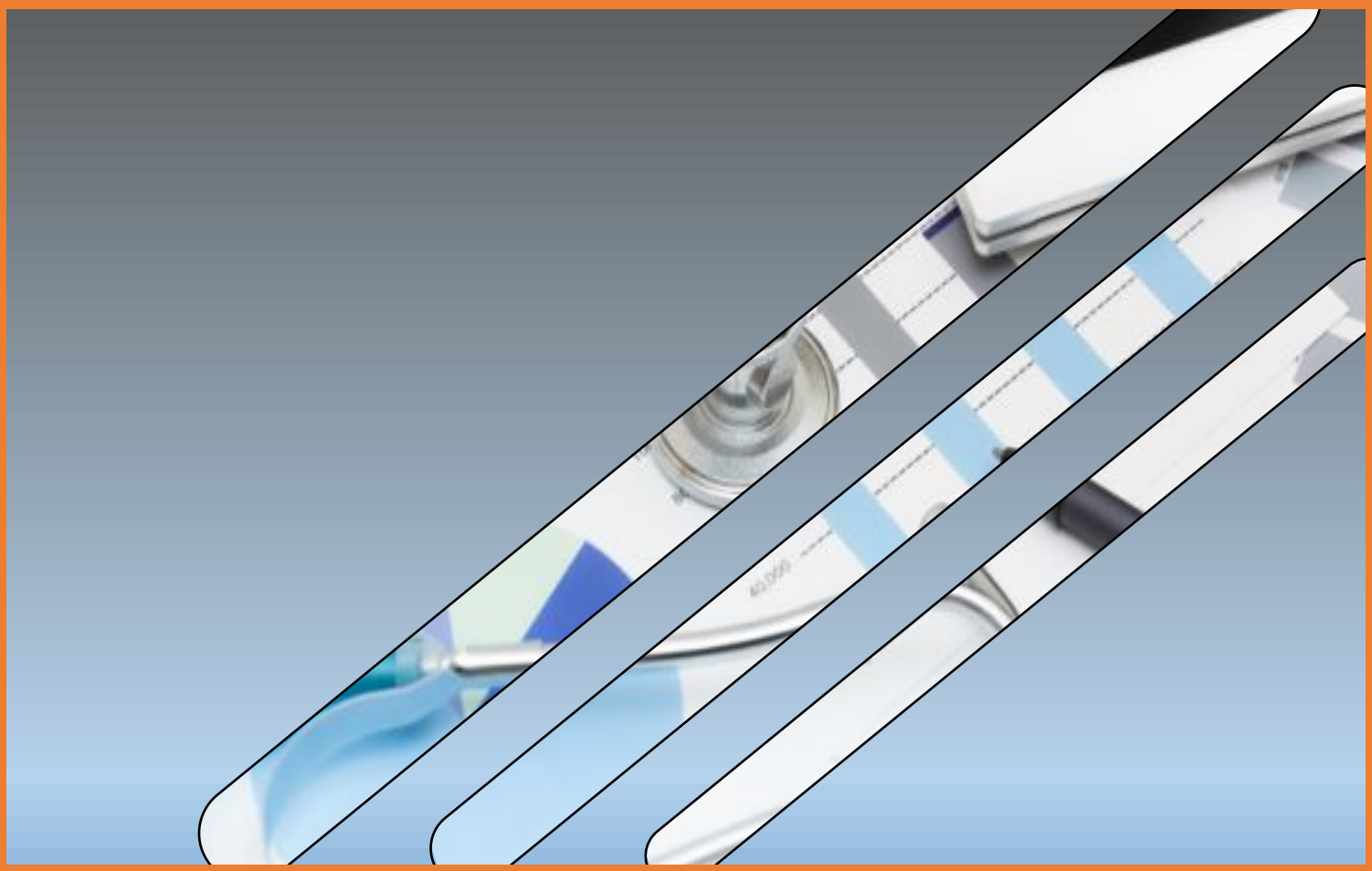

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COVID-19 and Sustainable Development Goals (SDGs)

Saurabha US*[1], Purushottam Giri[2]

The unprecedented crisis like COVID-19 which soon converted itself into a pandemic has been seen as a roadblock by many. COVID-19 has halted the progress of individuals and has made many countries revisit their health policies and bring about wanted changes. One such global goal adopted by all United Nations member States in 2015, the Sustainable Development Goals (SDGs) has also been impacted. COVID-19 has infected more than a 10 million people across the globe. It has greatly affected each of the goals of SDG 2030 - direct and indirect. The SDGs in a sense were the cornerstone of global governance, and governance at all levels even at the most micro-level of an institutional governance set-up.[1]

The Sustainable Development Goals were born at the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012. It was adopted as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030. The objective was to produce a set of universal goals that meet the urgent environmental, political and economic challenges facing our world. The SDGs are integrated that is, they recognise that action in one area will affect outcomes in others and that development must balance social, economic and environmental sustainability.[2]

The world is going through an unpleasant time with various restrictions on work and social interaction, COVID-19 has demanded a modification in the way of life of people across the globe, which may be the new normal. These restrictions have altered the progress of countries in achieving their SDG goals and targets. The year 2020 was supposed to be the Decade of Action. With just 10 years to go, plans were made to deliver the 2030 promise by mobilising more governments, civil society, businesses and calling on people to make the global goals their own.[3] Around 51 countries had signed up to conduct the Voluntary National Review in 2020, which includes India. Voluntary National Reviews is a process through which countries assess and present progress made in achieving the global goals and pledge to leave no one behind.[4]

The current health crisis has revealed the risks and vulnerabilities, both in humanitarian and social, economic and environmental terms.[5] The pandemic has exposed fundamental weaknesses in the global system. It has shown how the prevalence of poverty, weak health systems, subpar education, and a lack of global cooperation exacerbate a health crisis.[3]

The pandemic of COVID-19 has not just come in the way but also calls for rethinking the timeline. COVID-19 has affected the SDGs greatly across the globe, the very many targets laid out seem like they are far from being achieved. The pandemic has affected India and has become a setback in achieving the SDG goals and targets well within time. In 2019, SDG Global index rank and score for India was 115 and 61.1 respectively.[6]

The COVID-19 pandemic brought a situation of lockdown in the country which greatly hit the economic growth. The SDG-1 which sets a goal of 'no poverty' might have been affected due to this. People have lost their jobs especially those who were already below the poverty line. A UNU study which took into account three scenarios of per-capita income or consumption contractions, mentioned that the economic fallout from the COVID-19 pandemic could increase global poverty by as much as half a billion people or 8% of the total human population. The concentration of the potentially new poor would occur in the poorest regions of the world, notably in sub-Saharan Africa and South Asia, which would account for 80–85 per cent of the total poor.[7] Many have lost their jobs, this has in turn led to individuals and their families remaining hungry which is the SDG-2. The Government of India has launched the Pradhan Mantri Garib Kalyan Anna Yojana and few other schemes focuses on these two aspects. The SDG-3 which focuses on good health and well being, the lockdown in true sense was to maintain the good

health and well being of all its citizens but, it did put a strain on the others health care services being availed by the people, the mental health of many were greatly affected. Telemedicine, e-health and counselling initiatives of the Government were focusing on reducing the gaps if any in providing the care to the individuals. The SDG-4 which is quality education, the COVID-19 revolutionized the education system in India once again, online education took the lead. The problem with this was in the remote areas where, the child's family didn't have a mobile phone or internet to continue education.

The SDG-5 is about gender equality, there are some reports which mention domestic violence increased during the lockdown period. The SDG-6 is about the clean water and sanitation. The provision of clean water is essential in the COVID-19 situation as one of the messages for prevention was frequent hand washing with soap and water. The availability of clean water and less than 50 per cent of the population in India has access to safely managed drinking water makes one want to ponder how many were actually able to use this as a preventive measure. The SDG-13 which is about climate action, this is the goal which has greatly benefited during the COVID-19 lockdown situation; the air quality of many cities in India had greatly improved.

CONCLUSION

The SDGs are inter-dependent goals, the success of one will amplify the improvement in others; the downfall of one will affect the other. This COVID-19 situation has taught mankind many important life lessons and also has forced the improvement of health care infrastructure in many parts of the world. In the context of post-crisis reconstruction, more than ever, the implementation of this universal agenda is a necessity, particularly to reduce vulnerabilities to crises by optimising the interactions between the SDGs.

