

Study of Contaminated Currency Notes in Circulation

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Abstract: *Currency is very important to our life as it facilitates the needs of common man. Paper currency is widely exchanged for goods and services in countries worldwide. It is used for all type of commerce. Paper currency provides a large surface area as a breeding ground for pathogens. Coins and currency notes could carry potentially pathogenic organisms. In India, most types of trades depend on currency, with lower-denomination notes receiving the most handling because they are exchanged many times. Mokhada is a rural area where peoples mostly depend upon cash trading. Currency notes and coins are handled by persons of varying health and hygienic standards and are also stored under varying environmental and personal hygienic conditions. Some of the associated fungal species are potential pathogens of human beings and plants. Moreover, money on which pathogenic microorganisms might survive represents an often overlooked reservoir of diseases. Therefore, adequate care must be taken while handling these currency notes and coins for the safety of human health. There should be public awareness of the fact that currency notes could be a source of infection and can be dangerous to health. Public enlightenment campaigns on proper money handling practices should be organized. Although there is no direct evidence for the presence of pathogenic microorganisms over currency which results in infection, yet their understanding could provide strategies to reduce the contamination of currency. This study will help people to avoid infections via currency notes.*

Keywords:

1. Introduction

Money is defined as a generally accepted material, even a piece of paper embodying a promise, that is, a currency note, which is used as a means of exchange and measure of value. Now days currency notes is the mostly discussed subject in India. In existing research awareness toward contaminated currency notes was attempted by author with the help of students.

We use money as a measuring unit in pricing a transaction, offer it as a medium for exchange of goods and services, settlement of debts, for deferred payments in economic activities and make it a store of value for our savings. Money, as we know it today, is the result of a long process of evolution. At the beginning, there was no money and people were engaged in barter in which there was exchange of merchandise for merchandise without value equivalence. This elementary form of trade prevailed at the beginning of civilization and is found even today among people of primitive economies, especially in regions where difficult access makes money scarce. This exchange, however, is not free from difficulties, since there is no common measure of value among the items bartered. At some point in the development of ancient societies people began to recognize that simple bartering can be cumbersome and slow. This led to the acceptance of commodity money. Many items, which were thought of having value, were used as commodity money. These included many objects such as naturally scarce precious metals, conch shells, beads, etc. However, with the growth of society towards commercialization, the society as well as economy shifted to metallic money. At this stage, coins of various metals such as gold, silver and copper were designated as money. Later, during 17th and 18th century, paper money (note) was introduced, which has now become the most popular form of money. Over the following centuries, paper notes became widely accepted as substitute for money and eventually they were recognized as

actual money. That is how paper currency notes came into existence and now-a-days they are being used repeatedly in exchange for goods and services. This study will help people to avoid infections via currency notes.

2. Objectives

Objectives of the current study are-

- 1) To find factors responsible for contamination of currency notes.
- 2) To make awareness towards contaminated currency among students.
- 3) To avoid spread of diseases through contaminated currency.

3. Methodology of Research

Data for the current study were collected at the 'Karmveer Bhaurao Patil High school Mokhada, a rural area from Mokhada, Dist- Palghar'. Study participants were drawn from parents of students of Standard-9th Division- A during the 2016-17 school year. All parents not participated in research. But most of the parents were participated from existing class. From this class 50 parents of students agreed to participate (Response rate 98%).

Measures were assessed by self-report using a laptop. Use of currency notes and awareness towards the contaminated currency was assessed by a questionnaire filled by parents.

Parent's payment method was assessed by a question which type of payment method you use mostly in daily life. Parents could respond "Cash", "Cheques", "E-payment", or "Other".

Source of currency notes was assessed by a question having responses "Banks," "ATM", "Traders" or "Other".

Parents were asked about from where they gets dirty currency notes.

The use of saliva during counting of currency notes as well as desists from placing money in the mouth and biting off corners of currency notes also asked by various questions.

Hygienic measures such as thorough hand washing with soap after using currency Notes also asked with responses “Always”, “Most times”, “Sometimes” and “Never”.

