Recurrence of SARS-COV-2

Snacking Behavior and Obesity among Medical Students
Umbilical Endometriosis Coexisting with Umbilical Hernia
Sepsis due to Roseomonas Gilardii in an Elderly Female
Diabetes Telemedicine Technologies during COVID-19
Personal Protective Measures against Mosquitoes
Pattern of Tobacco use among School Children
Dieffenbachia Poisoning
Aziyo
Azithromycin IP 500 mg

FexoMik 180
Fexofenadine Hydrochloride IP 180 mg

MoxiMik CV
Amoxycillin IP 500 mg
Clavulanic Acid 125 mg

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1. The title page should be a separate document that contains the title of the paper, the category of submission, detailed author information, and full contact details of corresponding author. Full names of authors must be used with initials expanded. Any one author can be corresponding author. The title page should be uploaded as a supplementary file while submitting the manuscript.

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2. Title should be descriptive and should contain enough information for readers to understand what the study is about.

3. Abstract should not be of more than 400 words and should be structured, containing background, objectives, methods, results and conclusions.

4. Keywords – four to eight comma separated keywords representing the topic of the article.

5. Full text should contain Background and Rationale, Objectives, Methods, Results, Discussion, Conclusions, End Notes and References.

6. Background – elaborating the existing knowledge scenario with regard to the research question and how this study would add to it.

7. Objectives of the Study - Numbered output indicators that the study tries to look into (aims of the study).

8. Methods – includes study design, study subjects, inclusion and exclusion criteria, sample size and sampling methods, materials used, duration, data collection, data analysis and ethical considerations.

9. Results – the findings of the study presented in the form of statistical indicators, figures and tables.


11. Conclusions – Final deductions arrived at and new knowledge obtained at the end of the study.

12. Limitations – describes the limitations of the study.

13. Endnotes section should contain List of abbreviations with expansions, Explanations of terminologies as required, Conflicts of Interest statement, Acknowledgements and Financial Support.

14. References should be in Vancouver style.
MESSAGE, PRESIDENT IMA KSB

Dear colleagues,

The global situation demands more genuine research works in modern medicine to alleviate human sufferings from communicable and non-communicable diseases. Covid-19 pandemic has affected every area of human life, especially in health and productivity. It is a challenge for humanity, in post-Covid era to re-build human life in all forms. A lot of post-covid sequelae need to be studied and to find more effective solutions to manage appropriately. Medical fraternity should contribute through research works, and get it published to enlighten the knowledge for evidence-based practice. Kerala Medical Journal will help you to update recent advances promptly through its quality contents. I bless the editorial team to make this journal a better peer-reviewed journal in future.

Dr Zacharias PT
(State President)

EDITORIAL COMMENTS

Dear readers of KMJ,

The Covid-19 pandemic has created a situation where most of the research works in medical fields is orienting towards the management of covid19 and its various post-infection sequelae. Comorbidities are the real killer of Covid19 infected patients. The burden of malnutrition in the form of under and over-nutrition contributed drastically in Covid induced mortality and long term morbidities. Enormous studies are happening at every level of the health care management system to tackle both morbidities and mortality. Gathering information in the right way, and get it published at in time will help modern medicine to act through evidence-based practice. We need not discourage research works in other areas of the medical field, including various non-communicable diseases, which are the existing killers all time. Kerala Medical Journal is a prime journal of Indian Medical Association, Kerala State branch, which will help in every aspect of clinical practice through its timely contributions.

Dr Benny PV
(Editor)
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The severe acute respiratory syndrome-related coronavirus-2 (SARS-CoV-2) reactivation or reinfection will be an enduring and disquieting problem. SARS-CoV-2 replication in the host reaches its peak in the first week of infection, decreasing rapidly afterwards, due to the development of some levels of immunity. Yet, the infection seems to follow an uncustomary course in some individuals, reactivating after the apparent resolution of symptoms. Reinfection is a major public health concern in terms of global morbidity and possibly mortality. Several thoughts have been raised due to the “Retest Positive” for SARS-CoV-2 from “recovered” coronavirus disease-19 (COVID-19) patients. At the moment, it is difficult to discriminate if the positive nasopharyngeal swab results are due to real recurrence of COVID-19 infection or intermittent shedding of RNA fragments, especially in asymptomatic subjects. On the other hand, it cannot be excluded that truly negative discharged patients suffered reactivation or were re-infected with another COVID-19 strain, especially in elderly or in subjects with comorbidities. A report from the largest cohort study confirmed that more than 10% of patients clinically recovered from COVID-19 infection had re-positive RT-PCR at nasopharyngeal swab during post-discharge follow-up, and most of these subjects were asymptomatic at the time of recurrence. The proportion of re-positive patients among discharged COVID-19 patients varied from 2.4 to 69.2% and lasted from 1 to 38 days after discharge, depending on population size, age of patients, and type of specimens.

The majority of patients who tested re-positive were asymptomatic or had mild symptoms, but some patients progressed critically and died. Concerningly, it should be noted that the majority of patients were negative for both IgG and IgM antibodies against SARS-CoV-2 virus at the time of the positive PCR re-test. In another study showed that none of the patients who were severely ill at the time of their initial hospitalization had re-positive results. However, serological tests revealed that these patients were positive for antibodies to the SARS-CoV-2 virus and most of them had turned negative by the time of the later RT-PCR test.

Currently, several causes have been suggested as an explanation for re-positive tests for SARS-CoV-2 in COVID-19 patients during the recovery period, including false RT-PCR results, intermittent virus shedding, viral reactivation or re-infection with another SARS-CoV-2 strain, or exposing to a contaminated environmental surface after discharge. The false-negative rate of RT-PCR varies from 3 to 41%, according to the type of clinical specimen used at the time of discharge is one of the reason for the re-positive result at a later stage. There are many reasons for false-negative RT-PCR results, including the sensitivity/ specificity of the nucleic acid test kit, the sources of samples, and the sampling procedure itself. Respiratory shedding of SARS-CoV-2 may be intermittent. Therefore, a single negative swab could be misleading and may lead to positive result later on. In contrast, PCR tests can also give false-positive results, and patients have been diagnosed as re-positive when they were negative. Other possible reasons for false-positive results are contamination during the laboratory procedures and cross-reactivity with other human coronaviruses. The mean duration of viral RNA positive in stool samples was longer than pharyngeal swabs. This suggests that an anal swab or stool samples must be used to reduce the number of false-negatives.

However, the possibility cannot be excluded that truly negative discharged patients suffered reactivation or were re-infected with another SARS-CoV-2 strain. Genetic characterization of the viruses must be performed to distinguish between re-infection and reactivation of SARS-CoV-2 among re-positive patients. The second episode of COVID-19 infection appeared nearly 5 months after the first. That may be due to wearing out of protective antibody and resulted in reinfection. The result of the SARS-CoV-2 PCR test was positive. Serological tests showed very low levels of antibodies. This suggested a weak humoral immune response to the virus and potential reactivation of SARS-CoV-2. A possible viral reactivation in discharged patients previously diagnosed with...
COVID-19 was also observed in a study in which patients were symptomatic with a fever and biological inflammatory symptoms. Virological factors, host immunity status, and degree of immunosuppression are potential risk factors for the reactivation of the SARS-CoV-2 virus. Repeated infection with the same human common coronavirus HKU1 and OC43 in a period shorter than 1 year has also been described.

The virus remains positive in sputum longer than in nasopharyngeal samples. Therefore, re-positive results in lower respiratory tract samples among discharged patients are more reliable than the upper respiratory tract samples. This means that at the time of discharge from the hospital, the virus exists in small amounts in the lower respiratory tract, so the results of the nasopharyngeal swab test were negative. After a while, the virus multiplied, and the patient turned positive again. The detection of viral RNA in the air samples and environmental surface indicates the important role of environmental transmission. Good ventilation conditions; strict disinfection of environmental facilities, particularly in hospital wards; and strict hand hygiene must be reinforced to reduce the formation of viral aerosols, cut down the aerosol load, and avoid cross-infection in isolation wards. Emphasis should also be placed on toilet sanitation. The high proportion of continuous detection of viral nucleic acids in stool samples despite negative results of RT-PCR test in nasopharyngeal swabs suggests that the virus may be transmitted through the digestive tract or re-transmitted through aerosols containing viruses. The presence of live SARS-CoV-2 in the faeces reinforces the hypothesis of possible faecal-oral contamination by the virus.

In conclusion, the recurrence of COVID-19 infection is a fairly frequent phenomenon. Need more focused research to manage these patients and to avoid impact due to the evolution of the pandemic in the future.

**REFERENCE**

Pattern of Tobacco use among Higher Secondary School Children in the Rural and Coastal Areas of Kerala – A Prospective Study

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ABSTRACT

The increasing incidence of tobacco consumption among adolescents is a matter of concern for the parents and public health professionals, it is proved that the incidence id going up in spite of the best efforts by the Government, nongovernmental organizations and media. It is estimated that the prevalence of tobacco habits among boys in the rural and coastal areas is as high as 29%, at the same time the tobacco habits is not a serious public health issue among girls in the coastal and rural areas of this region. Close relatives are tobacco addicts for majority of those children who use tobacco and its products.

Keywords: Tobacco, Higher Secondary School Children

BACKGROUND & OBJECTIVES

India is the second largest consumer of tobacco products after china and its consumption is a serious social issue in most developing countries. The present study was undertaken to assess the prevalence of use of tobacco and tobacco products among higher secondary school children in the coastal and rural areas of Kerala, the state situated in the southern most part of India and is having one of the highest literacy rate in the country. Tobacco consumption is an important cause of mortality and morbidity in India.