REFERENCES

1. How Covid-19 will affect sustainability and the UNSDGs. (Online Article). Available from: *https://www.dailyo.in/variety/covid-19-coronavirus-pandemic-un-sustainable-development-goals-sdg-health-climate-change-inequality/story/1/32643.html* (Last accessed on 22nd June, 2020)
2. Sustainable Development Goals. (Online Article). Available from: *https://www.undp.org/content/undp/en/home/sustainable-development-goals.html* (Last accessed on 29th June, 2020)
3. Sustainable Development Goals: What to salvage from Covid-19. (Online Article). Available from: *http://www.ipsnews.net/2020/05/sustainable-development-goals-salvage-covid-19/* (Last accessed on 29th June, 2020)
4. United Nations High Level Political Forum 2017. Voluntary National Review Report on Implementation of Sustainable Development Goals. 2017.
5. Achieving the 2030 Agenda for Sustainable Development: A necessary horizon for the post-crisis recovery, but how to do it?. (Online Article). Available from: *https://www.iddri.org/en/publications-and-events/blog-post/achieving-2030- agenda-sustainable-development-necessary-horizon* (Last accessed on 29th June, 2020)
6. Sachs J, Schmidt-Traub G, Kroll C, Lafortune G, Fuller G, Woelm F. The Sustainable Development Goals and COVID-19. Sustainable Development Report 2020. Cambridge: Cambridge University Press. (PDF available Online). Available from: *https://sdgindex.org/reports/sustainable-development-report-2020/* (Last accessed on 30th June, 2020)
7. Sumner A, Hoy C, Ortiz-Juarez E. Estimates Of The Impact Of Covid-19 On Global Poverty. WIDER Working Paper 2020/43 (2020). Helsinki: UNU-WIDER.

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REVIEW

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Health Literacy: Addressing Well-Being: A Review

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ABSTRACT

Literacy forms an important input in overall development of individual enabling them to comprehend their social, political and cultural environment better and respond to it. Health literacy requires knowledge of health topics. People with limited health literacy often lack knowledge or have misinformation about the body as well as the nature and causes of disease. Without this knowledge, they may not understand the relationship between lifestyle factors such as diet and exercise and various health outcomes. Health literacy plays a key role on the overall health and wellbeing and is now recognized as a determinant of health and has been made a priority of public health agendas, as there is existence of clear scientific evidence regarding its association with health outcomes such as use of health care services, hospitalizations, mortality rates, and adherence to treatment regimens. Therefore, responsive health system that eliminates barriers to clear communication and provides usable and actionable health information and services is important to uplift the current situation.

KEYWORDS: Health, Health Literacy, Oral Health, Programs

INTRODUCTION

Among the world's adult population nearly 17% is still illiterate with an estimation of 122 million youth globally, of which young women represent 60.7%.[1] Of all the illiterate adults in the world, 37% are Indians which makes up to 287 million. The scale of illiteracy among youth represents an enormous challenge.[2] Beyond the obvious difficulties faced by an illiterate person in modern times, such as few employment opportunities and the inability to effectively communicate, it impacts our society in very profound ways.[2]

Literacy is fully crucial for the development of social and human verse in its ability to transform lives. For civilizations alike, it is a tool to empower and improve one's health, revenue & relationship with the world.[3] It forms a key input in complete development of individual which enables them to grasp their social, political and cultural environment better and respond accordingly. Literacy and Education levels are basic pointers for the level of development achieved by a civilization. Extent of Literacy is generally allied with important personae of recent civilization such as modernization, urbanization, industrialization, communication and e- commerce. The sharing of ideas, perspectives and concerns also leads to greater levels of mutual understandings and caring and ultimately strong community spirit.[4]

At the national level, in a participative democracy like India, a literate population is required to build a nation with strong social, economic and political foundations. The Effectiveness in literacy abilities open the access to more educational & employment opportunities that aids the people to pull themselves out of poverty and lingering underemployment. As a community's education level and social awareness increase, the population becomes "activated" and is more likely to initiate health-related interventions. This raised consciousness can lead to higher participation rates in vaccination programs, and more active involvement in community hygiene and sanitation interventions, altogether can lead to a decline in the frequency and incidence of various infectious diseases.[4]

The ability to obtain process and understand health evidence desirable to make conversant health decisions is known as health literacy. The process of gaining health information, assessing its concept and applying health prevention & treatment plans appropriately requires new skill development. It is interaction between culture & society, the health system, education system, language and oral health outcomes indicating that it could be a new element of oral health and should be measured more intensively in oral health research.[5]

The intricacy of the healthcare system provided, it is not astounding that limited health literacy is associated with unfortunate health. According to research studies, individuals with limited and low literacy skills are more likely to skip the more

important preventive measures, for example: the screening tests, visiting the healthcare system when they are sick and are more likely to have chronic conditions and are less able to manage them effectively rather they make greater use of facilities designed to treat impediments of disease & fewer use of services designed to prevent the complications.[4]

The pitch of the health literacy is growing briskly, expanding to involve a larger and more interdisciplinary addressee, & with that there occur a superior recognition of its complex and multi-layered nature. One such field is the Oral Health.[6]

Oral health is the key necessity to general health and well-being at every juncture of life. A fine fettle mouth empowers not only nutrition of the human body, but also augments social interaction which promotes self-esteem & the feeling of well-being. To uphold oral health & diseases when they occur, one should be able to comprehend, construe, and act on oral health data, whether it is communicated verbally or in written form. Hence, the importance of health literacy should be attained by every individual to maintain basic oral health.[5]

This review article enlightens on the significance of health literacy with its connotation with oral health, its contribution towards different disciplines and in assessment of health literacy.

IMPORTANCE OF HEALTH LITERACY

• Crucial for successful and fruitful access to care and use of amenities, self-care of continuing conditions, and maintenance of health & eudemonia by active life.
• The Ultimate of healthcare is that it requires individuals to have a more active role in pronouncements, decisions and management.[7]

WHAT CAN BE DONE TO EXPAND AND FURNISH THE LOW HEALTH LITERACY?

The Improvement of the health literacy is the accountability of health organizations, healthcare systems, and healthcare professionals worldwide. It is perilous for the patients to develop health literacy so that they can be more proactive in their health regimes. When patients engagement increase, they are able to make more well-versed decisions which increases the patient gratification, adherence, and can ultimately improve the overall outcome.[8]

FACTORS AFFECTING HEALTH LITERACY

• Illiteracy
• Poverty
• Inequality, discernment and traditional culture beliefs
• Deep distrust of the prevailing medical system
• Special challenges: Scheduled Tribes, rural villages and slums.[9]

SIGNIFICANCE OF ORAL HEALTH LITERACY

OHL (Oral Health Literacy) is the new imperative for better oral health as health literacy is now considered a determinant of health. Oral health is an essential part to overall health and well-being of an Individual. With underprivileged, poorer and untreated oral health and conditions, the impact on quality of life (QoL) will be deleterious.