Observation by students

Author told students to bring currency notes with them. Students observed currency notes using 60X currency detecting LED microscope and simple microscope. Samples of currency notes were collected from students. These currency notes sorted in various category like ‘Very Clean’, ‘Medium clean’ and ‘Dirty’. Students noted the count of dirty notes.

Awareness camp

A half day camp for students and their parents on ‘Contaminated Currency’ was arranged on 21 December 2016 at Karmveer Bhaurao Patil High school, Mokhada. In existing camp information about unhygienic habits which contaminate the notes gives by researcher.

Following instructions had been given to parents:

- Keep your currency always neat.
- Do not keep currency notes in socks, shoes and pockets, under the carpet or rugs.
- Do not squeeze currency notes in the hand frequently.
- Do not wet your hands or fingers with saliva or use of contaminated water to lubricate the hand in counting money.
- Do not store notes in polythene, cotton or leather bags in humid and dark conditions.
- Do not keep currency notes with direct body contact

4. Data Analysis and Interpretation

All analysis was conducted using survey procedures to adjust for the clustered sample design. Study of factors responsible for contamination of was done by various sources (Library, Websites etc.). Paper currency can also be contaminated by droplets during coughing, sneezing, touching with previously contaminated hands or other materials and by their placement on dirty surfaces Contamination from the wounds and nasal secretions are also potential sources of transfer of microorganisms to currency notes during handling

In Mokhada town, poor currency handling culture is widespread, and there is indiscriminate abuse of currency notes. An individual living in unhygienic conditions and having unhygienic habits will contaminate the notes e.g., keeping currency notes in socks, shoes and pockets, under the carpet or rugs and squeezing them in the hand frequently

introduces an array of microbes to the notes. The final study sample had a high prevalence of unhygeigness. 86 % of the study sample were classified as getting dirty currency notes sometimes. (Chart 1)

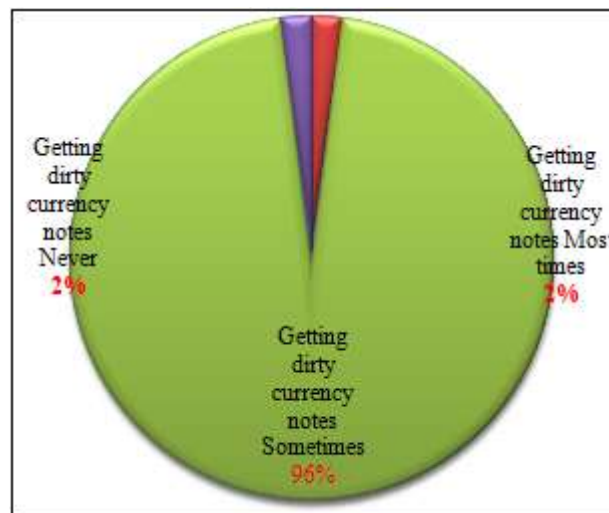


Chart 1: Getting dirty currency notes

In day to day transactions, money is handled by persons of varying health and hygienic standards and also stored under varying environmental and personal hygienic conditions. In total 62% peoples get clean notes through Automated Teller Machines ie.ATMs where 36% from banks.(Chart 2)

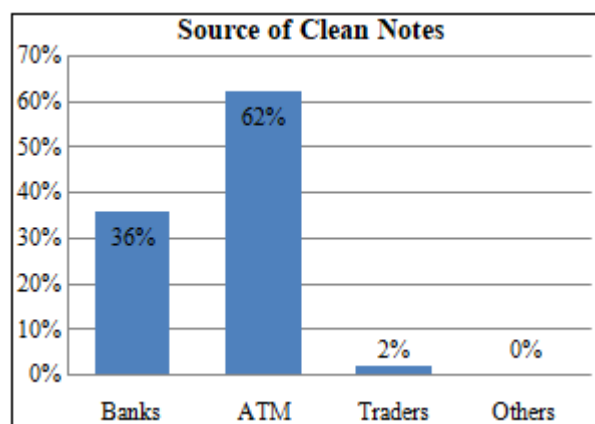


Chart 2: Source of Clean Notes

Attitudes such as the wetting of hands or fingers with saliva or use of contaminated water to lubricate the hand in counting money and use of food contaminated fingers in handling currency notes may not only enhance the contamination of currency notes but may also increase the risk of infection from contaminated ones. In addition, contamination of currency notes can also be traced to dust, soil, water of the body of handlers (hand, skin, etc.,). Microorganisms on the skin can be transferred from cashiers, salespeople and the general public to the currency notes that they handle. In total of 92% of people sometimes wet hands or fingers with saliva in handling currency notes (Chart 3)