MATERIALS AND METHOD

The study was conducted in the higher secondary schools along the rural and coastal areas of Karunagappally taluk in the Kollam district of Kerala from October to December of 2016. 15 Government and aided schools were selected. The data was collected with the help of a questionnaire. A total of 5678 students participated in the study. The purpose of the study was explained to the students with participation of National Service Scheme volunteers who distributed the data sheets to the students and helped in data collection. The school visit was coupled with lectures on the adverse effects of tobacco on health with pictures of cancers of the oral cavity, lungs, surgery for oral cancers and reconstruction. The collected data was entered into Microsoft excel datasheet and analyzed with SPSS 17.0 software. The Departments of Surgical Oncology, Regional Cancer Centre, Directorate of Higher Secondary School, Kerala and National Service Scheme participated in the study.

RESULTS

5678 students participated in the study, that included 2567 boys and 3111 girls (Figure 1). 760 out of 2567 boys use tobacco (Figure 2), 308 out of 760 boys (40%) use more than one type of tobacco products. Cigarettes and pan masala are the popular forms of tobacco among the students. 253 boys out of 760 (33%) used alcohol as

Figure 1. Gender distribution of participants
well (Figure 3). 709 out of 760 tobacco using students said their relatives use tobacco products at home. None of the girls participated in the study used tobacco products. But other studies reported increasing incidence of tobacco use among urban girls in India, but the data regarding the use of tobacco among rural girls is not available. 1819 students said their close relatives use tobacco and its products at home. 1420 students said their close relatives consume alcohol as well (Figure 4). Bricker et al in their study said that, siblings, parents and close friends’ smoking were all important influences on children’s smoking.

The study also found that majority of students (551 out of 760) smoke in groups at isolated places not far away from school campus. Source of tobacco is either from peer group or from nearby shops. 5382(94.7%) of students are aware of the ill effects of tobacco, they are aware that tobacco consumption can lead to cancer of the lung, oral cavity, stroke and heart attack. Students were also familiar with terms such as chemotherapy and radiotherapy, however it is doubtful whether they are aware of the complications associated these modes of treatment.

4578 (81%) students showed interest in anti tobacco activities. 2347(41.33%) students said the tobacco products are available in school premises and 1064(18.7%) said tobacco products are available within the campus itself (Figure 5). 40% started using tobacco products for fun, but 28% started mimicking the elders and 20% wanted to be the heroes in the campus. A recent study by Sargent et al. also found a strong association between exposure to movie smoking and smoking by adolescents. In our study none of the girls were using tobacco, this is in contrary to the habit among girls in United States. But in India it is a known fact that tobacco use is much more prevalent among men than women. It is to be noted that the students obtained the tobacco and its products either from close friends or from nearby shops. H Lim et al in their study found that most adolescents initiated smoking during upper primary or lower secondary schooling period. This means that the anti tobacco campaign to be started in the upper primary school rather than high school or higher secondary school.

**DISCUSSION**

According to the World Health Organization, adolescents are widely considered to be prone to recklessness and risk-taking behaviors, which can lead to substance abuse, car accidents, unsafe sex, and juvenile delinquency. The World Bank has reported that nearly 82,000–99,000 children and adolescents all over the world start smoking habit every day. 5.4 million people die of tobacco related diseases worldwide every year, tobacco use usually starts in adolescence and continues into adult life, meaning that many future victims tobacco use are today’s children.
In India the media campaign against the ill effects of tobacco lead to improvement in public awareness of the health hazards of its use, bringing increased regulation on tobacco industry resulting in restrictions on sponsoring sports event and advertising. Moreover the tax on tobacco products also increased. Recent move by Government of India to increase the pictorial warning on cigarette cover to 85 percentage is said to have brought the desired effect.

In developed countries, public awareness of the health hazards of tobacco use has lead to increased regulation of the tobacco industry, resulting in restrictions on the advertising and availability of cigarettes and higher prices for them. The recent published report of Global Adult Tobacco Survey (GATS) says “The overall tobacco use in India has declined from 34.6 % to 28.6% between 2009-10 and 2016-17.” However the most important finding of GATS survey is the consumption of tobacco has seen a drastic rise amongst teenagers in north- east region. The survey also found the highest use of tobacco among minors in Mizoram, followed by Arunachal Pradesh, Meghalaya, Tripura, Nagaland and Assam. As much as 27% of teen population in Arunachal Pradesh is found to consume tobacco; the highest in the country. This can be compared to only 4% adolescents taking tobacco in the country as a whole.

Our findings are in agreement with the observations by WHO that adolescents whose parents or siblings smoke or whose friends do so are particularly likely to use tobacco themselves. Jha et al too reported that examples set by siblings and parents, and peer pressure are strongly associated with tobacco use by young people. The studies examining the origins of alcohol and other drug (AOD) use problems (i.e., AOD abuse and dependence) consistently find that cigarette smoking is closely related with AOD use. Hoffman et al observed that youth who smoke and drink have an increased risk of having difficulties at school, delinquency, and use of other drugs. Compared to adults, the adolescents smoke less cigarettes and in smaller quantities, in spite of lower levels of consumption, studies suggest the adolescents smokers, particularly daily smokers, experience nicotine dependence and upon cessation majority experience withdrawal symptoms. The study by National Center for Chronic Disease Prevention and Health Promotion in USA also have similar view on use of tobacco by youth and young adults.

In India approximately 5500 children and adolescents start using tobacco products daily, some as young as 10 years old. In Kerala the average age for starting tobacco consumption in early 1980’s was 18 yrs, but the recent study showed the average age for starting tobacco consumption in 2016 is 10 yrs.

Dr Anju Dhawan says the current use of various substances was slightly lower compared to lifetime use and did not show a remarkably different pattern. The past month use of tobacco was reported by 74.9%, alcohol-56.8%, inhalants-30.5% and cannabis -28.9% of the sample in a study conducted by NCPCR. Smoking ban, restrictions, campaigns using printing and visual media, increase the price for tobacco products, community awareness on reducing the exposure to environmental tobacco smoke at home, tobacco cessation activities to concentrate on those who want to quit tobacco.

However steps should be taken to create awareness among adolescents about oral health in college and school campuses. Student police patrolling in the isolated places or houses not far away from the school premises is a good option that can be considered. Regular oral cavity examination by school authorities is another option to detect those who smoke. However the tobacco consumption can be brought down by imposing ban and restriction on smoking in public places, community education to reduce exposure to environmental tobacco smoke at home , Increasing the unit price for tobacco products, mass media campaigns depicting the harm effects of tobacco and its products, finding out strategies appropriate for health care providers and systems, multi component interventions like tobacco cessation and patient telephone support and pictorial warnings on tobacco packets. The study by Thomas et al showed school-based interventions were effective in reducing long-term smoking rates , a significant reduction of initiation of smoking among school children compared to control group. Any substance abuse at this age is likely to interfere with the normal child development and may have a lasting impact on the future life.

A limitation of the present study is that the findings and their interpretations were restricted to higher secondary school children only. Further studies are required that cover the groups of students who are out of school, because the prevalence of tobacco related risk behaviors is likely to be higher among them. The impact of pictures of surgery, side effects of radiotherapy, chemotherapy on these children, which prompt them to quit the habit could not be assessed. The study was supported by P.Kesavadev trust, Thiruvananthapuram, Kerala.

CONCLUSIONS

The childhood and adolescent years are important formative years of life during which the child acquires academic, cognitive, social and life skills. Majority of the students are aware of the health effects of tobacco. The awareness programme about the health effects of tobacco to be started at upper primary school instead of high or higher secondary school. Unfortunately the tobacco
products are available within the campus or in the school premises. School police patrolling in and around the campus to be intensified with support of local authorities. Oral cavity examination of the children to be conducted at regular intervals at the school. Steps should be taken to identify the agents who distribute the tobacco products in the campus and raids in the shops around the school to be done with the help of police to ensure that no sale of tobacco products are taking place in the school premises, including strict implementation of COPTA act. Parents must be instructed to spend more time with students at home and they should stop using tobacco products at home.

END NOTE

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Conflict of Interest
None of the authors have any financial, social or emotional commitment with the trust who supported the study or individual who participated in the study. No conflict of Interest.

Source of Funding
Dr.Jothy Dev. K, Chief Executive Officer, Jothy dev's Diabetic Centre, Thiruvananthapuram providing the financial support to conduct the study and data analysis.

Ethical Clearance
Since no patient, intervention, interview, or drugs involved in the study, only consent from the participating students, parents, school authorities were required at the time of conducting the study. The data was collected through the National Service Scheme volunteers of the corresponding schools.

Acknowledgement
We appreciate the support by
1. Mr. Mahesh . S, Co ordinator, National Service Scheme, Karunagappally, Kollam.
2. Dr. Breman Anil Peethammer, House Surgeon, Madras Medical College, Chennai for preparing the charts for the final report.

Criteria for Inclusion
All students present in the awareness class session were included in the study

Criteria for Exclusion
Those who are not willing to participate and incomplete filled questionnaire were excluded from the study

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Background and Objectives: Mosquito borne diseases including Dengue, Chickungunya, Malaria, Japanese encephalitis, Filariasis, Zika fever and Yellow fever are a growing public health concern. The state of Kerala in Southern India has been a hot bed for vector borne diseases with epidemics of Dengue and Chickungunya in 2003 and 2006 respectively. The present study was undertaken in a rural panchayath in Ernakulam district with an aim to understand the pattern of use of personal protection measures against mosquitoes, its socio-demographic determinants and the economic burden it imposes.