According to oral health framework, Oral Health Literacy (OHL) can be considered as the aids necessary for society to comprehend the causes of poor oral health; to learn & implement fundamental aspects of positive oral self-care behaviors; to interconnect with oral health care providers. Also, research has revealed that OHL is allied with increased prevalence of OHRQoL impacts lower level oral health literacy directly affected the oral health status. Refining health literacy is a critical goal in refining health outcomes. Healthcare providers can make an optimistic approach on improving health outcomes by assessing practice & working to advance communication and knowledge. The improvement in oral health literacy will require intensive collaborative efforts and collective approaches among healthcare providers.[10]

Basic awareness of oral health issues for many Indians may be quite limited because of cultural or language barriers or problems with literacy. Among Indians, many lack understanding and cognizance of the importance of oral health and its essential relationship with their overall health.[11] According to the report, the literacy blockade to the health has been made largely unseen until recently because it was not often recognized and poorly understood and many health care providers could not address the literacy needs of their patients.[12] Deficiency of access to care results in patient's perceived need for care, lack of oral health literacy, geographic distribution of dentists and dental teams, economical drawback, individuals with physical disabilities and/or challenges.[13]

It is important that the government, dental professionals, and IDA work together to break the blockades to access the oral health. They have been identifying and addressing access issues by their various initiatives -- which provide a stage to forge a mutual ground in order to yoke opportunities and create viable solutions which provide improved oral health through prevention & treatment for vulnerable populations.[14]

HEALTH LITERACY FRAMEWORK

It is the process of gaining health information, appraising the concepts & applying health prevention and treatment plans correctly with requirement of the new skill development. Health literacy is forms a relationship between culture and society, the health system, education system, language and its outcomes.[15]

Dentistry has made improvements in terms of determining the scope of low health literacy and who is affected by it; understanding the economical and health-related burdens placed on health care providers and patients; and defining in what way to attain health literacy on an individual and on the community basis.[12]

A committee formed by the Institution of Medicine in the U.S. to comprehend health literacy & its influence on health outcomes have developed a health literacy framework. This framework identifies three major areas that may play key roles in influencing individual's health literacy: culture and society, health and the education system. Interventions should be directed towards these three areas to improve health literacy.[16]

DIMENSIONS OF ORAL HEALTH LITERACY

According to Sorensen et. al (2012)[17] the 5 important key extents for health literacy are as follows-

1. Health care system acquaintance and utilization;
2. Elementary health knowledge;
3. Marketing and the consumer behavior;
4. Health capabilities at the workplace;
5. Political participation.[17]

HEALTH LITERACY LEVELS

There are three distinct levels in health literacy, which are:

1. Functional: basic skills in reading and writing necessary for effective functioning in a health context.

2. Interactive: more advanced cognitive literacy and social skills that enable vigorous contribution in health care.

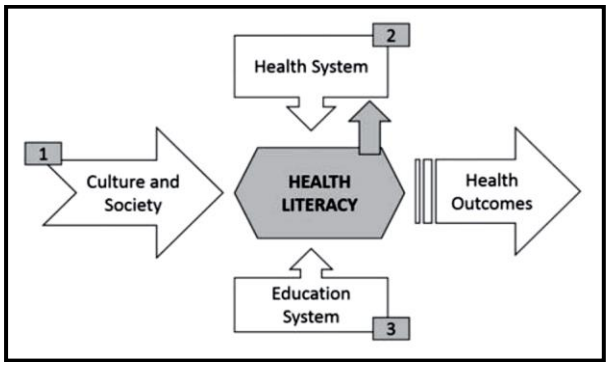

Figure 1. Health Literacy Framework

3. Critical: it is the capability to critically analyze and use data to participate in actions that overcome structural blockades to health.[18]

ASSOCIATION AMONG ORAL HEALTH & HEALTH CONSEQUENCES

In recent years, an increasing number of studies have been dedicated toward the study of health literacy. The health literacy construct can be understood as the capacity of people to attain and process the elementary health information and services needed to make appropriate health policies and decisions. Researchers have built up a causal pathway linking OHL to oral health outcomes. It is believed that low health literacy directly relates to less knowledge about oral health, which leads to a decreased adherence to positive oral health behaviors. Moreover, enlarged health literacy ideas and knowledge is associated with better patient-dentist communiqué, which can contribute to lower dental anxiety and thus an increased likelihood of seeking dental treatment.

The social and economic circumstances of individuals influence their behavioral choices, and consequently affect their health outcomes. Yet, to act on the grounds of diseases, it is important to focus on health promotion with appropriate strategies.[19]

Despite all the communication resources existing today, especially with the dawn of the Internet, many persons still do not use these resources and do not have access to health information. This result brings

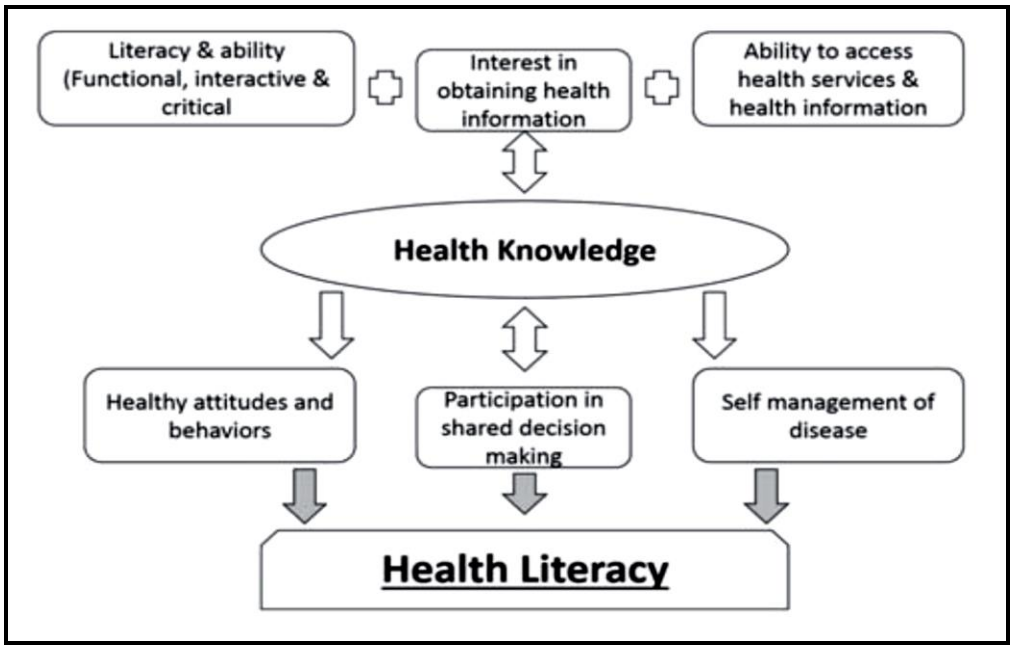

Figure 2. Health Knowledge and Literacy

with it the issue of where the loopholes between the numerous bits of health information in the media exist and how one can accesses these bits of intel. Health literacy has been shown to be an intermediary among health determinants, for instance, income, education, race, health behavior and health outcomes.[20]

Health literacy is one of the strategies of health promotion according to Nutbeam.[21] The increasing health literacy potential in promoting the better decisions based on information, reduce health hazards, increase prevention and well-being and increase transit through health schemes, patient care and quality of life.[21]

HEALTH LITERACY AND PUBLIC HEALTH

At the level of an individual, ineffective communication due to underprivileged health literacy will result in errors, deprived quality, and risks to patient safety of the healthcare services.

At a population level, health literate individuals are able to partake in the ongoing public and private dialogues about health, medicine, scientific knowledge and cultural principles. Thus, the doles of health literacy effect the full range of life's activities–home, work, society and culture. In the population, it may also lead to more equity and sustainability of changes in public health.[22]

TOOLKIT & ASSESSESSING THE ORAL HEALTH LITERACY

The purpose of this tool kit includes the apprise and to provide resources on oral health literacy to dental and healthcare professionals and other individuals and programs providing care and services to individuals at risk for dental diseases. The knowledge hence, enlarged from understanding oral health problems and how effectively to reach individuals with low oral health literacy will aid in providing optimal dental care, support and education.

Perceiving patients with low reading ability for various signs allows the dentist to offer the assistance a patient need without causing any embarrassment or uneasiness. There has been no availability of medical or dental test that systematically measure a person's reading fluency, terminology, ability with numbers, oral and written communication skills and his or her ability to meet the demands engaged on these abilities by the healthcare system. However, valid and reliable instruments are available to measure key aspects of this literacy skills.[23]

THE THREE A'S FOR ORAL HEALTH INFORMATION:

Oral health information should be:

• **Accurate:** By means of health literacy best practices does not mean "dumbing-down" the facts or distorting

the science. The practices of Health literacy ensure that the information is presented accurately and in ways that people can understand.

