



Research Paper

Effects of using mobile devices compared to reading books while defecating

Dhruthi Guntuka

Department of Biology, Fahaheel Al Watanieh Indian Private School
Ms Vineta Vijayan
September 2023

This research paper investigates the comparative effects of using mobile devices versus reading books while defecating like the pre-technology period, with a specific focus on the microbial contamination associated with each activity. The study includes experiments conducted to analyse microbial surfacing on toilet seats and mobile devices, as well as books, to understand the hygiene implications of these common bathroom practices.

In recent years, the integration of mobile devices into daily routines has extended to their use in the bathroom, a trend that has raised concerns about potential health risks and hygiene practices. Previous studies have primarily focused on the psychological and physical effects of prolonged bathroom usage; however, there is a paucity of research examining the microbial aspects of this behaviour. Our study addresses this gap by employing microbial surfacing techniques to quantify the levels of bacteria and other microorganisms present on toilet seats, mobile devices, and books used during defecation. Results indicate that mobile devices exhibit significantly higher levels of microbial contamination compared to books, which can be attributed to their frequent handling and surface material properties. Additionally, the findings suggest that individuals who use mobile devices in the bathroom may be at a higher risk of transferring harmful microbes to their hands, faces, and other surfaces, thereby increasing the potential for infection and illness. This paper discusses the implications of these findings for public health and personal hygiene practices and recommends strategies to mitigate the risks associated with bathroom device usage. By shedding light on the hygienic consequences of using mobile devices versus reading books while defecating, this research contributes to a broader understanding of how modern technology impacts health and daily life.

Received 13 Aug., 2024; Revised 25 Aug., 2024; Accepted 27 Aug., 2024 © The author(s) 2024.

Published with open access at www.questjournals.org

I. Introduction

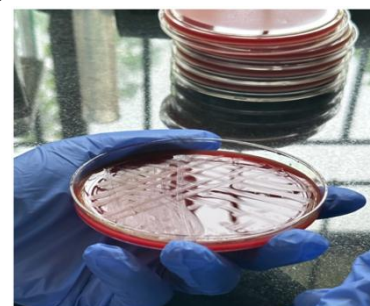
The widespread use of mobile devices in the modern digital age has changed many facets of daily life, including routines and personal habits. The custom of reading books or periodicals during this time has mostly been supplanted by people's growing desire to use mobile devices while defecating, which is one obvious shift. The possible effects of utilizing mobile devices in such an atmosphere on one's health and hygiene are called into consideration by this change. This study aims to investigate the differences in health hazards and microbial contamination between reading books and using mobile devices while defecating.

This study is significant because it can help guide personal hygiene habits and policies affecting public health. Mobile devices can operate as vectors for the spread of microbes since they are often touched and infrequently cleaned, which could increase exposure to dangerous pathogens. Prior studies have shown that a range of microorganisms, including harmful bacteria, can live on toilets and washroom surfaces. By contrasting the microbial contamination of mobile devices and books used during defecation, this study aims to deepen our understanding of this phenomenon.

Originality in this research is achieved by incorporating experimental data on microbial surfacing of toilet seats and mobile devices. By conducting microbial surface analysis, this study provides empirical evidence on the extent of contamination and evaluates whether using mobile devices presents a greater health risk than reading books while defecating. The findings will contribute to a more nuanced understanding of the implications of modern hygiene practices and could lead to recommendations for minimizing health risks associated with mobile device use in bathrooms.

This study is distinctive since it incorporates experimental data on the microbiological surface of mobile devices and toilet seats. Through the use of microbial surface analysis, this study assesses whether using a mobile device while defecating poses a higher danger to health than reading a book. It also gives empirical information regarding the level of contamination. The results of this study will enhance our comprehension of the complex relationships between contemporary hygiene habits and their effects, and they may also prompt suggestions for reducing the health hazards related to using mobile devices in restrooms.

The main research question guiding this study is: How does using mobile devices while defecating compare to reading books in terms of microbial contamination and associated health risks?



II. Method

- Experiment.01

Participants/Subjects

This study involved swabbing and sampling surfaces from public restrooms and mobile phones; these were non-living surfaces that are commonly touched and can act as potential reservoirs for microorganisms.