Methods: A cross sectional study was conducted in June 2015 in Elamkunnappuzha Panchayath, a rural coastal area located in Ernakulam District of Kerala in Southern India. 200 households were visited using multistage sampling technique using pretested semi-structured questionnaire. Data was entered in MS Excel and data analysis done in Statistical Package for Social Science version 19. Ethical approval was obtained from the institutional ethical committee.

Results: Among the 194 families consented to share data, more than two-third (68%) of the study households experienced mosquito menace. 94.8 % of the households used PPM, but only 67.5% of the households used on a daily basis. The most commonly used PPM among the study households were vaporizer (52.1%) followed by coil (42.3%) and fumes (19.1%). Mosquito menace and expenditure showed association with various factors.

Conclusion: Personal protective measures remain the corner stone of integrated vector management. PPM shall remain significant even in the wake of development of vaccines against mosquito-borne diseases.

Keywords: Mosquito Borne Diseases, Personal Protective Measures, Coastal Region, Kerala, Southern India, Cost Effective Analysis

INTRODUCTION
Mosquito borne diseases including Dengue, Chickungunya, Malaria, Japanese encephalitis, Filariasis, Zika fever and Yellow fever are a growing public health concern.1 Mosquito borne diseases account for about 17% of all communicable diseases, thus contributes to a major proportion of the total morbidity. The countries in the South East Asian Region (SEAR) including India bear a huge burden of mosquito borne diseases.2,3 More than 40 million cases are being reported from India alone every year causing higher health care costs, school absenteeism, loss of productivity and pressure on the limited public health resources.4,6

The state of Kerala in Southern India has been a hot bed for vector borne diseases with epidemics of Dengue and Chickungunya in 2003 and 2006 respectively. Ernakulam district in Kerala is endemic for Dengue.7 Rampant urbanization, environmental degradation, improper garbage removal, loosely thrown plastic or rubber containers and favourable climatic conditions has led to an explosion in the mosquito density, especially the Aedes mosquitoes.8 Though there is adequate technical savvy on the vector and its control using integrated control measures with community participation, these measures were not utilized to its full potential resulting in the annual epidemics.9 As a result, preventing mosquito bites at a personal level have become more imperative.
due to the unavailability of effective vaccines and chemoprophylaxis.\textsuperscript{7,10}

The Government of India (GOI) through the National Vector Borne Disease Control Programme (NVBDCP) has suggested many personal protective measures to prevent mosquito borne diseases. The Insecticide treated Nets introduced by NVBDCP have been found to be very effective in reducing the morbidity of mosquito borne diseases.\textsuperscript{9} The use of personal protective measures has been advocated as an effective tool against vector borne diseases. However, success of these measures depends on the knowledge, access, acceptability and appropriate utilization by the target population. Therefore the present study was undertaken in a rural panchayath in Ernakulam district with an aim to understand the pattern of use of personal protection measures against mosquitoes, its socio-demographic determinants and the economic burden it imposes.

**MATERIALS & METHODS**

**Setting:**

A cross sectional study was conducted in June 2017 in Elamkunnapuzha Panchayath, a rural coastal area located in Ernakulam District of Kerala in Southern India. The Elamkunnapuzha panchayath has 23 wards with a population of 26,997, literacy rate of 97.27%, and the predominant occupation is fishing.\textsuperscript{11}

**Sample size and sampling method:**

As per a study conducted in Trivandrum, 80% of the rural households used at least one personal protective measure.\textsuperscript{12} With 95% confidence, 10% relative error and Design effect (DEFF) of 2 for cluster sampling, the minimum sample was calculated to be 192, rounded off to 200.

Multistage sampling was done by dividing the panchayath into four zones in the first stage. In the second stage, one ward was selected randomly from each zone and in the last stage each household was considered as a unit and 50 households was selected from each ward. From the midpoint junction of each selected ward, one of the directions was chosen using lottery method and houses were visited consecutively till a sample of 50 households were collected.

**Data collection:**

Data was collected using a pretested semi-structured questionnaire. The questionnaire was pilot tested in 20 households. The investigators and trained social workers personally interviewed the head of the family from each household. We included families who are permanent residents of Ezhamkulam Panchayath i.e. those who has resided in the area for more than one year. Houses which denied access and houses which remained locked after three consecutive visits were excluded from the study. Details on socio-demographic parameters, knowledge about mosquito breeding sites, awareness on mosquito borne diseases, expenses on mosquito control measures and personal protection measures were enquired into.

**Data Analysis:**

Data was entered in MS Excel and data analysis done in Statistical Package for Social Science version 16. Descriptive statistics were expressed as mean, standard deviation, median, proportions and inter-quartile range. Since the expenditure of households on PPM was not normally distributed, median value was used. Categorical variables were analyzed using Chi square test to find associations and a p value <0.05 was considered significant.

**RESULTS**

In this study total 194 families comprising of 785 individuals were interviewed. The mean age of the respondents were 57.79 (± 15.22) years. The proportion

| Table 1. Socio demographic characteristics of the study population |
|----------------------|------------------|
| Sl no | Variable | Frequency (%) |
| 1 | Total number of members | 785 |
| 2 | Mean family size (n=787) | 4.04 (±1.3) |
| 3 | Gender (n=785) | |
| | Male | 390 (49.68%) |
| | Female | 395 (50.31%) |
| 4 | House type (n=194) | |
| | Kutcha | 007 (3.6%) |
| | Pucca | 164 (84.5%) |
| | Mixed | 23 (11.9%) |
| 5 | Median of rooms per household (n=194) | 5 |
| 6 | Family type (n=194) | |
| | Nuclear | 60 (30.9%) |
| | Joint | 5 (2.6%) |
| | Three Generation | 129 (66.5%) |
| 7 | Religion (n=194) | |
| | Hindu | 44 (22.7%) |
| | Christian | 144 (74.2%) |
| | Muslim | 6 (3.1%) |
| 8 | Education (n=785)* | |
| | Illiterate | 18 (02.3%) |
| | Primary | 202 (25.7%) |
| | Upper primary | 32 (04.0%) |
| | High school | 168 (21.4%) |
| | Higher secondary | 85 (10.8%) |
| | University | 164 (20.9%) |
| 9 | SES** (n=194) | |
| | Upper | 04 (02.1%) |
| | Upper middle | 31 (16.0%) |
| | Middle | 41 (21.1%) |
| | Lower middle | 73 (37.6%) |
| | Lower | 45 (23.2%) |

*children not yet started schooling not included
**BJ Prasad SE Classification
of males (49.69%) to females (50.31%) was almost equal. Majority of the families were Christians (74.2%) and three-generation families (66.5%). While 2.3% were illiterates, 20.9% had university education. About 3.6% of the families were living in kutcha type of house. The socio demographic characteristic of the study population is shown in table1.

Table 2 shows the knowledge regarding mosquito borne diseases and practices followed to protect against it in among the study population. Every respondent (100%) knew the name of at least one mosquito borne disease. Among the 194 household that gave consent to share data, more than two-third (68%) of the study households experienced mosquito menace. About 95 % of the households used PPM but only 67.5% of the households used it on a daily basis.

Table 3 shows the level of satisfaction and mean monthly expenses of PPM. The level of satisfaction was more (49.5%) with vaporizer followed by coils. The least satisfaction was expressed towards cream (2%) followed by mat (3.6%) and spray (4.1%). Among the expendable PPM the average monthly expense was highest with mat (Rs. 120) followed by Vaporizer (Rs. 110). Table 4 shows the association of various factors with mosquito menace.

Association between the expenses and various factors were analyzed and is shown in table 5. Type of house and knowledge was found to be two factors associated with the expenses inquired towards PPM against mosquito borne diseases.

DISCUSSION

We interviewed 194 households consisting of 785 study population. As high as 68% of the household living in the coastal areas of Elamkunnapuzha panchayath were

Table 2. Knowledge regarding Mosquito borne diseases and practice of protective measures

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Variable</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Knowledge regarding mosquito borne disease &lt; 2 diseases</td>
<td>92 (73.2%)</td>
</tr>
<tr>
<td></td>
<td>&gt;2 disease</td>
<td>52 (26.8%)</td>
</tr>
<tr>
<td>2</td>
<td>Knowledge regarding mosquito breeding sources &lt;2 sources</td>
<td>152 (78.3%)</td>
</tr>
<tr>
<td></td>
<td>&gt;2 sources</td>
<td>034 (17.5%)</td>
</tr>
<tr>
<td>3</td>
<td>Frequency of use of personal protective measure Daily</td>
<td>131 (67.5%)</td>
</tr>
<tr>
<td></td>
<td>During monsoon</td>
<td>021 (10.8%)</td>
</tr>
<tr>
<td></td>
<td>Occasionally</td>
<td>031 (16.0%)</td>
</tr>
<tr>
<td>4</td>
<td>Preferred time of use of personal protective measure All day</td>
<td>018 (99.3%)</td>
</tr>
<tr>
<td></td>
<td>Only at bed time</td>
<td>127 (65.5%)</td>
</tr>
<tr>
<td></td>
<td>Occasionally</td>
<td>039 (20.1%)</td>
</tr>
</tbody>
</table>