• **Accessible:** An often over-looked aspect of health literacy is the issue of access. Just because anyone can produce oral health information doesn't mean people see it or can use it. The World Wide Web is not always the best way to reach "the general public."
• **Actionable:** In the health arena, we classically want people to start or stop doing something, or do more or not as much of of something. We often spend our resources giving people background information instead of endorsements. Some background information may be significant, but make sure you provide actionable information so the people you want to target can do something with the info delivered.[23]

HEALTH LITERACY TOOLKIT

The health literacy assessment tools most commonly used in medical practice includes the following:
1. REALM (Rapid Estimate of Adult Literacy in Medicine) (1991) – Word recognition test.[24]
2. REALM (1993) – Shortened version of REALM.[24]
3. Test of Functional Health Literacy in Adults (1995) – Reading comprehension and numerical ability.[24]
4. NVS (Newest Vital Sign) (2005) – Literacy and numeracy skills.[24]

THE USE OF SOCIAL MEDIA

Through the times, platforms like Facebook, YouTube, Twitter and other social media tools to circulate health messages has grown significantly, and continues to trend upward and speedily. Using social media tools has become an active way to enlarge reach and spread, foster engagements and increase access to reliable, science-based health memoranda. The Assimilating social media into health communication campaigns and activities allows health communicators to influence social dynamics and networks to encourage participation, conversation and community, altogether can help spread key messages and help in the influence of health decision making.[25]

HEALTH LITERACY PROGRAMS WORLDWIDE

Public Health Agency of Canada (PHAC)[26] designated health literacy as a priority area of work and had a position for senior advisor in health education and literacy over the previous years. The PHAC was also reported to have custom-made a national thing “tank to advice” on the expansion of a tactic to health literacy within the agency as well as supported the public health association of British Colombia (PHABC) who organized subsequent national think tanks which resultant in the development of a national draft approach to health literacy.[26]
Chinese Association for Health Education (CASE) is aimed to unite health education work nationwide, promote the undertaking of health education and the construction of socialist material and cultural civilization in China and increase the knowledge of health and science among Chinese people in order that they develop healthy behaviors and lifestyles.[27]

HEALTH LITERACY PROGRAMS IN INDIA

In 1988, the national literacy mission was launched to aim the literacy rate of 75% by 2007 (National Literacy Mission), the effort through the 1947. Though this was a superior than six-fold improvement, the level is well below the world average literacy rate of 84% (literacy in India, 2012).

No government policies explicitly focusing on health literacy were reported, however, multiple government reports on health issues such as tobacco use, health equity, and non-communicable disease, state of urban health in Delhi and the practice of information technology for health referred to as the significance of health literacy.

Kalyani is an initiative of Ministry of Health and Family Welfare of the Govt. of India and has been called the longest running public health campaign in the nation. Program is broadcast over Doordarshan and National public television, in states of INDIA, targeting approximately 50% of INDIA’s population. These 9 states experienced poorest health indicators in the Nation. Themes of the television program, reinforced by in community efforts, are Reproductive & Child Health, Malaria, Tuberculosis, HIV/AIDS, Anti-tobacco, Cancer, Water Borne Disease, Insulin-dependent diabetes (IDD), Blindness, and Leprosy and Food Safety.[28]

Darpana Academy, based in Ahmedabad, India, uses methods like - Indian dance culture, puppetry, music, theatre, and television to train, empower, and promote awareness about critical issues India is facing today, Health, being one of the primary focus areas for their work (2012). Health issues that Darpana projects are reported to have addressed include family planning; diabetes; cervical cancer; maternal; and infant mortality; HIV/AIDS; children’s health; hygiene;

sanitation; the medical and social impact of HIV/AIDS for at risk population, including truck drivers, sex workers, and their clients and port labor; leprosy; and addictions.[29]

Public Health Foundation of India (PHFI)[30] is a public-private initiative that is reported to have conducted community-based health literacy campaigns to effectively build engagement and facilitate action for improved health outcomes at the grassroots. The organization has conducted health literacy assessment, participatory action research projects on increasing health literacy at the grassroots relating risk factors and symptoms of selected chronic disease prevention opportunities in three states in India. Various campaigns conducted throughout so far have apparently used mass media through community and commercial radio, ads in newspaper, participatory mid-level media using songs, street plays, puppetry shows, public meetings, dance shows, and adapted board games as well as interpersonal communication via board games as well as via peer education via a cascade approach.[30]

Maanavta se Anmol Mann Tak (2010-2012)[27]: Under the sponsorship of the National Mental Health Program (NMHP), Ministry of Health and Family Welfare. Government of India, the PHFI accomplished the implementation and operation of a pilot awareness generation campaign on mental and psychological health. The initiative was started with the key objective of inspiring timely help-seeking behaviors by individuals and families through partaking information on available services & efforts in stigma reduction in 10 districts of Andhra Pradesh, Assam, Gujarat, Uttar Pradesh, and Delhi. A series of activities were conducted in partnership with civil society organization with close association with the District Mental Health Program teams.[27]

The Self-Employed Women's Association (SEWA)[31]
It is a trade union including nearly a million self-employed women in Gujarat, India. The organization works to link health security, which means that all economic activities are SEWA have a healthy component and all health action. The association has jointly organized health insurances to pay for health costs, systematizes child care and held campaigns with state and national level authorities for child care as an entitlement for all women workers. Training of the traditional midwives, so that they become the barefoot doctors of their communities, aids in promoting health and well-being by providing access to health information and health education and accentuate self-reliance for women in economic terms and in rapports of women themselves owing, controlling and managing their own health activities (SEWA, 2009).[31]
Gender Resource Center (GRCs)[32] are being reported to be implemented in Delhi, India for its overall empowerment of women among the areas of health literacy, legal awareness and skill advancements. The efforts to accomplish greater convergence of programs and activities of government for the women and other agencies through single window information and facilitation centers for the community woman to provide broader acquaintance to available services and better placement opportunities.[32]

CONCLUSION

Health literacy plays a crucial role on the general health and wellbeing. People with inadequate health literacy often lack knowledge or have misinformation about the body, about the nature and causes of disease. Various factors like proper usage of health care services, communication of health issues with health care providers, leading healthy lifestyle, good hygienic conditions, taking preventive measures like immunization, which could show to impact an individual's physical and mental wellbeing are directly or indirectly related to health literacy. Hence, the suggestion about the promoting health literacy will make a healthy community, and it should be measured as a primary public health objective.

Health literacy is described as the fuel for improving the quality of health & health care necessities. It's the essential skills that allow an individual to function within the health care environment. It is a health care provider responsibility to make sure that health information and repair provided are easily understandable, accessible, and the other people are ready to grasp and apply these recommendations.[29]

REFERENCES

1. Statistics | Education | United Nations Educational, Scientific and Cultural Organization." Statistics | Education | United Nations Educational, Scientific and Cultural Organization.
2. The Power of Literacy: Women's Journeys in India, Indonesia, Philippines and Papua New Guinea. 2012, Asia South Pacific Association for Basic and Adult Education (ASPBAE)
3. International Literacy Statistics: A Review of Concepts, Methodology and Current Data-UNESCO Institute for Statistics.