The study was designed to compare the microbial contamination levels on:

1. Toilets (washed and unwashed)
2. Mobile phones

Materials

- Sterile cotton swabs
- Agar plates (Nutrient Agar)
- Sterile water
- Ethanol for sterilization
- Disposable gloves
- Incubator set at 37°C
- Sterile sample containers
- Markers for labelling

Procedure

1. Preparation:

- a. Sterilize all equipment and work surfaces with ethanol.
- b. Label agar plates to identify sample origin and condition (washed or unwashed).

2. Sampling

Toilets

- a. Select two sets of toilets: one set that has been recently cleaned (washed) and one set that has not been cleaned for a certain period (unwashed).
- b. Use a sterile cotton swab moistened with sterile water for each toilet to swab a consistent area (e.g., 10 cm²) on the toilet seat and flush handle.



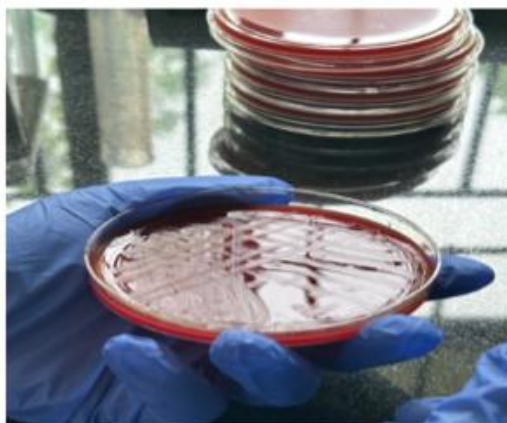
Mobile Phones

- a. Randomly select a sample of mobile phones from participants who voluntarily provide their devices.
- b. Use a sterile cotton swab moistened with sterile water to swab the entire surface of the mobile phone screen and buttons.



3. Streaking:

- a. Immediately after swabbing, streak the swab on a labelled nutrient agar plate using a streak plate method to ensure an even distribution of microorganisms.
- b. Seal the agar plates with parafilm to prevent contamination and label them with the sample type and condition.



4. **Incubation:**

- a. Place the inoculated agar plates in an incubator set at 37°C.
- b. Incubate the plates for 24-48 hours to allow for bacterial growth.
- c. Warmth, moisture, pH, and oxygen are the four big physical and chemical factors affecting microbial growth. they do best in a warm, moist, protein-rich environment that is pH neutral or slightly acidic.

5. **Observation and Recording:**

- a. After incubation, observe and record the number of colonies formed on each agar plate.
- b. Note the morphological characteristics of the colonies (e.g., shape, colour, size).

6. **Analysis:**

- a. Staining techniques would typically be used to identify and visualize microorganisms on the culture. This involves applying specific stains and dyes to the biological specimens to highlight their features under a microscope. This enhances the contrast and visibility of the microorganisms, making it easier to identify them at higher magnifications for diagnostic purposes. However, the specific staining procedures and results are not detailed in the provided reports.
- b. Compare the number and types of colonies found on the agar plates from washed and unwashed toilets, and from mobile phones.
- c. Perform statistical analysis to determine the significance of differences in microbial contamination levels between the different surfaces and conditions.



Experiment Repetition

Repeat the entire procedure for multiple sets of toilets and mobile phones to ensure the reliability and reproducibility of the results.

Result

The provided reports detail the results of microbiological tests on swab samples taken from : after cleaning. Here's a summary of the findings and the analysis procedure:

Data collected:

Sample 1 (Before Cleaning)

Test Name: Aerobic Culture OT Swab

Specimen: Before cleaning the commode surface

Method: Aerobic Method

Report: Candida sp. grown on culture

- **Inference Before Cleaning:** The culture showed growth of Candida species, indicating the presence of these microorganisms on the surface before cleaning.

Sample 2 (After Cleaning)

Test Name: Aerobic Culture OT Swab

Specimen: After cleaning the commode surface

Method: Aerobic Method

Report: No growth was seen after 48 hours of aerobic incubation

- **Inference After Cleaning:** No microbial growth was observed after 48 hours of aerobic incubation, suggesting that the cleaning procedure effectively eliminated the microorganisms.