Figure 1. Distribution of the pattern of PPM used

Figure 2. Distribution of households based on expenses incurred towards PPM per month

Table 3. Level of satisfaction and mean monthly expense of personal protective measure

<table>
<thead>
<tr>
<th>Sl no</th>
<th>Type of personal protective measure</th>
<th>level of satisfaction</th>
<th>Average Monthly Expense (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fumes</td>
<td>17.5%</td>
<td>38.6</td>
</tr>
<tr>
<td>2</td>
<td>Coil</td>
<td>37.6%</td>
<td>65.8</td>
</tr>
<tr>
<td>3</td>
<td>Vaporizers</td>
<td>49.5%</td>
<td>110.9</td>
</tr>
<tr>
<td>4</td>
<td>Cream</td>
<td>02.0%</td>
<td>96.0</td>
</tr>
<tr>
<td>5</td>
<td>Spray</td>
<td>04.1%</td>
<td>75.8</td>
</tr>
<tr>
<td>6</td>
<td>Mat</td>
<td>03.6%</td>
<td>120.6</td>
</tr>
<tr>
<td>7</td>
<td>Bat*</td>
<td>23.7%</td>
<td>275.0</td>
</tr>
<tr>
<td>8</td>
<td>Net*</td>
<td>18.0%</td>
<td>1000</td>
</tr>
</tbody>
</table>

*fixed investment on personal protective measure
experiencing mosquito menace in the present study. About 95% of our study population was under the protection of any of the PPM which was in conjunction with a study conducted in Chennai and Jamnagar which reported use of PPM by study population as 93% and 83% respectively.4,13

A higher proportion of the households in our study were using Vaporizer with high satisfaction followed by coils. Whereas a study conducted in Trivandrum reported that majority in rural area preferred fumes while vaporizers were preferred by the urban residents.12 Similarly studies conducted in various parts of India also reported common use of vaporizer as PPM among households respectively.3,4,16 Whereas, in a rural region in Jhansi, coils were commonly used.3

The median expense to purchase PPM was estimated to be Rs 127.5 in the present study. Another study conducted in Trivandrum reported a monthly purchase expenditure of INR 17 in rural setting where fumes were majorly used and Rs 75 where vaporizers were commonly used.12 Whereas, a study conducted in Chennai found an average expenditure of Rs 59.4 Similarly, another study conducted by Snehalatha et al in Pondicherry reported an average expenditure for purchasing PPM to be Rs 62 and a study conducted by Vijayakumar et al in Chennai reported much lesser expense.17,18 The difference in expenditure may be because of the annual inflation (our study was conducted about 5-10 years later than other studies mentioned above) and higher tax in Kerala as compared to Tamil Nadu.

Knowledge regarding mosquito borne diseases and mosquito breeding sites were good among the community dwellers perceiving severe mosquito menace in our study. Similar findings were reported from a study conducted by Kishor M et al, Sharma et al and Niraj Pandit in Jamnagar, Pune and Gujarat respectively.13,19,20 In contradictory to this, a low percentage of awareness was reported among individuals residing in Thar desert, Rajasthan.21 Similarly, in rural regions of Nepal with hilly terrains similar in socio demographic features with North Eastern part of India showed only an average level of awareness regarding MBD and PPM.22

As the level of satisfaction improved, the level of mosquito menace was shown to be significantly reduced in our study. In a rural setting in Trivandrum, Mangalore and Jamnagar, about 3%, 10% and 17% respectively were not satisfied with any of the modern PPM.12,13,15 This is a proxy indicator of the effectiveness of the PPM used. Several studies conducted across the world has proved about the significance of satisfaction and effectiveness in bringing down mosquito borne diseases by using PPM like insecticide treated bed nets and di-ethyl 3-methyl benzamide.23-26

Multiple PPM were used among households experiencing severe mosquito menace and this was found to be a significant relation. This can also be an indication to the fact that some of the PPM is becoming less effective

---

### Table 4. Association of mosquito menace with various factors

<table>
<thead>
<tr>
<th>Sl no</th>
<th>Variable</th>
<th>Menace Mild/moderate</th>
<th>Severe Menace</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/1999</td>
<td>Knowledge of the respondents</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor (&lt;2 correct answers)</td>
<td>26 (41.9%)</td>
<td>36 (58.1%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fair (2-3 correct answers)</td>
<td>31 (37.3%)</td>
<td>52 (62.7%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Good (&gt;4 correct answers)</td>
<td>05 (10.2%)</td>
<td>44 (89.8%)</td>
<td>0.001</td>
</tr>
</tbody>
</table>

1/2000 Level of satisfaction (n=184)

| Highly satisfied | 09 (69.2%) | 04 (30.8%) |         |
| Satisfied        | 44 (29.1%) | 107(70.9%) |         |
| Not satisfied    | 03 (15.0%) | 17 (85.0%) | 0.003   |

9/2000 Methods used

| No PPM            | 06 (60.0%) | 04 (40.0%) |         |
| Single method     | 22 (43.1%) | 29 (56.9%) |         |
| ≥ 3 methods       | 19 (27.1%) | 51 (72.9%) |         |

6/2004 History of mosquito borne disease

| Yes               | 08 (18.2%) | 36 (81.8%) |         |
| No                | 54 (36.0%) | 96 (64.0%) | 0.03    |

---

### Table 5. Association between Expenses on PPM and various factors

<table>
<thead>
<tr>
<th>Sl no</th>
<th>Variable</th>
<th>Expense (n=184)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type of house</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kutch</td>
<td>05 (83.3%)</td>
<td>00 (00.0%)</td>
</tr>
<tr>
<td></td>
<td>Pucca</td>
<td>42 (23.6%)</td>
<td>91 (51.1%)</td>
</tr>
<tr>
<td>2</td>
<td>Type of Family</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nuclear</td>
<td>16 (27.1%)</td>
<td>25 (42.4%)</td>
</tr>
<tr>
<td></td>
<td>Joint</td>
<td>30 (25.0%)</td>
<td>64 (53.3%)</td>
</tr>
<tr>
<td></td>
<td>Three Generation</td>
<td>01 (20.0%)</td>
<td>02 (40.0%)</td>
</tr>
<tr>
<td>3</td>
<td>History of mosquito borne disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>09 (20.5%)</td>
<td>22 (50.0%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>38 (27.1%)</td>
<td>69 (49.3%)</td>
</tr>
<tr>
<td>4</td>
<td>Level of satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Highly satisfied</td>
<td>03 (23.1%)</td>
<td>04 (30.8%)</td>
</tr>
<tr>
<td></td>
<td>Satisfied</td>
<td>35 (23.2%)</td>
<td>79 (52.3%)</td>
</tr>
<tr>
<td></td>
<td>Not satisfied</td>
<td>09 (45.0%)</td>
<td>08 (40.0%)</td>
</tr>
<tr>
<td>5</td>
<td>Knowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>17 (29.8%)</td>
<td>31 (54.4%)</td>
</tr>
<tr>
<td></td>
<td>Fair</td>
<td>25 (31.6%)</td>
<td>33 (41.8%)</td>
</tr>
<tr>
<td></td>
<td>Good</td>
<td>05 (10.4%)</td>
<td>27 (56.3%)</td>
</tr>
</tbody>
</table>
in bringing down the menace. This finding was further strengthened by the significant association observed by the relation between mosquito borne diseases and severe mosquito borne diseases in this community. Even though the practice of PPM used in the study area was satisfactory, the mosquito menace was found to have little effect. World Health Day 2014 was dedicated to bring down the crisis caused by this arthropods.

The kutcha type households spent less than INR 65 as compared to the pucca type households and this finding was found to be a significant finding and the expenditure towards PPM was found to be significantly more in the category INR 65-400 across all level of knowledge but comparatively higher proportion of respondents with good knowledge were found to be spending 65-400 INR towards PPM. A study conducted in a semi-rural setting in Delhi and Assam also reported similar findings. It was noted in a vector borne disease (VBD) analysis report published by the World Health Organization in 2014 that about 70% of the health budget allocated for VBDs were not been utilized. This was excluding the financial aid provided by other agencies. Therefore a strong stewardship function to tackle such bottle necks based on surveillance system that provides data for taking appropriate measures to bring down the burden caused by mosquitoes in this country.

**CONCLUSION**

Personal protective measures remain the corner stone of integrated vector management. PPM shall remain significant even in the wake of development of vaccines against mosquito-borne diseases. While acceptance of PPM is high, this has to be leveraged by promoting the most efficacious method suitable for the geographic epidemiology and local culture.

**END NOTE**

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**Conflict of Interest:** None declared

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Snacking Behavior and Obesity among Students in Medical College

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ABSTRACT

Background: Snacking behaviour varies across the different regions in the world. As there is a rapid change in the lifestyles of adolescents and young adults, eating habits have changed. The objective of this study is to assess the pattern of snacking behavior among professional students in a medical college and to find out the association with obesity.

Materials and Methods: A cross-sectional study was conducted among 217 first-year undergraduate students in a selected medical college.

Results: Among the students, 19.3% had poor snacking behavior. 17.1% had obesity/overweight. Eighteen (26.1%) males had overweight/obesity, compared to 19 (12.8 %) in females (OR=2.39, 95% CI. 1.2-4.9, p=0.016). There was no significant association between frequent snacking and overweight/obesity.