4. US Department of Health and Human Services. Quick Guide to Health Literacy. (Online Article). Available from: https://health.gov/healthliteracyonline/. [Last Accessed on 12th December, 2019]
5. Dental Health Foundation Ireland. Links between Oral and General Health (Online Article). Available from: https://www.dentalhealth.ie/dentalhealth/causes/general.html [Last Accessed on 12th December, 2019]
6. Berkman ND, Davis TC, McCormack L. Health Literacy: What Is It?, Journal of Health Communication. 2010;15:9-19. https://doi.org/10.1080/10810730.2010.499985
7. Institute of Medicine. Health Literacy: A prescription to end confusion. Nielsen-Bohlman L, Panzer A, Kindig DA, editors. Washington, D.C., National Academy Press 2004.
8. Centers for Disease Control and Prevention. (Online Article). Available from: https://www.cdc.gov/healthliteracy/learn/Understanding.html [Last Accessed on 12th December, 2019]
9. Health Education Library for People (HELP). Chapter 13: Health Literacy in India: A Unique Challenge. (Online Article). Available from: (Online Articleo). Available from: https://www.cdc.gov/healthliteracy/learn/understanding.html [Last Accessed on 12th December, 2019]
10. Sajjanshetty M, Rao A, Gururaghavendran R, Shenoy R, Mithun Pai B H. Oral health knowledge and practices: their influence on oral health status of auxiliary health workers in health centers of Mangalore, India. J Indian Assoc Public Health Dent 2019;17:97-102. https://doi.org/10.4103/jiaphd.jiaphd_173_18.
11. Baliga SM. Child oral health-care literacy in India: Can access to services be improved? J Indian Soc Pedo, Prev Dent. 2019; 37:1-2.
12. Institute of Medicine (US) Committee on Health Literacy; Nielsen-Bohlman L, Panzer AM, Kindig DA, editors. Health Literacy: A Prescription to End Confusion. Washington (DC): National Academies Press (US); 2004. 2, What Is Health Literacy? (Online Article) Available from: https://www.ncbi.nlm.nih.gov/books/NBK216035 [Last Accessed on 12th December, 2019]
13. Patrick DL, Lee RSY, Nucci M, et al. Reducing Oral Health Disparities: A Focus on Social and Cultural Determinants. BMC Oral Health 2006; 6:S4. https://doi.org/10.1186/1472-6831-6-S1-S4
14. Indian Dental Association (IDA). Advocacy (Online Article). Available from: https://www.ida.org.in/Advocacy/Details/Advocacy. [Last Accessed on: 14th December, 2019]
15. McCray AT. Promoting health literacy. J Am Med Inform Assoc. 2005;12(2):152-163. https://doi.org/10.1197/jamia.M1687.
16. Hongal S, Torwane NA, Goel P, Chandrashekar BR, Jain M, Saxena E. Assessing the oral health literacy: A review. Int J Med Public Health 2013;3:219-24. https://doi.org/10.4103/2230-8598.123406
17. Sørensen, K, Van den Broucke S, Fullam J, et al. Health literacy and public health: A systematic review and integration of definitions and models. BMC Public Health 2012;12:80. https://doi.org/10.1186/1471-2458-12-80
18. Ishikawa H, Kiuchi T. Health literacy and health communication. Biopsychosoc Med. 2010;4:18. https://doi.org/10.1186/1751-0759-4-18
19. Tran TD, Krausch-Hofmann S, Duyck J, et al. Association between oral health and general health indicators in older adults. Sci Rep. 2018;8:8871. https://doi.org/10.1038/s41598-018-26789-4
20. Nielsen-Bohlman L, Panzer AM, Kindig DA, eds. Health Literacy: A Prescription to End Confusion. Washington, DC: The National Academies Press; 2004:5
21. Nutbeam D. Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. Health Promotion International 2000;15(3):259–67.
22. Van den Broucke S. Health literacy: a critical concept for public health. Arch Public Health. 2014; 72(1):10. https://doi.org/10.1186/2049-3258-72-10
23. Chopra A, Rao NC, Gupta N, Vashisth S. Oral health literacy: An approach to end oral health disparities. SRM J Re Dent Sci 2013; 4:16-20.
24. Centers for Medicare and Medicaid Sercives (CMC). (Online Article).Available From: https://www.cms.gov/Outreach-andEducation/Outreach/WrittenMaterialsToolkit. [Last Accessed on 13th December, 2019]
25. Centers for Disease Control and Prevention (CDC). The health communicator's social media toolkit. (Online pdf). Available from: http://www.cdc.gov/socialmedia/tools/guidelines/pdf/socialmediatoolkit_bm.pdf. [Last Accessed on 14th December, 2019]
26. Rootman I, Gordon-El-Bihbety D. A vision for a health literate Canada: report of the expert panel on health literacy. CPHA. 2008. (Online Pdf) Available from: http://www.cpha.ca/uploads/portals/h/reporte.pdf [Last Accessed on 16th December, 2019]
27. Roundtable on Health Literacy; Board on Population Health and Public Health Practice; Institute of Medicine. Health Literacy: Improving Health, Health Systems, and Health Policy around the

World: Workshop Summary. Washington (DC): National Academies Press (US); 2013 Jul 10. Appendix A, Health Literacy around the World: Part 1 Health Literacy Efforts Outside of the United States. Available from: https://www.ncbi.nlm.nih.gov/books/NBK Darpana Academy of Performing Arts 202445/ [Last Accessed on 13th December, 2019]
28. Ministry of Health and Family Welfare. Government of India website. Available from: https://mohfw.gov.in/ [Last Accessed on 12th December, 2019]
29. Darpana Academy of Performing Arts (Online Article). Available from: https://pubmed.ncbi.nlm.nih.gov/24872976/ [Last Accessed on 14th December, 2019]
30. Healthy India (Online Website). Available from: http://www.healthy-india.org. [Last Accessed on 16th December, 2019]
31. Self Employed Women's Association (SEWA). (Online Website). Available from: http://www.sewa.org/. [Last Accessed on 12th December, 2019]
32. Gender Resource Centre (Gujrat). (Online Website). Available from: http://www.grcgujarat.org/ [Last Accessed on 14th December, 2019]

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REVIEW

QR CODE

COVID-19 and Dental Practice: A Review

SANA BASHIR

ABSTRACT

Novel coronavirus outbreak which started in Wuhan in December 2019 has spread across the globe at a high pace. This infection can be transmitted through droplets, close contacts, aerosols and other forms. Both uninfected patients and healthcare professionals are hesitating in seeing each other being scared of catching this viral disease. To overcome this upcoming gap between healthcare professionals and patients, there is a need to find out a way to answer their concerns and reinforce their confidence. As no specific treatment for this pandemic exists, one can only rely on infection control measures to prevent further spread of this disease. The aim of this review is to focus on specific guidelines in order to reduce the risk of COVID-19 transmission in dental clinics and hospitals.

KEYWORDS: COVID-19, Coronavirus, Dentistry

INTRODUCTION

Coronavirus pandemic that originated in Wuhan, China in December 2019 has brought the world to a standstill. It has impacted the financial status of not only individuals but also big countries. Not only businesses and transportation have been hampered, the daily needs are also going out of stock due to stopped or low production and difficulty in supply due to movement issues. The important concern is its negative effects on the health of the subjects who are even COVID negative. The patients with other medical or dental ailments are reluctant to visit hospitals or clinics because they are scared to get COVID-19 infection thinking that the doctor or his workplace might have come in contact with a coronavirus infected patient.

The vice-versa also holds true. Private practitioners are not entertaining patients especially those who are down with flu like symptoms. Their feelings are genuine as this infection has high chances of transmission during medical or dental procedures. Research work has confirmed person to person transmission of the disease.[1,2] Infection is transmitted by inhalation of large droplets generated during coughing, talking, or sneezing by both symptomatic and asymptomatic persons who are in a close range. Infection can also be acquired by touching surfaces contaminated by these droplets and then touching the nose, mouth, and eyes.[3] Transmission through aerosols can also occur under specific circumstances such as tracheal intubation and extubation, non-invasive ventilation, manual ventilation before intubation, cardiopulmonary resuscitation, bronchoscopy, administration of high-flow oxygen or nebulized medications, tracheotomy and upper gastrointestinal endoscopy.[4] The infected droplets can spread one to two meters and deposit on surfaces where it remains viable for a variable period. The virus was detectable up to four hours on copper, 24 hours on cardboard, and up to two to three days on plastics and stainless-steel surfaces.[5] Healthcare professionals performing or assisting in aerosol generating procedures are at a very high risk of exposure.

The findings from a study indicate that the oral mucosa is an important vehicle for the COVID-19 infection transmission.[6] Even though saliva can be delivered through cough, droplets can be emitted also through normal breathing.[7] Therefore, viruses can be easily vehiculated by the aerosol generated by most of dental procedures. The dental staff should wash hands frequently, clean hands with alcoholic preparation before entering the operative area, follow social distancing and wear surgical masks, surgical cap, overshoes, disposable waterproof gown, protective goggles or full-face shield and gloves. During the dental procedures, extraoral x-rays should be preferred, isolation with rubber dam should be done,

aerosol making procedures should be avoided, high volume aspirating system should be used and disposable instruments should be preferred to the most possible extent. Furthermore, air purification and sanitization before and after dental procedures should be done. Disinfection of the whole clinic including reception areas, changing rooms and washrooms should be carried out every morning and evening even if no patient visits. In case of multiple patient, this needs to be implemented for maximum number of times possible, ideally after every patient.

Scheduled appointments should be fixed in such a manner that there is enough time gap between two patients, making disinfection of clinic and sterilization of the instruments possible. Time overlap should be strictly avoided for proper implementation of the sanitization protocol. Whole of the dental unit should be covered with disposable sheets that can be changed after every patient. In case of prosthodontic patients, the impression should be disinfected and sealed in an envelope before sending to lab. Care should be taken to avoid contamination of x-ray envelopes, visiting cards, prescription slips and other stationery items. The patient should be directed to rinse the oral cavity with 1% hydrogen peroxide solution before every procedure.