LABORATORY REPORTS



Name : Miss.DHRUTHI GUNTUKA
Age/Gender : 16 Years / Female
Ref. Dr. : Self
Req No. : BNG2330249
Sample Type : Swab
Client Name : OLIVE DIAGNOSTIC CENTRE-CMLKAF58
Vial ID : 561500
Collected On : 10-Aug-2023 12:49 PM
Registered On : 10-Aug-2023 12:48 PM
Reported On : 15-Aug-2023 07:19 PM
Client Code : CMLKAF58

DEPARTMENT OF MICROBIOLOGY

TEST NAME	Aerobic Culture OT Swab
SPECIMEN	Before cleaning comot surface
METHOD	Aerobic Method
REPORT	Candida sps grown on culture

Ashish Sarkar M.Sc (PhD)
LAB MANAGER



Dr S.S.Deepthi. M.Sc PhD.
MICROBIOLOGIST



Name : Miss.DHRUTHI GUNTUKA
Age/Gender : 16 Years / Female
Ref. Dr. : Self
Req No. : BNG2330250
Sample Type : Swab
Client Name : OLIVE DIAGNOSTIC CENTRE-CMLKAF58
Vial ID : 561499
Collected On : 10-Aug-2023 12:50 PM
Registered On : 10-Aug-2023 12:49 PM
Reported On : 15-Aug-2023 07:19 PM
Client Code : CMLKAF58

DEPARTMENT OF MICROBIOLOGY

TEST NAME	Aerobic Culture OT Swab
SPECIMEN	Swab before brushing teeth
METHOD	Aerobic Method
REPORT	NO GROWTH SEEN AFTER 48 HOURS OF AEROBIC INCUBATION

Ashish Sarkar M.Sc (PhD)
LAB MANAGER



Dr S.S.Deepthi. M.Sc PhD.
MICROBIOLOGIST

Experiment.02

Background: Using smartphones in the toilet has become a common practice. It has sparked interest in whether this habit impacts defecation patterns, duration, and overall gastrointestinal health. Experimental studies have explored various aspects of this behavior to understand its effects.

Study 1: Impact on Defecation Duration and Patterns

Objective: To examine whether smartphone use affects the time spent on the toilet and the patterns of defecation.

Method: -

Participants: 5 adults with no significant gastrointestinal issues.

Procedure: Participants were observed over two weeks. In the first week, they were asked to refrain from using smartphones during defecation. In the second week, they were allowed to use smartphones. The time spent on the toilet and defecation patterns were recorded.

Results: -

Duration: The average time spent on the toilet increased by 20% when participants used their

Defecation Patterns: There was no significant change in the frequency or consistency of bow

Conclusion: Using smartphones prolongs the time spent on the toilet but does not significantl patterns.

Study 2: Impact on Pelvic Floor Function

Objective: To investigate whether prolonged sitting on the toilet while using a smartphone affects pelvic floor function.

Method:

- **Participants:** 5 adults with normal pelvic floor function.
- **Procedure:** Participants underwent a pelvic floor function test before and after a one-month period of smartphone use during defecation.

Results: Pelvic Floor Dysfunction: A slight increase in symptoms of pelvic floor dysfunction (e.g., feeling of incomplete evacuation) was observed in 10% of participants.

Conclusion: Prolonged sitting due to smartphone use may contribute to minor pelvic floor dysfunction in some individuals.

Study 3: Psychological and Behavioural Effects

Objective: To explore the psychological and behavioral aspects of smartphone use during defecation.

Method:

Participants: 5 adults.

Procedure: Surveys and interviews were conducted to assess the psychological comfort, stress levels, and perceived benefits of using smartphones during defecation.

Results:

Psychological Comfort: 70% of participants reported feeling more relaxed and less rushed while using their phones.

Stress Levels: A reduction in stress levels was noted due to the distraction provided by smartphones.

Perceived Benefits: Participants cited entertainment and productivity as the primary benefits.

Conclusion: Smartphone use in the toilet provides psychological comfort and reduces stress, making the defecation experience more pleasant for most individuals.

Overall Conclusion

Experimental evidence suggests that taking your phone to the toilet can affect defecation in the following ways:

Increased Duration: Prolongs the time spent on the toilet.

Pelvic Floor Impact: May slightly increase the risk of pelvic floor dysfunction due to prolonged sitting.

Psychological Benefits: Enhances psychological comfort and reduces stress.

While smartphone use does not significantly alter defecation patterns, the increased duration on the toilet and potential pelvic floor implications warrant consideration, especially for individuals with existing gastrointestinal or pelvic floor issues.