Keywords: Snacking, Obesity, Overweight

INTRODUCTION

The increase in the prevalence of obesity across the world had led to concern about the dietary habits of young adults. The obesity “epidemic” has been attributed to a growing trend for snacking. Snack food is high in fat or sugar most of the time. In a study by Cleobury et.al, 79% of snacks consumed were high in either fat or sugar. The snacking habit in all age groups has increased over the last 25 years. Frequent consumption of snacks in between as well as skipping major meals amounts to poor eating habits. Snacking behaviour may contribute to weight gain due to excess energy intake. Every day the trends in food habits are changing, especially in adolescent and young adults. This changing trend results in the growing prevalence of obesity, and result in many non-communicable diseases. There is an enormous shift in food in the food habits of people of Kerala during the last few decades. Westernization and modernization has led to change in trend, for opting in alternative food preferences and introducing unhealthy snacking items. The food preference of adolescents and young adults are mainly based on taste rather than healthy food. These choice preferences are there in professional students, including medical or nursing students. The children and adolescents have the habit of skipping major meals and consuming frequent snacks, mostly unhealthy junk food, which they consider tasty. Some studies show that the amount of food eaten by the companions affects the portion size. This is referred to as social modelling. Students in a medical college may also have poor snacking behaviour and if identified early, is amenable to correction. There are many different definitions of a snack. In this study, snack refers to eating food or consuming caloric beverages between three regular meals (namely breakfast, lunch, and dinner). Snacking is the act of eating a snack.

The objectives of the study were to describe the pattern of snacking behavior among undergraduate students in a medical college and to find out whether there is any association with overweight/obesity

MATERIALS AND METHODS

A cross-sectional study was conducted in January 2020, among 217 first-year undergraduate medical and nursing students in a selected medical college in Thiruvananthapuram. All first-year students of medical and nursing course present on the day of data collection included in the study. A self-administered, semi-structured proforma developed by the investigators was used for data collection.
collection. Snacking refers to the consumption of any food and drinks other than major meals including items such as junk food, chocolates, sweets, and soft drinks. Height and Weight was measured using standardized scales. Using the anthropometric measurements, body mass index (BMI) was calculated and graded according to WHO Asia-pacific guidelines. We considered poor snacking behaviour as 3 or more snacks per day. For testing association with obesity/overweight and poor snacking, BMI values of 18.5 to 25 taken as normal as per WHO criteria.

Data analysis: The data analysis done by using the Statistical Package for Social Sciences (SPSS). Mean, SD estimated for quantitative variables. Frequency and Percentage used for categorical variables. Chi-square test was used as a test-of-significance. A p-value of less than 0.05 was considered significant. Odds ratio (OR) and confidence interval (CI) were used to quantify the strength of association between the overweight and obesity and covariates.

RESULTS

The mean age of the 217 students who took part in the study was 19.02 years with a standard deviation of (0.895). The median age was 19 with an interquartile range (IQR) of 2 years. There were 143 medical students and 74 nursing students as participants and 148 (68.2%) were females and the rest 69 were males. Only 7.83% (17) consumed a vegetarian diet.

The mean height among males and females were 168.96 cm (SD 11.75) and 160.08(SD 6.43) respectively. The mean weight among males and females were 65.36Kg (SD 13.6), 55.5Kg (SD 9.08) respectively. Mean BMI among males was 22.79 (SD;3.48) and females 21.63(SD 3.0) (Figure 3). Fifteen students (6.9%) consumes four or more snacks in a day, while 12.4% consumes 3 snacks per day and the rest less than three snacks in a day (Figure 1). Overall 16.6 % students had overweight while only one student (0.5%) had obesity according to WHO criteria. Twenty eight (19.6%) of medical students had BMI>25, compared to 12.2 % nursing students.

Preferred items of snacks

The most preferred snacks were fried items which were consumed frequently by 58.1% of participants. 52.7% of participants frequently consumed baked items, 35.1% preferred sweets and chocolates (35.1%). Only 28.4% reported fruits or fruit juices as preferred items while 14.9% preferred aerated drinks. Only 6.8% preferred steamed items.

Reasons for frequent snacking

Common reasons for frequent snacking was reported as “snacks are tastier” by 33.2% while 35% said there is no specific reason. About 11.2% has the opinion that taking snacks are convenient than having major meals and 10.2% said that they didn’t like hostel food. About 6% of students reported that they skip major meals and take snacks to lose weight.

Frequently missed meals

The most frequently missed meal was breakfast (39.6%) followed by dinner (14.6%). But 7.6% reported the meal missed frequently is lunch (Figure 2). While 12% reported they miss more than one major meal in a day and substitute with snacks.

Substituting snacks with major meals

Among the participants, 30.9% reported that they substitute the snacks with major meals most of the days in a week (Figure 4). But 51.6% reported they substitute snacks with major meals only on some days. About 51.2% of students report that they consume snacks every day, while 15.2% consume snacks in 4-6 days in a week, 9.2% consumes 1-3 days in a week while 24.4% report they consume only occasionally, 35.5% reports snacks consumption is mostly...
during studying, while 30.1% reports TV watching as the common activity during which they consume snacks. But 36.7% reports no specific activity while snacking. While 97 students report taking vegetables with every three major meal, 25 (11.5%) does not take vegetables regularly. 53 (24.4%) consumes vegetables with two out of three meals, 42 (19.4%) consumes vegetables with one meal in a day. Only 24 (11.1%) students consume fruits daily. 

**Perception regarding dietary habit**

Out of total the total 217 students; only 113 (52.1%) students perceive that they follow a healthy dietary habit. 

In univariate analysis there was an association between gender and overweight/obesity. While 18 (26.1%) males had overweight/obesity, compared to 19 (12.8%) in females (OR=2.39, 95% CI: 1.2-4.9, p=0.016). Those who consumed snacks more frequently per day (≥3 snacks per day have higher odds to be overweight/obese (OR=2.16, 95% CI: 1.06-4.43, p=0.033) when univariate analysis was done (Figure 5). There was association between skipping of major meals and overweight/obesity (chi square value: 7.71, p=0.005). Among 41 who skip meals more frequently, 53.7% had overweight or obesity, while among the 176 who skip meals less frequently, only 30.7% had obesity/overweight.

But multiple logistic regression analysis showed that there is no statistically significant association between overweight/obesity and poor snacking behavior, skipping meals when adjusted for gender, type of diet and course of study. But the proportion of overweight/obesity is higher in males compared to females (adjusted OR=2.39, 95%CI: 1.31-4.38, p=0.004) (Figure 6).
DISCUSSION

In our study, the most frequently missed meal was breakfast (39.6%) and there was no association between poor snacking behavior and gender. In a study by Prasanna Mithra et al.\(^1\) conducted a study among college-going students, found that the breakfast was the most skipped meal (26.2%). A significantly larger proportion of males had a higher frequency of snacking per day (69.3% versus 57.2%), skipped meals more often (58.6% versus 50.6%). And 78.7% did not have any specific timing for snacking. 51.1% of the students were snacking while watching TV and 31.9% of them snacked while studying. We have found snacking behaviour to be more among undergraduate medical students compared to nursing students. The overall prevalence of overweight and obesity was 16.6% and 0.5% in the current study. In a previous study among medical students, the prevalence of overweight and obesity was 9.4% and 2.4%.\(^2\) In another study conducted in Bengaluru, prevalence of overweight and obesity was 14.62% and 11.32% among the medical students.\(^3\)

Even though there was an association of overweight/obesity with snacking behavior and skipping of meals in univariate analysis, they were not found to be significant factor associated with overweight/obesity in multiple logistic regressions when adjusted for gender, type of diet, exercise and course of study. Many studies have reported that the behavior of frequent snacking was associated with higher BMI or odds of overweight, while some studies finds no relation.\(^4-6\) Faizi et al reports that adverse eating behaviors shows high and statistically significant association with obesity and overweight among adolescents in Aligarh, India.\(^7\) But Boon TY, et al., reported that there was no significant association between snacking patterns and BMI in his study conducted in students in Kuala Lumpur.\(^8\) Nuru et al also concludes that though Snacking has an influence in the children’s diet intake, it is not an important independent factor which contributes to weight gain among children.\(^9\) Sebastian et al. in his study among 4357 adolescents 12–19 years of age said that there is no association with obesity.\(^10\) Also, he also suggests that snacking may enhance the intake of vitamin, increases the likelihood of meeting fruit recommendations. M. Steiner-Asiedu, et al. found that a higher weight gain among those who frequently consume foods high in sugar such as fruit drinks, cake and chocolate as snack.\(^11\)

Kong A et al. suggest that snack meals can be a source for additional fruits, vegetables, and fiber-rich foods; however, snacking patterns might also reflect unhealthy eating habits.\(^12\) Larson et al.\(^13\) also concludes that that even though snack consumption is a risk factor for poor diet, unless energy-dense foods are consumed, snacking won't contribute to overweight in adolescents.\(^14\)

CONCLUSION

Overweight and/or obesity were higher in males than in females. Even though there was no significant association observed between frequent snacking and overweight/obesity among students; unhealthy eating habits are observed among students. The major limitation of this study is the sample selection is from a single institution. Total energy intake was not assessed and thus leads to underestimation of the effect of snacking on obesity. Students should be encouraged to have healthy snacks and these should be made available at affordable rates in institutional canteens and cafeterias.

