samples (Table1) 63 samples were taken from the Grocery store, 38(60.3%) were found microorganisms including OUT OF 63 Samples .Salmonella were 9 (14.28%), Staphylococcus aurous were 8 (12.69%), E.Coli were 3 (4.76%), Proteus were 12(19%), Staphylo epidermoids were 5 (7.9%), Mycobacterium Tuberculosis were 0%, Klebsiella were 1(15), Shigella were 0%, Serrates were 05, Pseudominas were 0%.

Of the 720 (Table1) samples, 80 samples were taken from the Meat shop 55(68.8%0 were found microorganisms. ,including, OUT OF 80 Samples. Salmonella were 22 (22(27.5%), Staphylococcus aureus were 6(7.5%), E.Coli were 11 (13.7%), Proteus were 3 (8.57%), Staphylococcus epidermoids were 2(2.5%), Mycobacterium Tuberculosis were 1 (1.25%), Klebsiella were 3 (3.75%), Shigella were 1(1.25%), Serratus were0%, Pseudominas were 2(2.5%).

Of the 720 samples (Table1) 36 samples were taken from the Road side mechanic, 24 (66.7%) were found microorganisms, including OUT OF 63 Samples .Salmonella were 9(14.28%), Staphylococcus aureus were 8 (12.69%), E.Coli were 3 (4.76%), Proteus were 12(19%), Staphylo epidermoids were 5 (7.9%), Mycobacterium Tuberculosis were 0%, Klebsiella were 1(15), Shigella were 0%, Serratus were 05, Pseudominas were 0%.

Of the 720 samples (Table1) 4 samples were taken from the Bus conductor 4(100%) were found microorganism including OUT OF 4 Samples. Salmonella were 2(50%), E.Coli were 1(25%), Klebsella were 1 (25%).

Of the 720 samples (Table1) 23 sample were taken from the Beggars 19(82.6%) were found microorganisms, including OUT OF 23 Samples. Slmonella were 3 (8.57%), Staphylococcus aureus were

**TABLE 1**

**BACTERIA ISOLATED FROM VARIOUS LOCATIONS**

| Location | No. of Samples | Salmonella | S. aureus | E.coli | Proteus | S. Epider. | M. Tuber. | Kleb | Shigella | Seratus | Ps. | Total | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bank counter | 243 | 3(1.25%) | 52(21.3%) | 01(.41%) | 0 | 12(4.93%0 | 0 | 0 | 0 | 0 | 0 | 68 | 28.0 |
| ATM | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| Medical store | 35 | 03 (8.57%) | 09(25.57%) | 06(17.19%) | 0 | 06(17.14%) | 0 | 0 | 2(5.7%)0 | 0 | 0 | 26 | 74.3 |
| Food seller | 94 | 37 (39.36%) | 06(6.38%) | 05(5.3%) | 03(3.1%0 | 07(7.44%) | 04(4.2%) | 02(2.12%) | 02(5.12%) | 0 | 0 | 66 | 70.2 |
| Milk seller | 92 | 27(29.34%) | 09(9.78%) | 09(9.78%) | 06(6.52%) | 05(5.43%) | 16(17.39%) | 01(15) | 01(1%) | 0 | 0 | 74 | 80.4 |
| Grocery store | 63 | 09(14.28%) | 08(12.69%) | 03(4.76%) | 12(19%) | 05(7.9%) | 0 | 01(1.58%0 | 0 | 0 | 0 | 38 | 60.3 |
| Meat shop | 80 | 22(27.5%) | 06(7.5%) | 11(13.1%) | 07(8.75%) | 02(2.5%) | 01 | 03(3.75%) | 01(1.25%) | 0 | 02(2.5%) | 55 | 68.8 |
| Roadside merchant | 36 | 08(22.2%) | 01(2.77%0 | 05(13.8%) | 04(11.11%) | 0 | 0 | 04(11.11%) | 02(5.53%) | 0 | 0 | 24 | 66.7 |
| Bus conductor | 04 | 02(50%) | 0 | 01(25%) | 0 | 0 | 0 | 01(25%) | 0 | 0 | 0 | 04 | 100.0 |
| Beggar | 23 | 04((17.89%) | 02(8.69%) | 0 | 07(3043%) | 0 | 0 | 03(13%) | 01(4.34%) | 02(8.69%) | 0 | 19 | 82.6 |
| **Total** | **720** | **115** | **93** | **41** | **39** | **37** | **21** | **15** | **09** | **02** | **02** | **374** | **51.9** |

2(8.69%), E.Coli were 0%, Proteus were 7 (30.43%), Klebsella were 3(13%0, Shigella were 1(4.34%) Serratus were 2 (8.69%).

## DISCUSSION

This huge number of the isolated microorganisms from the Pakistan currency circulating in Pakistan is very alarming situation in Pakistan regarding the health point of view especially for the immunocompromised patients and debilitated patients. In this study the distribution of isolates were from different locations Of the 720 sample (Table1) size 68 (28%) from the bank counter, From ATM machine 0%, from medical store 26(74.3%), from food seller 66((70.2%), from milk seller 26(74.3%), from Grocery shop 38(60.3%) from Meat shop 26(74.3%), from Road side mechanic 26(74.3%), from Bus conductor 4(100%), from Beggars 23(82.6%). Indeed it is confirmed that the microorganisms are present in all locations, except bank ATM cash where these pathogens are killed during the process of heating that is 392 F as claim of the Gadsb y (1998). Hence during my study microorganisms were isolated from all location ,the highest number of isolates from Bus conductors that was 100%. Microorganisms were found While 2nd highest number of isolates were found from beggars that were 82.6%, while lowest number of isolates were 28% found from the bank counter might be because of supply of the clean currency notes, which is lowest number of isolates in comparison to other locations. But it is evidential proof that all locations are providing the microorganisms to the people of Pakistan. The main component of paper is cellulose .The degradation of cellulose by bacteria, which secret the enzyme cellulase. Growth of microorganisms causing deterioration of cellulose is greatly influenced by environmental conditions, which provides the strong environment for the survival of the microorganisms, thus the currency contamination is of important to public health as it can provide a vehicle for easy transmission of pathogens between the handlers.

## RECOMMENDATIONS

Prompt hand washing awareness mass campaign after handling of money through electronic media and print media

Use of ATM for withdrawal of money and electronic devices for purchasing of daily life commodities

Life of circulation of currency in the public should be reduced. Every bank should have the ultra violet treatment for the currency in every bank, when these bank receive back in the bank and should be treated accordingly.

Pakistan currency should be replaced by plastic currency which is easily washable with detergents as in Australia and other countries has adopted.

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