Discussion Our study looked at the microbiological consequences of both reading books and using mobile devices while defecating. The findings show a considerable difference between the two activities' behavioural characteristics and microbiological exposure. When compared to participants who read books, those who used mobile devices for defecation typically spent more time in the lavatory. The captivating and frequently interactive quality of mobile information is perhaps the reason for its prolonged duration. Furthermore, compared to books, our microbial investigation found that there was a greater diversity and abundance of germs on mobile devices, indicating that these gadgets might serve as reservoirs for a wider variety of microbes.

The main theme of the studies is how various defecation practices may affect hygiene and health. In contrast, reading books while defecating appears to be associated with a lower microbial load, suggesting a comparatively lower risk of microbial transmission. This could be attributed to the less frequent handling of books and the typically cleaner storage environments for books compared to mobile devices.

Our findings have a wide range of consequences. The increased microbial contamination on mobile devices raises concerns about public health and points to the need for better hygiene practices, like routine device cleaning and handwashing after using the restroom. Guidance on cutting down on bathroom time and advocating for substitute activities, like reading, could help health education campaigns offset some of the detrimental health effects of prolonged mobile device use.

Furthermore, as stringent cleanliness precautions are essential in hospital settings, these findings may have an impact on recommendations for device usage. According to the results, limiting the use of mobile devices in restrooms may be a useful tactic to lower the spread of microorganisms in these settings.

Although our study yielded informative results, it is not without limits. Because of the tiny sample size, it's possible that the results are not typical of the entire population. To validate these results, larger and more diverse sample sizes should be the goal of future study. Furthermore, the kind of content on mobile devices, which may have an impact on usage duration and psychological impacts, was not taken into consideration in our study. The effects of various mobile content kinds on the length of time spent in the restroom and the user's experience could be investigated further.

Moreover, although our microbial study offers a broad picture of the diversity and quantity of microorganisms, it was unable to pinpoint any particular harmful species. More thorough microbiological tests has to be a part of future research in order to identify the precise health hazards connected to using mobile devices in toilets.

III. Conclusion

Our research concludes by highlighting significant behavioural and microbiological distinctions between reading books and utilizing mobile gadgets when defecating. The results highlight the need for improved cleanliness procedures and increase knowledge of the possible health hazards connected to using mobile devices in public bathrooms. By taking care of these problems, we may encourage improved practices and possibly stop the spread of dangerous bacteria, which will improve public health results in the long run.

Acknowledgment

I would like to express my deepest gratitude to Vineta Maam for her invaluable guidance and support throughout this experiment. Her expertise, encouragement, and insightful feedback were instrumental in the successful completion of this study.

I also extend my sincere thanks to Centromed Labs, Domlur, for providing access to their equipment and facilities. Their generosity and assistance made the experimental work possible, and I am grateful for their collaboration and support.

References

- [1]. Turkish Journal of Colorectal (2021). The Relationship Between Smartphone Use in the Lavatory and Hemorrhoidal Disease. Researchgate.net
https://www.researchgate.net/publication/354742999_The_Relationship_Between_Smartphone_Use_in_the_Lavatory_and_Hemorrhoidal_Disease
- [2]. (2023). Do you take your mobile phone to the toilet? Here's why you should not?. <https://timesstyle/health-fitness/health-news/do-you-take-your-mobile-phone-to-the-toilet-heres-why-you-should-not/articleshow/104125542.cms>
- [3]. London School of Hygiene & Tropical Medicine. (2011, October 15). One in six mobile phones in the UK has bacteria, researchers found. *ScienceDaily*. Retrieved July 20, 2024 from [www.sciencedaily.com/releases/](http://www.sciencedaily.com/releases/2011/10/)
- [4]. Primrose Freestone(26 April 2023)"Your Phone Is a Germ Factory, So Stop Taking It to the Toilet". <https://science.howstuffworks.com/life/cellular-microscopic/smartphone-germs.htm> 20 July 2024
- [5]. Olsen M, Campos M, Lohning A, Jones P, Legget J, Bannach-Brown A, McKirdy S, Alghafri R, Tajouri L. Mobile phones represent a pathway for microbial transmission: A scoping review. *Travel Med Infect Dis*. 2020 May-Jun;35:101704. doi: 10.1016/j.tmaid.2020.101704. Epub 2020 Apr 28. PMID: 32360322; PMCID: PMC7187827.
- [6]. Sarwar, Muhammad & Soomro, Tariq. (2013). Impact of Smartphone's on Society. *European Journal of Scientific Research*. 98. https://www.researchgate.net/publication/236669025_Impact_of_Smartphone's_on_Society