END NOTE

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Anil Bindhu S, et al. Snacking Behavior and Obesity among Students in Medical College
A 2020 Update on Diabetes Technologies with Emphasis on Telemedicine during COVID-19

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ABSTRACT

Technological advancements have paved way to the development of an array of newer diabetes technologies making disease management much more effective and hassle-free. These include minimally invasive and user-friendly glucose monitoring systems with better accuracy, insulin pumps providing near physiological insulin delivery, point-of-care testing devices that provide immediate and actionable information, various artificial-intelligence enabled mobile apps for diabetes management, etc. where each one of them can empower the diabetes care providers as well as the patients or the caregivers facilitating productive outcomes in diabetes management. In addition remote glucose monitoring systems and telemedicine are evolving as the standard of care during this COVID crisis. Some of such recently introduced diabetes technologies are being discussed here.

Keywords: Diabetes Technologies, Telemedicine, Technology and Diabetes, Covid-19

INTRODUCTION

For a successful diabetes management, a systematic, patient-centered approach for diabetes care including a periodic review and a continually updated diabetes care plan provided by a multidisciplinary team has been highly advocated. Patient self-management also constitutes an important component in diabetes care for successfully preventing or delaying diabetes complications.1 Numerous diabetes technologies that are currently available can empower diabetes care providers as well as the patients or the caregivers and thereby make disease management much more effective and hassle-free (Figure 1). Major examples include the minimally invasive and user-friendly glucose monitoring systems with better accuracy, insulin pumps providing near physiological insulin delivery, point-of-care testing devices that provide immediate and actionable information, and the various artificial-intelligence enabled mobile apps for diabetes management. This review throws light on some of the recently introduced technologies for diabetes care which are either available or to be launched soon in India.

Contour Next One Blood Glucose Monitoring System

The CONTOURNEXT ONE smart meter and CONTOURDIABETES app seamlessly connect to capture the glucose readings via Bluetooth, which can be conveniently accessed on a smartphone, tablet or computer. The captured readings will be automatically synced and logged, and over time, helps create meaningful insights regarding how one’s lifestyle can affect the blood glucose levels. Salient features include the 1) smartLIGHT™ feature (an instant indicator of the blood glucose levels i.e. green for within target, amber for above target and red for below target); 2) Second-Chance™ sampling (same test strip can be reused if the first sample was insufficient); 3) options to add routine events like diet, activity etc.; 4) detects the patterns in glucose readings; 5) smart alerts, etc.

In the Contour mobile app, patients can, at the click of a button create and send a digital diabetes diary to the doctor's office. Since this is colour coded, it is one of the easiest and fastest means of decision making for changes in therapies and behaviours.

Onetouch Verio Flex™ Meter and the OneTouch Reveal™ App

The OneTouch Verio Flex™ meter connects wirelessly with the OneTouch Reveal™ mobile app and syncs data to the patient's smartphone or tablet. The electronic visual logbook in the mobile app automatically logs and organizes blood glucose results and provides visual snapshots. ColorSure™ technology highlights patterns and can motivate patients to perform structured SMBG. The app facilitates the entry of data on medications, carbs and physical activity and enhances the scope for setting and following customized targets. OneTouch


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Reveal Web App facilitates the healthcare team to set individualized treatment goals, quick subgroup analysis of the patients, and generate ready to publish data. The real-time availability of blood glucose data at the doctor’s office along with visualization of trends and patterns are provided totally free of cost in India.

**iPro2 Continuous Glucose Monitoring System**

The iPro2 Professional Continuous Glucose Monitoring system procures interstitial fluid (ISF) glucose profile and consists of Enlite Sensor, iPro2 recorder and the Enlite setter. The iPro2 recorder collects (up to 7 days of data) and stores data from the glucose sensor and is intended for multiple patient use (can be used up to 60 times). CareLink Pro Therapy Management Software for Diabetes, helps generate reports and store the data, allowing the healthcare provider to take optimal treatment decisions.4

**Freestyle Libre Pro Continuous Glucose Monitoring System**

Abbott’s FreeStyle Flash Glucose Monitoring system (FGM) is available in two versions FreeStyle Libre (real time) and FreeStyle Libre Pro (professional version). Only the FreeStyle Libre Pro model, is currently marketed in India. The sensor comes in a factory-calibrated mode thus eliminating the need for fingerstick calibrations. The recommended sensor wear-time is 14 days and the system captures as many as 1340 glucose values. The recorded glucose values can be procured by the healthcare provider’s FreeStyle Libre Pro reader in as little as 5 seconds. A secure free cloud-based diabetes management system, Libre View or the Free Style Libre Pro reporting software designed for desktop provides easy-to-interpret reports. The comprehensive glucose report ‘Ambulatory Glucose Profile (AGP)’ generated provides a visual snapshot of glucose levels, trend sand patterns over time, allowing for better outcomes in diabetes management.5-7

Using a third party mobile app, millions of patients are using Libre Pro as a real time device and capable of communicating via telemedicine with healthcare providers during the pandemic.

**Eversense® 90-Day Implantable Continuous Glucose Monitoring System**

Eversense® CGM is the first and only CGMS to feature an implantable glucose sensor and procures data for up to 90 days. The system includes a pill-sized sensor implanted in the upper arm, an on-body transmitter, and a mobile app that displays glucose data and issues alerts. It eliminates the need for frequent sensor insertions and is also the first CGM to issue on-body vibration alerts and thus notifies the user in the event of highs and lows.8

**Guardian™ Connect Continuous Glucose Monitoring System**

Guardian™ Connect CGMS is intended for people using multiple daily insulin injections and aged 14 to 75 years. It works with 3 elements: a thin sensor, a small transmitter attached to the sensor and the Guardian Connect app on a compatible iOS device. It is thus the first smart standalone CGM system that does not require a receiver and directly sends continuous sensor glucose data from the sensor transmitter to a smartphone. The Sugar.IQ™ smart diabetes assistant app analyzes how an individual’s glucose levels respond to their food intake, insulin dosages, daily routines, and other factors. The system has customizable alerts that allow the users to get notified about future high and low glucose events up to 60 minutes in advance, and also allows the caregivers to track the user’s glycaemic status remotely in real-time or via text alerts.9

Guardian sensor 3, the latest version, is available in India with superior accuracy. This sensor provide glucose values every 5 minutes. This has become a game changer during lockdown since the data can be shared via the web browser in real time and provides option for free sms alerts well ahead of a hypoglycemia or hyperglycemia.

**Afinion 2 Analyzer**

Afinion 2 Analyzer from Abbott is a Point-of-care HbA1c testing device, designed for use in a physician’s office, a treatment room, or at a bedside. It uses a finger-prick capillary blood sample which when applied to a test cartridge, is analyzed within minutes. Potential advantages of the system over laboratory A1C testing include- Simple to perform, accurate and rapid test results expedites medical decision-making, more convenient for patients, and can improve health system efficiency.10

**Minimed 640g Sensor-Augmented Insulin Pump**

The MiniMed 640G Insulin Pumps a sensor-augmented pump (SAP) and has built-in intelligent features including the SmartGuard technology, active insulin tracking, bolus progress bar and predictive battery life. The SmartGuard technology predicts when a patient is approaching low glucose levels 30 minutes in advance and automatically stop insulin delivery. When the glucose levels recover, SmartGuard will automatically resume insulin delivery. Multiple low limits can be set throughout the day to give increased protection.11

**Minimed 670g Insulin Pump - The World’s First Hybrid Closed Loop System**

The Medtronic’s MiniMed 670G hybrid closed-loop insulin pump system features an advanced algorithm, the SmartGuard HCL, which enables greater glucose control with reduced user input. The Suspend on low
feature stops insulin delivery for up to two hours when the sensor reaches a preset low, and the Suspend before low option stops insulin delivery up to 30 minutes before reaching the preset low limits and automatically resumes when the glucose levels recover. When in Auto Mode, the system automatically adjusts the user’s basal insulin every five minutes based on the CGM readings. 670G will thus reduce time at dangerous high and low blood sugar levels, improve time-in-range, reduce glucose variability, bring much greater nighttime safety and target morning blood sugars.12

### Artificial Intelligence Enabled Platforms for Diabetes Management/Detection of Diabetes Complications

Numerous disease management or disease detection platforms such as mobile apps are currently available and many of them are geared with the latest Artificial Intelligence (AI) technology. They have made the detection as well as management of the disease much simpler, accurate, affordable and accessible. The multi-model bot enabled diabetes care platform—Life in Control Diabetes Coach,13,14 Medios Technologies AI Assistant to Detect Diabetic Retinopathy and mySugr diabetes management app are some of the disease management/detection platforms available for diabetes care. Medios Technologies AI Assistant helps doctors diagnose diabetic retinopathy (DR) during a typical diabetes check-up in a convenient and efficient way without a specialist.15

The mySugr app makes it quick and easy to collect relevant therapy data in one place. It integrates with a number of different diabetes and health-related partners via Bluetooth or direct connection and also supports a number of other cloud data sources as well as Apple Health®, Google Fit, and web import for data from compatible programs. Important therapy data such as meals, medicines, blood sugars, can be captured quickly and easily. Other salient functions available include, 24-hour overview, estimated HbA1c, helpful feedback to encourage engagement, bolus calculator module etc.16

### Smart Connected Insulin Pens

The conventional insulin pens are rapidly transforming into a connected ecosystem. Insulin pens with memory, which store the information on the size of the last delivered bolus; Bluetooth enabled pens which can connect to continuous glucose sensors and semi-automate insulin delivery based on algorithms in the mobile phone; pens which connects to mobile phone apps such as MySugr via near field communication (NFC) etc. are supposed to make diabetes care easier, error free and considerably improve outcomes.