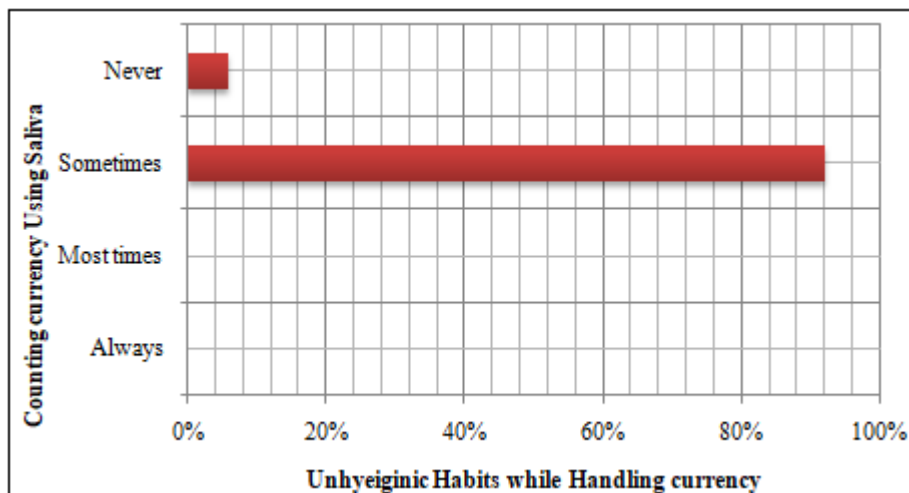


Chart 3: Counting currency using saliva

Source of contamination could also be due to poor or negative money handling practices like spraying during ceremonies where such notes may be trampled upon when they fall on the ground. These notes pass through many hands, during which pathogens become imposed on them and thus act as vehicles delivering microbes to contaminate the hands of the next user. 100% of people of sample never wash their hands after handling currency. (Chart 4)



Chart 4: Washing hands after handling currency

Currency notes of lower denomination receive the roughest handling as they are circulated among people from various occupations and walks of life, like beggars, street food vendors, shoe-shiners, school children, butchers, etc. Therefore, there are chances of higher levels of microbial contamination on lower denomination notes. Students observed currency notes using 60X currency detecting LED microscope and simple microscope. Samples of currency notes were collected from students. These currency notes sorted in various category like 'Very Clean', 'Medium clean' and 'Dirty'. Students noted the count of dirty notes. Among these sample notes 74% notes were dirty. (Chart 5)

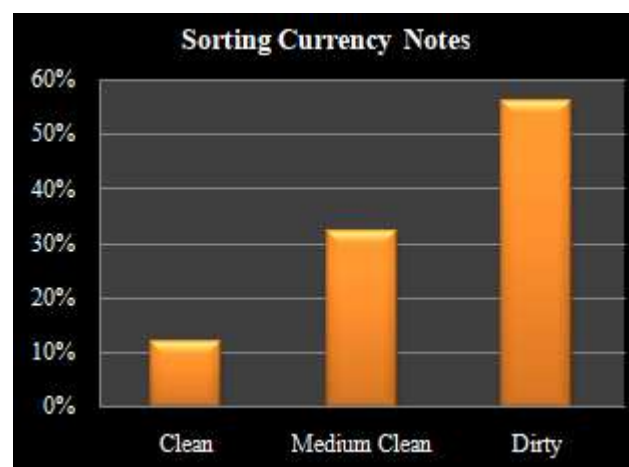
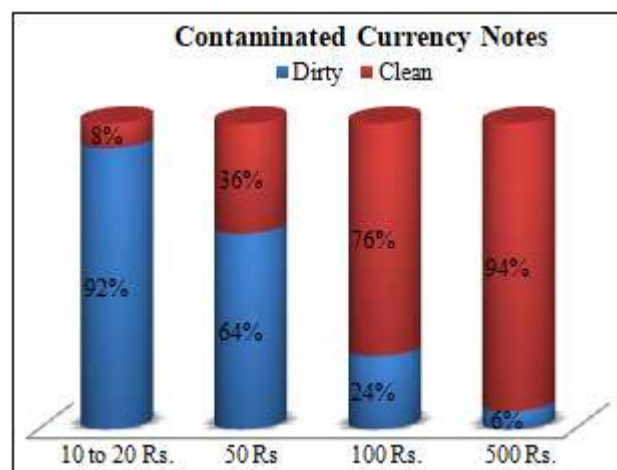