Waste contaminated with blood, body fluids and secretions should be disposed of properly as per the local regulations. Single time use items should be discarded properly. Personal protective equipment kit has a very important role to play. All the dental staff including the assistants, hygienists, receptionist should wear the same. For more protection the patient should also be provided with such a kit. Accompanying persons should only be allowed in case of emergency, major dental procedure, pediatric patients and special cases like elderly and those who are medically or physically unfit. Before fixing an appointment, a detailed medical and travel history taking into account all symptoms of COVID-19 should be recorded and relevant associated questions should be asked via telephonic conversation.

In case of a recent travel to any foreign nation, the appointment should be re-scheduled. At the point of entry, thermal screening using contactless thermometer and hand sanitization of subjects entering the clinic should be done. In case of doubt, the regional health care authorities should be immediately intimated without any delay. Printed posters and standees should be pasted/placed in the dental office to instruct patients regarding standard respiratory hygiene recommendations and social distancing.[8-10] It would be great if the patient leaves the clinic with more knowledge about preventive measures against coronavirus infection. All patients should be encouraged to download the Arogya Setu application. They should be told to further spread any important facts they have learned during their dental visit and inculcate hand and respiratory hygiene habits to protect themselves and their close ones from the frightful COVID-19 infection.

CONCLUSION

In the absence of specific therapy directed against the virus, it is of paramount importance to implement infection control practices by controlling the source of infection, blocking the route of transmission, and protecting the susceptible population. Prevention involves strict infection control measures at clinics that include contact and droplet precaution. The entire human race is eagerly waiting for some solution to this horrendous situation may be in the form of drugs or vaccines. Until this happens, dental professionals need to take precautions and follow infection control protocol far beyond what they have been implementing prior to this pandemic.

REFERENCES

1. Chan JFW, Yuan S, Kok KH, To KKW, Chu H, Yang J, et al. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. Lancet. 2020;395(10223):514-23.
2. Cai J, Xu J, Lin D, Yang Z, Xu L, Qu Z, et al. A case series of children with 2019 novel coronavirus infection: clinical and epidemiological features. Clin Infect Dis. 2020 Feb 28;ciaa 198.
3. Singhal T. A review of coronavirus disease-2019 (COVID-19). Indian J Pediatr. 2020;87(4):281-6
4. Omer SB, Malani P, Del Rio C. The COVID-19 pandemic in the US: a clinical update. JAMA. 2020 Apr 6.
5. van Doremalen N, Bushmaker T, Morris DH, Holbrook MG, Gamble A, Williamson BN, et al. Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1. N Engl J Med. 2020 Apr16;382(16):1564-7.
6. Xu H, Zhong L, Deng J, Peng J, Dan H et al. High expression of ACE2 receptor of 2019-nCoV on the epithelial cells of oral mucosa. Int J Oral Sci. 2020;12:8. https://doi.org/10.1038/s41368-020-0074-x.

7. Yan J, Grantham M, Pantelic J, et al. Consortium Infectious virus in exhaled breath of symptomatic seasonal influenza cases from a college community. Proc Natl Acad Sci. USA 2018; 115:1081–6. doi: 10.1073/pnas.1716561115.
8. Centers for Disease Control and Prevention. *https://www.cdc.gov/coronavirus/2019-ncov/downloads/stop-the-spread-of-germs.pdf* [Last accessed on June 25th, 2020].
9. Centers for Disease Control and Prevention. *https://www.cdc.gov/oralhealth/infectioncontrol/pdf/safe- care2.pdf* [Last accessed on June 25th, 2020].
10. Centers for Disease Control and Prevention. *https://www.cdc.gov/coronavirus/2019-ncov/php/risk-assessment.htm* [Last accessed on June 25th, 2020].

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CASE REPORT

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Denture Stomatitis: Report of a Case with Rarely Used Treatment Modality and Review of Literature

PARUL UPPAL MALHOTRA[1], NEERA OHRI[2], YAGYESHWAR MALHOTRA*[3], ANINDITA MALLIK[4]

ABSTRACT

Candida albicans is the most common Candida species isolated from the oral cavity both in healthy and diseased. Candida albicans is a dimorphic fungus existing both in blastopore phase (yeast phase) and the hyphal or mycelial phase. Although these organisms typically colonize mucocutaneous surfaces, the latter can be portals of entry into deeper tissues when host defences are compromised. Denture stomatitis is a common form of oral candidiasis that manifests as a diffuse inflammation of the maxillary denture bearing areas & is associated with angular cheilitis. At least 70% of individuals with clinical signs of denture stomatitis exhibit fungal growth & these conditions most likely result from yeast colonization of the oral mucosa combined with Bacterial colonization. Candida species act as an endogenous infecting agent on tissue predisposed by chronic trauma to microbial invasion. At one time, oral fungal infections were rare findings in general dentist's office. They were more commonly seen in hospitalized and severely debilitated patients. However with enhanced medical and pharmaceutical technology, increasing numbers of ambulatory immunosuppressed individuals with oral fungal infections are seeking out general dentists for diagnosis and treatment of these lesions.

KEYWORDS: Denture Stomatitis, Candida Albicans, Fungal Infection, Yeast, Candidiasis

INTRODUCTION

Denture stomatitis also known as denture sore mouth and prosthetic stomatitis implies inflammation of oral mucosa especially palatal and gingival mucosa which is in direct contact with the denture base. The frequency of its development is 25 to 67%, mostly in women, and prevalence increases with age.[1-3]

Yeast attached to the denture plays an important etiologic role in chronic atrophic candidiasis. The attachment of yeast to the patient's appliances is increased by mucus & serum & decreased by the presence of salivary pellicle suggesting an explanation for the severity of candidiasis in xerostomic patients. Soft liners in dentures provide a porous surface & an opportunity for additional mechanical locking of plaque & yeast to the appliance. Poor denture hygiene habits are the most prominent contributing factor for denture stomatitis and colonization.

Symptoms of denture stomatitis vary in their severity, from asymptomatic to pain and irritation. Occasionally, the overgrowth of Candida can be very severe and lead to discomfort, altered taste, dysphagia and a burning sensation in the mouth.[4]

The condition has been divided by Newton in to 3 clinical categories:[5] type 1: show pinpoint hyperemia, type 2 (Erythema of general simple type) and this is the most common type of chronic atrophic candidiasis presents with diffuse erythema & edema of the denture bearing areas of the palatal mucosa. The affected mucosa is bright red or dusky & sharply differentiated from the surrounding mucosa at the margins of the denture. The majority of the patients do not complain of soreness & the condition is generally accompanied by angular cheilitis. Type 3 is of the Granular type (inflammatory papillary hyperplasia).

If the type 2 is not treated for a long period a hyperplastic epithelial reaction may occur resulting in a nodular type of lesion with intermittent atrophic areas. A vast majority of patients with chronic atrophic candidiasis are otherwise healthy as local factors such as trauma, poor oral hygiene, carbohydrate diet determine the pathogenesis. We here discuss a case of denture stomatitis with large lesions and its unique responsiveness to tacrolimus and fluconazole combination as treatment modality.

CASE REPORT

A 70-year-old female was referred to Dr. RPGMC, Tanda with non-healing ulceration of palate for three months. On clinical examination the two erythematous lesions with well-defined hyperemic borders were present 0.5 cm and 1cm away from mid-palatine raphe on left and right side of anterior palate. The lesion on left side was unusually large and measured nearly 3.5 cm x 1.5cm in greatest dimensions whereas lesion on right side was 1.5 cm x 0.5 cm in greatest dimensions. The mucosa over mid-palatal raphe and over alveolus had white patches (Figure 1).

Figure 1. Erythematous Lesions on Palate

History revealed patient had no significant medical history. Patient was a denture wearer since 10 years. The provisional diagnosis of denture stomatitis was made. Patient had already tried topical clotrimazole, benzalkonium and steroid combination for months and Fluconazole tablets from different local dentists. The denture was worn out (Figure 2).