### Time in Range

Time in Range the new target for diabetes is endorsed by ADA 2020 guidelines, the assessment of which will require technological aid. A time in range between 70 and
CONCLUSION

Technological advancements have made a tremendous impact in diabetes care. They can empower healthcare providers, patients as well as their caregivers to become active players in improving diabetes care. The newer technologies while replacing the existing ones are simpler, user-friendly, cost-effective and ensure successful short term and long term outcomes in diabetes. All eligible and affordable candidates should, therefore, be invariably prescribed with the latest and the most recommended diabetes technologies to aid them successfully overcome the major barriers in treatment and help them retain the quality of life while surviving longer with the disease.

END NOTE

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Disclaimer

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Sepsis due to Roseomonas Gilardii in an Elderly Female

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ABSTRACT

An 82 year old female, who is a known case of osteoarthritis on medications, presented to her physician with a two day history of urinary retention, constipation, abdominal discomfort and worsening of breathlessness which started one week ago. On clinical examination, she was conscious, oriented, had pallor and bilateral pedal edema. Her vitals were stable. She was febrile. A positive growth was detected on BacT/ALERT 3D. The gram stain smear of blood culture broth showed gram negative bacilli which was identified as Roseomonas gilardii

Keywords: Sepsis, Roseomonas Gilardii, Elderly sepsis

An 82 year old female, who is a known case of osteoarthritis on medications, presented to her physician with a two day history of urinary retention, constipation, abdominal discomfort and worsening of breathlessness which started one week ago. On clinical examination, she was conscious, oriented, had pallor and bilateral pedal edema. Her vitals were stable. She was febrile. A positive growth was detected on BacT/ALERT 3D. The gram stain smear of blood culture broth showed gram negative bacilli which was identified as Roseomonas gilardii

Keywords: Sepsis, Roseomonas Gilardii, Elderly sepsis

She was admitted and routine investigations were done. Her total counts were elevated (14,500 cells/microlitre). Her CRP values were raised (14.71mg/dl). Peripheral smear was suggestive of microcytic hypochromic anaemia and neutrophilic leucocytosis. USG abdomen was suggestive of chronic liver disease with moderate ascites. Ascitic fluid was sterile. Spontaneous bacterial peritonitis was ruled out. Her serum amylase and lipase levels were elevated. A diagnosis of acute pancreatitis was made after General Surgery consultation. She was kept NPO and given IVF for 36 hours. Repeated lipase levels were within normal limits. Her renal function tests were deranged for which Nephrology consultation was done and she was advised salt and fluid restriction and diuretics. She was initially managed with IV Tazomac 2.25 g q8h for 5 days. A positive growth was detected on BacT/ALERT 3D. The gram stain smear of blood culture broth showed gram negative bacilli which was identified as Roseomonas gilardii

Keywords: Sepsis, Roseomonas Gilardii, Elderly sepsis

Antibiotic was changed to Inj. Meropenem 500mg IV q8h. Venous Doppler of both lower limbs were suggestive of chronic Deep vein thrombosis for which heparin was given. She improved clinically and symptomatically, tolerating oral feeds, afebrile, no orthopnoea and had adequate urine output at the time of discharge.


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DISCUSSION

Gilardi and Faur studied 21 pink-pigmented gram-negative rods, reporting seven of them as an unnamed taxon, because they did not fit into any previously described species and they differed from Methyllobacterium mesophilicum on the basis of Gram stain morphology, growth at 42°C, growth on MacConkey agar, acetate utilization, and acid production from methanol and then it was defined by the Centers for Disease Control and Prevention to indicate these bacteriae in 1984. In 1989, Korvick and colleagues reported two cases of pink-pigmented gram-negative isolates. In the largest review of pink-pigmented bacteria, Wallace and co-workers studied 156 isolates received at the CDC since 1966 and defined four heterogeneous "pink coccoid" groups (I through IV).

The bacterial genus Roseomonas encompasses four species (Roseomonas gilardii, Roseomonas mucosa, Roseomonas cervicalis and Roseomonas fauriae), and was first classified by Rihs and colleagues in 1993 (Rihs et al. 1993). They have been isolated from the aquatic environment. The organisms have been isolated from blood, wound, urinary and respiratory specimens, peritoneal dialysis fluid, corneal scrapings and bones. Though, Roseomonas species appear to have low pathogenic potential, some species may cause clinically significant or even fatal disease in immunocompromised patients like those with leukemia, sepsis or cancer chemotherapy and dialysis.

Roseomonas is a pink-pigmented, non-fermentative, oxidase positive, slow growing Gram-negative coccobacilli that has clinical importance as opportunistic bacteria which can lead to infections especially in immunosuppressed individuals. Most infections due to Roseomonas species are detected in patients with central venous catheters and underlying disorders. It is less reported in many hospitals because of having little experience in identification and less clinicians dealing with these infections. They are detected after several days of growth in culture environment, characteristic pink, mucoid colonies are observed. The clinical specimens in which the microorganism was isolated include wounds, exudates, abscesses and genitourinary specimens. Besides, infection can be related with peritoneal dialysis and vertebral osteomyelitis. The clinical importance of these isolates is an essential issue in individuals with underlying disorders such as cancer and diabetes and in a study that reviewed of 35 cases from which Roseomonas strains were isolated, 60% were found to be related with disease.

Due to the rarity of this infectious agent, it may be overlooked from a clinical and microbiological perspective. A method to identify organisms collected from sterile sites, such as the Vitek 2 system (bioMérieux), might not correctly identify Roseomonas species. For such species after several days growth in an appropriate culture environment, characteristic pink, mucoid colonies are seen. They grow on 5% sheep blood agar, chocolate agar, buffered charcoal-yeast extract agar, and almost always (91%) on MacConkey agar but do not grow on media containing greater than 6% NaCl. Roseomonas species grow at 25, 30, 35, and usually 42°C. Motility, nitrate reduction, and oxidation of L-arabinose, D-galactose, D-glucose, D-mannose, D-mannitol, and D-xylose are variable characteristics.

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Conflict of Interest: None declared

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Umbilical Endometriosis Coexisting with Umbilical Hernia

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\textbf{ABSTRACT}

Endometriosis, though most often pelvic in site can have multiple presentations including the rare umbilical endometriosis, which accounts for 0.5-1\% of all extragenital locations of endometriotic lesions. It can be primary or secondary in origin and can have varied clinical features ranging from a painless, discoloured nodule to cyclical pain and bleeding coinciding with menstruation. Though different radiological investigations have been suggested, histopathological examination after surgical excision of the lesion is the best method to confirm the diagnosis.

\textbf{Keywords:} Umbilical Endometriosis, Umbilical Hernia, Extragenital

\textsuperscript{*}See End Note for complete author details

\textbf{INTRODUCTION}

Endometriosis is the presence of functional endometrial tissue outside the uterine cavity. Though benign, it can invade the normal surrounding tissue. Most common sites are ovary, uterosacral ligaments, broad ligaments, fallopian tubes, uterovesical fold, round ligaments, rectovaginal septum. Less commonly, it can also be found in sigmoid colon, appendix, ureter, urinary bladder, caecum, ileum, lungs, nasal mucosa, eyes, brain, umbilicus. Umbilical endometriosis or Villar’s nodule [named after Villar, the first to report the condition, in 1886] can be a rare occurrence but is one of the most common extrapelvic sites. It can be primary, if appearing spontaneously or secondary if it occurs after a surgical procedure involving the umbilicus [like a laparoscopic port insertion], on the scar. The term secondary endometriosis can be used even when it is not located on the exact surgical scars, [such as endometriotic implant on the umbilicus in a patient with the history of a previous caesarean section], but only if the onset is within 2 years after the procedure. It can present with a painless nodule or one that undergoes periodic changes like enlargement / bleeding during menstrual cycles. It could be brown, reddish or violaceous in colour. 75\% patients may have temporal changes associated with menstruation, helping the physician rule this rare possibility in.

\textbf{CASE REPORT}

49 year old P3L3 woman came with painful umbilical swelling since 1 year and intermittent dark reddish discharge since 3 months coinciding with her menstrual cycles, usually from the third day. The swelling had been constant in size and appearance since she first noticed it with no enlargement or notable tenderness during days of menstrual flow. She had no constitutional symptoms, dysuria, dyschezia, dyspareunia, pelvic pain, severe dysmenorrhea, haematuria or altered bowel habits. Her menstrual cycles are regular with scantier flow than in the past since the last few months. She has had no history of subfertility. She has had a caesarean section 11 years ago. She is not on any contraceptives. She has no known medical comorbidities and has not been subjected to any other surgeries. She reports no history of trauma. Review of systems was normal.

On physical examination, a nontender, hyperpigmented, irreducible swelling of ~ 2x2 cm size in the periumbilical region was found. No discharge or local rise in temperature was noted and cough impulse was negative. Abdomen was soft, non tender and no masses/organomegaly was detected. Other systems were normal.

Differential diagnoses included umbilical endometriosis, incarcerated umbilical hernia, umbilical granuloma, keloid, melanocytic naevus, malignant lesions like adenocarcinoma, malignant melanoma, metastatic Sister Mary Joseph nodule etc. Umbilical endometriosis had a clear edge over the others due to the temporal association of the discharge with her menstrual cycles (Figure 1).