Chart 5: Sorting currency notes

Out of sample currency notes lower value notes were more contaminated than higher value notes. (Chart 6)



Paper currency remains for few years in circulation and provides a large surface area as a breeding ground for pathogens. Further, storage of these notes in polythene, cotton or leather bags in humid and dark conditions also favours the growth of fungal and bacterial organisms on them.

5. Conclusion

Our findings suggest that there are number factors which contaminate currency notes which can causes infections to human beings.

People sometimes get dirty notes in their daily life.

Most of the people get clean currency notes via banks and ATMs.

Most of the people have attitudes such as the wetting of hands or fingers with saliva or use of contaminated water to lubricate the hand in counting money and use of food contaminated fingers in handling currency notes.

People never wash their hands after handling currency notes.

Currency notes of lower denomination receive the roughest handling as they are circulated among people from various occupations and walks of life, like beggars, street food vendors, shoe-shiners, school children, butchers, etc. There are chances of higher levels of microbial contamination on lower denomination notes.

6. Scope for Future Work

Public enlightenment campaigns on good money handling practices should be done and lastly more similar studies should be carried on a regular basis in order to build a global information network on money hygiene bearing in mind the public health implications of contaminated currency notes. Studies on the contamination of money with microbial agents is lacking in most of the developing countries. This

shortage of information may contribute to the absence of public health policies regarding currency usage, handling and circulation. The situation is further compounded by the inability of some of the governments to consistently withdraw old, worn-out and mutilated currency notes from the circulation as these could elevate their contributory role in transmission of some pathogens, thereby constituting potential public health hazard.

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References

- [1] Kumar T., Abirami B., Saravanamuthu R., Asian Pharma Press/Studies on the Fungal Flora of Indian currency.
- [2] Nayantra Narayanan, scroll.in/dirty money, 05 July 2015
- [3] Newscientist.com/article/banknote tracking helps model spread of disease 25 Jul 2006
- [4] Sarojini, Lifestyle/Health/Dirty contaminated money 26 Feb 2016
- [5] Times of India/science/money trouble: currency notes are laced with infections 17 Oct 2015

Date: 01 / 12 / 2016

Questionnaire

I am **Mr. Tushar Chandrakant Mhatre**, assistant teacher at Rayat Shikshan Sanstha's **Karmveer Bhaurao Patil Highschool Mokhada**. I am conducting a questionnaire to study contamination of currency. If you could take a few minutes to complete the questionnaire we would be very grateful. Thank you for your time.

Name: Age:

Address: Occupation:

1. Which type of payment method you use mostly in daily life?

☐ Cash ☐ Cheques ☐ E-payment ☐ Other

2. From where do you get currency notes?

☐ Banks ☐ ATM ☐ Traders ☐ Other

3. Did you found dirty currency notes ?

☐ Always ☐ Most times ☐ Some times ☐ Never

4. From where do you get clean currency notes?

☐ Banks ☐ ATM ☐ Traders ☐ Other

5. Do you count currency notes using spit?

☐ Always ☐ Most times ☐ Some times ☐ Never

6. Did your child of put coins in mouth?

☐ Always ☐ Most times ☐ Some times ☐ Never

7. Do you keep currency notes with body contacts?

☐ Always ☐ Most times ☐ Some times ☐ Never

8. Do you wash your hands after handling currency?

☐ Always ☐ Most times ☐ Some times ☐ Never

9. Do you have an idea about contaminated currency?

☐ Yes ☐ Some ☐ No ☐ Can't say

10. Do you have an idea about bacteria?

☐ Yes ☐ Some ☐ No ☐ Can't say