Figure 2. Worn Out Denture

The patient was instructed to discontinue denture use completely. The treatment given was tablet fluconazole 100 mg OD for three days, Tab multivitamin OD and Tacrolimus 0.1% ointment mixed with orabase twice a day for local application and was recalled after three days. On fourth day the lesion had completely disappeared on right side and had considerably reduced in size on left size (Figure 3).

Figure 3. Healing Lesion On 4th Day of Treatment

Patient was advised to take 50 mg of fluconazole once weekly for four weeks and was advised to continue tacrolimus 0.1% twice a day. The patient was recalled after a week and lesion was completely healed (Figure 4). The patient continued fluconazole once weekly and multivitamins as advised for 3 more weeks and tacrolimus was discontinued. Patient was instructed to maintain oral hygiene and advised to get new prosthesis.

Figure 4. Completely Healed Lesion

DISCUSSION

Denture stomatitis is a common form of oral candidiasis that manifests as a diffuse inflammation of the maxillary denture bearing areas & is associated with angular cheilitis. Denture sore mouth is rarely found under a mandibular denture. One possible explanation for this is that the negative pressure that forms under the maxillary denture excludes salivary antibody from this region & yeast may reproduce undisturbed in the space between the denture & the mucosa. The closer adaptation of maxillary denture & palate may also bring in large number of yeasts adhering to the denture surface into contact with the mucosa.[4]

The precise etiology of the condition is unknown but is likely to involve at least one of the following factors: mucosal trauma from poorly fitting dentures, poor oral and deficient denture hygiene, night-time wear of removable dentures and bacterial and yeast infection with Candida albicans. Dentures may produce a micro-environment conducive to the growth of Candida. This may be due to the enhanced adherence of Candida to the acrylic, reduced saliva flow under the surface of the denture fitting and poor oral hygiene. Long-term and continuous use of a denture along with poor denture and oral hygiene promote the development of a biofilm (plaque) on the surface of the prosthesis. The biofilm colonizes the surface and penetrates into the cracks and imperfections of the denture material. The mucosa in contact with the denture then becomes inflamed.[4,6]

The problem may be compounded by physical disabilities that reduce an individual's ability to maintain good oral hygiene, and also by illnesses such as diabetes mellitus, immunosuppression and medications (e.g. antibiotics and corticosteroids), all of which can disturb the balance of the oral flora, leading to an increase in Candida as an opportunistic infection (candidiasis). Other risk factors have been associated with oral candidiasis and denture stomatitis such as vitamin A and folate deficiency and tobacco use.[6,7]

Histologic examination of the soft tissue beneath dentures has shown proliferative or degenerative response with reduced keratinization and thinner epithelium.[8] Dentures can also produce other changes: the oral flora may be altered and plaque collects between the mucosal surface of the denture and the palate. In addition, the saliva that is present between the maxillary denture and the mucosa may have a lower pH than usual [9]. The generalized simple and the granular types of denture-induced stomatitis are most often caused by the accumulation of microbial plaque (bacteria or yeasts) on and in the fitting surface of the denture and the underlying mucosa.[10] Denture-induced stomatitis is not exclusively associated with Candida, however, and, occasionally, other factors such as bacterial infection, mechanical irritation, or an allergic reaction to the denture base material may be implicated. Nonetheless, there are no clinical criteria that can reliably distinguish between a Candida-associated, a bacterial-induced, a trauma-induced denture stomatitis, or an allergic reaction to the denture base material.[1]

The high proportion of women to men sufferers is more likely because of the higher incidence of edentulism among women and because of the tendency for women to seek dental treatment more often than men.[11]

For management taking history followed by a thorough examination of the mouth, looking at the soft & hard palate & examining the buccal mucosa in those wearing dentures after they have been removed are usually good starting points. Predisposing factors are identified & resolved if possible & the type, severity & chronicity of the infection are assessed. Dentures should be cleaned & disinfected daily & left out overnight or for at least 6 hours daily. The dentures should be soaked in a denture cleaning solution such as 15 to 30 mins in white vinegar (diluted 1;20) or 0.1% sodium hypochlorite or chlorhexidine as this is more effective in eliminating candida than brushing. This is because dentures have irregular & porous surfaces to which candida easily adheres & brushing alone cannot remove them. The patient should ensure that the whole mucosa is coated with the antifungal & held in mouth for a few minutes. Chlorhexidine can discolor dentures. Specific management of candidiasis can be accomplished with topical applications & if not controlled, treatment should include systemic medications. Similarly in patients with persistent infection, advantage can be gained by combining

topical agents, in addition to systemic medications. This may allow a lower dose or reduced duration of use of systemic medications.[7]

Judgment of care completely depends on type, chronicity & severity of disease. It is recommended that the duration of antifungal therapy extend at least twice as long as the termination of clinical signs & symptoms of candidiasis. When selecting an antifungal medication, factors such as taste, comfort of use, texture (includes sucrose or alcohol) potential sensitivity or resistance to drug & cost should be taken into consideration. In patients with dry mouth, tablets given to dissolve in the mouth may be poorly soluble. Oral liquid suspensions may be a better choice, particularly for patients with dry mouth.[7,12]

Fluconazole is effective against a variety of fungal infections in immunocompetent & immunocompromised hosts. When combined with azoles, tacrolimus and cyclosporine A have synergistic activity in-vitro against the pathogenic fungi Candida spp., C.neoformans, and Aspergillus spp. Against Candida albicans biofilms, the synergistic effect of tacrolimus and fluconazole is due to calcineurin inhibition.[13] We successfully used this combination in this case.

REFERENCES

1. Budtz-Jørgensen E. Oral mucosal lesions associated with the wearing of removable dentures. J Oral Pathol. 1981;10(2):65-80. https://doi.org/10.1111/j.1600-0714.1981.tb01251.x
2. Moskona D, Kaplan I. Oral lesions in elderly denture wearers. Clinical Preventive Dentistry. 1992;14(5):11-4.
3. Arendorf TM, Walker DM. Denture stomatitis: a review. J Oral Rehabil. 1987;14(3):217-7. https://doi.org/10.1111/j.1365-2842.1987.tb00713.x
4. Naik AV, Pai RC. A study of factors contributing to denture stomatitis in a North Indian community. Int J Dent. 2011:589064 https://doi.org/10.1155/2011/589064
5. Newton AV. Denture sore mouth. Br Dent J. 1962;112:357–9.
6. Shulman JD, Rivera-Hidalgo F, Beach MM. Risk factors associated with denture stomatitis in the United States. J Oral Pathol Med. 2005;34(6):340-6. https://doi.org/10.1111/j.1600-0714.2005.00287.x
7. Farah CS, Lynch N, McCullough MJ. Oral fungal infections: an update for the general practitioner. Aust Dent J. 2010;55 (s1):48-54. https://doi.org/10.1111/j.1834-7819.2010.01198.x
8. Razek MK, Shaaban N. Histochemical and Histopathological Studies of Alveolar Mucosa Under Complete Dentures. J Prosthet Dent. 1978;39:29-39.
9. Burket LW. Oral Medicine in the Edentulous Patient. In: Burket's Oral Medicine: Diagnosis and Treatment. 7th ed. Philadelphia: Lippincott Publications;1977:568-81.
10. Arendorf TM, Walker DM. The prevalence and intra-oral distribution of Candida albicans in man. Arch Oral Biol. 1980;25(1):1-10. https://doi.org/10.1016/0003-9969(80)90147-8.
11. Dorey J, Blasberg B. Oral Mucosal Disorders in Denture Wearers. J Prosthet Dent. 1985;53:210-214
12. Scully C, el-Kabir M, Samaranayake LP. Candida and oral candidosis: a review. Crit Rev Oral Biol Med. 1994;5(2):125-57. https://doi.org/10.1177/10454411940050020101
13. Borba-Santos LP, Reis de Sá LF, Ramos JA, et al. Tacrolimus Increases the Effectiveness of Itraconazole and Fluconazole against Sporothrix spp. Front Microbiol. 2017;8:1759.