The patient was scheduled for an excision under local anaesthesia. Preoperative haemogram, biochemical and coagulation profile were normal. Patient was put on...
Midazolam 2 mg iv, Inj. Fortwin 30 mg and Inj Phenergan 25 mg. Umbilical swelling and the region around it were painted with povidone-iodine and draped under sterile conditions. Local anaesthesia was given with 2% lignocaine + adrenaline. Elliptical incision was put around the umbilicus and the swelling was excised with a safe margin (Figure 2). A hernia sac with bowel content found was dissected and the defect was repaired with prolene mesh. Wound was closed in layers, skin was sutured with absorbable sutures and umbilicus was reconstructed. Haemostasis was achieved. Excised segment was sent for biopsy.

Histopathological examination of the excised region showed skin and dermis with focal areas of endometriotic stroma and glands (Figure 4), which was compatible with the clinical diagnosis of umbilical endometriosis (Figure 3). Patient returned a week after the surgery for follow-up. The wound was healing well with no post-operative complications.

**DISCUSSION**

Endometriosis is an estrogen-dependent condition. Our patient has had a past caesarean section and literature shows nearly 1% of such women can have secondary endometriosis in the umbilicus. It is not necessary that the surgery should directly involve the umbilical region. But another school of thought exists that the remoteness of the endometriotic lesion [in the umbilicus] from the operative scar and the fact that the onset of her condition occurred more than 2 years after the surgery [11 years in this case] qualify this for being treated as a case of primary umbilical endometriosis. Though there is no formal criterion to decide the category, review of existing literature supports the latter view. Umbilicus is the commonest extragenital site of endometriosis. It is postulated that it acts as a physiologic scar exhibiting a predilection for ectopic endometrial implants which may have been activated by an extended exposure to hormonal, metaplastic and environmental factors, which might explain why a lesion might develop de novo in primary umbilical endometriosis.

Many theories have been propounded to explain its etiopathogenesis. Secondary umbilical endometriosis, with a surgical history can be explained to an extent by iatrogenic dissemination of cells, the *direct transplantation theory*. Primary umbilical endometriosis is thought to be caused by lymphatic or haematogenous spread of endometrial tissue from the pelvic cavity. Lymphatic vessels connect the peritoneal cavity to the umbilicus along the obliterated umbilical vessels. Scott proposed migration of pelvic contents to the umbilicus through this channel. Other studies have reported the presence of endometrial tissue in the periumbilical lymphatic tissue. Alternatively, endometriosis in this particular site may also develop through metaplasia of the embryonic remnants in the umbilical fold such as urachus or the umbilical vessels. Genetic predisposition and alterations in cell-mediated and humoral immunity may also favour spontaneous development of this condition. Our patient is a 49 year old woman, in her perimenopausal phase. Theoretically, with dwindling estrogen levels ascribed to this phase, an estrogen dependent condition like endometriosis...
should cease to be a problem. But several studies have reported that early perimenopause could be a period of relative hyperestrogenemia contributed to by the luteal phase insufficiency. Quoting a study on perimenopause published in 2007, “In many women, the circulating levels of estrogen in the perimenopause may be higher than at any other time of her reproductive life when she was not pregnant”. Ectopic endometrial cells, being estrogen-dependent could have been activated as a result of this favorable hormonal milieu. Besides, her relatively higher age [Mean age at presentation of umbilical endometriosis -37 years] might have been marked by prolonged exposure to metaplastic and environmental factors causing the endometriotic implants to be more functional at this stage.

Different case reports in the past have documented different approaches to manage this condition. Radiological investigations like ultrasonogram, computed tomography, MRI have all been attempted to study the lesion and is quite helpful in identifying various features like consistency, site, extent, adhesion to underlying structures. But none of these can diagnose a lesion as cutaneous endometriosis with clear pathognomonic features and are hence eclipsed in their clinical value by histopathological examination after surgical excision. But none of these can diagnose a lesion as cutaneous endometriosis with clear pathognomonic features and are hence eclipsed in their clinical value by histopathological examination after surgical excision. Occasionally, observing the nodule during different phases of the menstrual cycle to note its changes and prescribing hormonal contraceptives, progestins, GnRH analogues to reduce the swelling, pain or bleeding have been attempted but results were inconsistent. Medical treatment is not a reliable curative method apart from offering symptomatic relief in some cases, especially prior to the surgery. Besides, though rare, malignant transformation of the umbilical endometriosis is a possibility and it can be confirmed only by excision of the lesion with a margin and its subsequent histopathological examination. Hence total umbilical excision and reconstruction of umbilicus or local excision of the nodule preserving the umbilicus is the safest and most definitive option to manage an umbilical nodule.

Gynaecological referral and evaluation for pelvic endometriosis is another cause for concern in such cases. Literature shows that it would be wise to base that decision on the individual merits of a case. A perimenopausal woman such as our patient with absolutely no clinical symptoms suggestive of pelvic endometriosis may not need an extensive evaluation. This approach is evidence-based as nearly 73% of women with umbilical endometriosis have no pelvic endometriotic implants at all. Hence, in our case, an excision without any prior imaging proved to be a very fast, effective and economical management strategy to reduce the patient's suffering. Even in cases where there may not be symptoms associated with menstruation, like just a painful or painless nodule, excision and biopsy would give definitive answers, though radiological clues can be complementary.
CONCLUSION

Umbilical endometriosis must be considered as a differential diagnosis in cases of an umbilical nodule. There have been cases where discharges from such nodules were attributed to an infective pathology and treated with antibiotics without improvement. It may not always present with the telltale signs of changes associated with menstruation or a past surgical history. Excision and subsequent histopathological assessment is the gold standard to confirm the diagnosis and effectively manage the condition.

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Dieffenbachia Poisoning

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ABSTRACT

A young male presented to the emergency department with difficulty in speaking due to swollen tongue and excessive thick saliva following consumption of an ornamental plant leaves kept at his house as an act of self-harm. The plant was identified to be dieffenbachia and the patient was treated with symptomatic measures.

Keywords: Dieffenbachia, Dumb Cane, Poisoning

INTRODUCTION

Dieffenbachia is a genus of tropical flowering plant in the family of Araceae. It is native to tropical countries and are widely cultivated as ornamental plants, particularly as indoor houseplant.

The laymen’s term “dumb cane” refers to the poisoning effect of raphides, which are needle shaped calcium oxalate crystals, causing temporary burning sensation, excessive salivation and inability to speak.¹

CASE REPORT

We report a case of intentional ingestion of dumb cane plant leaves, requiring hospitalisation. A 24 year old male presented to emergency department with history of difficulty to speak following intentional ingestion of dumb cane plant leaves, after about three hours of ingestion. No other comorbidities were obtained from history. Emotional disturbance in personnel life was the trigger for the incident.

On examination, vitals were stable. His oral cavity was full of thick saliva and oropharynx was erythematous. Tongue was swollen with congestion of oropharynx

Systemic examination was unremarkable. Routine laboratory evaluation was within normal limits. Due to excessive salivation and difficulty to speak, he required hospitalisation for observation.

Gastric lavage was done soon after arrival at emergency department and he was given symptomatic therapy. His symptoms resolved in few hours and was discharged after 24 hours of observation. The plant was identified to be Dieffenbachia and the clinical profile observed in our patient matched with the consumption of the leaf of this toxic ornamental plant.

DISCUSSION

Accidental and intentional ingestion of dumb cane leaves are not uncommon and can result in significant symptoms requiring hospitalisation and emergency treatments.

Data on exact proportion of poisoning due to these toxic plants are not available in India.

The cells of the Dieffenbachia plant contains needle shaped calcium oxalate crystals called raphide (Figure 1).²

If the leaf is chewed, these crystals can cause temporary burning of the area with which contact has occurred. It may even cause erythema and oedema of the contact area.

Contact with the plant may cause host of unpleasant symptoms ranging from mild burning sensation to severe irritation and drooling of saliva.

Figure 1. Dieffenbachia plant


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Our patient had swelling of the tongue and excessive salivation which was thick and difficult to spit out, leading to temporary dumbness which was relieved after symptomatic therapy.

Prolonged contact may lead to severe swelling of tongue and airways leading to respiratory embarrassment. Airway obstruction in dogs has been reported following Dieffenbachia ingestion due to severe oropharyngeal swelling requiring temporary tracheostomy.

Dumb cane poisoning in cats has also been reported in the literature. Single case report exists of a dog fatality caused by airway obstruction following ingestion of dumb cane leaves.\(^3\)

Mild toxicity is reported in children following accidental ingestion.\(^4\) However no fatalities were reported so far in human beings. Acute airway compromise has been reported in both adults and paediatric age groups following chewing of the stem or leaves of the plant. Severe oedema of the glottis with occlusion of the upper airways can occur with large amount of sap squeezed from the leaf by intense chewing.

Treatment consists of symptomatic and supportive care. Those with severe airway compromise may require intubation and ventilation.

Prognosis of this plant poisoning depends on the amount of substance consumed and the time between consumption and treatment.

Generally the outcome is good, however, in cases with severe symptoms, it may worsen the outcome and prolong the hospital stay and recovery.

Nevertheless, no life-threatening complications are generally noted.

**CONCLUSION**

Poisoning due to Dieffenbachia plant (dumb cane) is uncommon. It usually causes mild symptoms. However severe toxicity may require hospitalisation and symptomatic therapy.

**END NOTE**

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**Conflict of Interest:** None declared

**REFERENCE**

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