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ORIGINAL RESEARCH

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Streptococcus mutans Level Estimation in Saliva Before and After Consumption of Chewable Probiotics among School Children

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ABSTRACT

INTRODUCTION: The World Health Organization (WHO) deemed probiotics to be the next most important immune defence system. Also known as the "friendly bacteria", these lactobacilli-derived food supplements are the current trending weapons to fight against *Streptococcus mutans,* the prime causative organism for dental caries.
AIM: To compare the levels of salivary mutans streptococci in children before and after short-term consumption of dental probiotic chewable containing Lactobacillus acidophilus and Streptococcus salivarius M18.
MATERIALS AND METHOD: A cross-sectional study was performed on 10 healthy subjects in the age group of 6-12 years who were followed for 7 days. The assessment of S. mutans in saliva was done at baseline, 1 hour after consumption of probiotic chewable and after 7-day of intervention period using mitis salivarius bacitracin agar. The colonies of S. mutans were identified and counted using a digital colony counter.
RESULTS: A statistically significant reduction of salivary S. mutans was recorded after consumption of the probiotic chewable on the 7th day in the probiotic group. Results were found to be statistically significant ($P \leq 0.05$) when the differences in the reduction of mutans streptococci counts with probiotic chewable and plain chewable on the 7th day were compared.
CONCLUSION: The following study, based on its observations, does conclude that short term consumption of probiotic chewable displays a significant reduction in the level of salivary Streptococcus mutans in children. Thus, keeping in mind the idea that prevention is always better than cure, the awareness regarding probiotics as a therapy to prevent dental caries should be made among both dental practitioners, especially paediatric dentists as well as parents.

KEYWORDS: Probiotics, *Lactobacillus Acidophilus, Streptococcus Salivarius, Streptococcus Mutans,* Saliva

INTRODUCTION

We are living in the 21st century where the ultimate pursuit is to seek changes that enhance our health status thereby improving our life from all aspects.

The invention of antibiotics was one among the foremost pathbreaking breakthrough in the world of drugs that resulted miraculous increase in expectancy of life. This greatly improved the standard of human life by decreasing the fatality rate globally. However, the most important drawback with antibiotics was that besides killing harmful bacteria it also kills useful bacteria and hence disturbs the ecosystem of the body, leading to adverse effects like super-infection and drug resistance. This is the point where the dawn of the probiotics transpire that comes with the agenda of 'save more, destroy less.' [1]

"Probiotic," are mechanisms that are employed to selectively remove only the pathogen while leaving the remaining of the oral ecosystem intact.[1]

In 1965, Lilly and Stillwell first coined the term 'Probiotic' which was derived from Greek word- 'Pro' (means 'for') and 'bios' (means life).[2] Ukrainian born Nobel Prize laureate, Elie Metchnikoff, observed the positive beneficial effect of some bacteria on human health and suggested that these beneficial bacteria may be used to replace harmful microbes within the body.[2] The WHO/Food and Agriculture Organization defines probiotics as: "Live micro-organisms, which when administered in adequate amounts, confer a health-benefit on the host". [3]

Streptococcus mutans has been regarded as one of the foremost and most virulent of the dental caries producing microorganisms. They form colonies and initiate plaque formation on the tooth surface by their ability to synthesize extracellular polysaccharides from sucrose, mainly water-soluble glucan, with the assistance of the enzyme glucosyltransferase. It's believed that inhibition of the colonization of *S. mutans* on tooth surface prevents the formation of dental plaque which successively lowers the probabilities of caries.[4] Probiotics attaches themselves to dental tissues to determine a cariostatic effect and thus become a component of the bio-film to fight the cariogenic

bacteria.[5]

Dental caries is one among the foremost common yet preventable dental disease that's prevalent in childhood and also affects an individual throughout its lifetime. A number of recent approaches for prevention of dental caries include chemo prophylactic agents, caries vaccine, sugar substitutes, fluoride, antibiotics, bacteriotherapy, or replacement therapy.[6]

Probiotics also play a crucial role in the prevention and treatment of assorted gastrointestinal disorders, like diarrheal diseases, irritable bowel syndrome, Helicobacter pylori-induced gastritis and atopic diseases. [7] They also possess biological potential in the management of intra oral halitosis.[8]

The probiotic strains that are most commonly available are Lactobacillus and Bifidobacterium species. Bacterial strains that have displayed probiotic action within the mouth include lactobacilli species (*Lactobacillus acidophilus, Lactobacillus rhamnosus GG, Lactobacillus johnsonii, Lactobacillus rhamnosus, Lactobacillus reuter, Lactobacillus gasseri, Lactobacillus casei, Lactobacillus paracasei*), *Bifidobacterium* species (*Bifidobacterium longum, Bifidobacterium infantis, Bifidobacterium bifidum, Bifidobacterium animalis strain* DN-173 010), and et al. (*Streptococcus salivarius, Weissella cibaria*).[9]

Dairy products like milk, yogurt, and cheese are commonly selected as delivery vehicles for the selected bacteria. Probiotics may be delivered by lozenges, powder, gelatine, straw or tablets. However, the simplest and most efficient vehicle for probiotic delivery is yet to be identified. [10]

The present clinical study was conducted to investigate whether short term consumption of chewable tablets containing L.acidophilus and S.salivarius M18 probiotics can affect the levels of salivary S. mutans count in school children, thus determining the efficacy of probiotics as the new generation weapon against combating dental caries.

MATERIALS AND METHOD

The present study was a randomized placebo-controlled design performed in New Lyceum Children Academy, Chandwaji, Jaipur, Rajasthan, India. The study protocol was in accordance with the approved guidelines of the Institutional Ethical Committee of NIMS University. Consent forms were signed by school authorities prior to subject enrolment in the study. This study compares S. mutans levels in saliva before and after consumption of chewables containing probiotic.

Inclusion criteria included children in the age group of 6-12 years, all healthy children with no history of consumption of antibiotics or probiotics preceding 1 month, no clinically detectable caries and those having no history of undergoing any preventive dental treatment, while the presence of any mental disorders, chronic debilitating diseases, congenital or systemic disorders, children undergoing orthodontic treatment[6] and not willing to participate in the study were excluded from the study.

The study group comprised of 10 healthy school children between the age group of 6-12 years of age randomly selected from Lyceum Primary School, Jaipur. Five of these volunteers posed as study subjects (subjects 1-5) and five as controls (subjects A to E). Subjects 1 to 5 were daily provided with one probiotic chewable (Nature's Plus Animal Parade Children's Chewable Tooth Fairy Probiotic) and subjects A to E were daily provided with one placebo chewable (Super Gummy Calcium plus vitamin D chewable supplement) respectively for 7 days.

The administered probiotic chewable has the composition – xylitol (2g), vitamin D3 (400IU), Calcium (as amino acid chelate/complex-300mg), Lactobacilli acidophilus (2 billion Viable cells-150mg) and S.salivarius M18 (10mg).

The administered placebo chewable has the composition- tricalcium phosphate and vitamin D2.

Samples of stimulated whole saliva were collected after a clinical examination, immediately before and 1 hour after sucking for 7 days. The daily sucking was performed for 10 minutes in the morning.

After the sucking, the participants were made comfortable and asked to swallow pre-existing saliva so as to clear the mouth of any residual saliva. The saliva was collected directly in a sterile plastic previously coded container.

The collected samples were stored in room temperature (17°C–25° C). All the samples were sent to AGSS Analytical and Research Laboratory Pvt. Ltd, New Delhi

on the 7th day in dry ice boxes.

The samples were precoded. The laboratory clinicians and technicians evaluating the culture plates were blinded to the subject's group assignment.

Assessment of saliva was done at baseline, after 1 hour and on the 7th day.

Laboratory Procedure: To explain the procedures for detection / enumeration of S. mutans.

***Culture Media*:** This included phosphate buffer saline, Mitis-Salivarius agar (MSA), Todd Hewitt medium, Nutrient – agar, reagent for gram's staining, blood agar and bile aesculin agar.

Reagents: These were crystal violet solution, gram's iodine, ethyl alcohol 70 % and safranine.

Procedure: (i) For detection: This was done by taking a specific quality of test sample (1 gm) in phosphate buffer saline (9 ml) (e.g. one part of test sample to nine part of phosphate buffer solution) and mixed. It was then incubated at 37°C for 24 hours. After 24 hours, 1 ml sample on Mitis-salivarius agar (MSA) was spread and incubated at 30°C overnight. Blue colour colonies were observed (S.mitis, Salivarius, S.mutans). After overnight growth in microaerophilic condition (Candle jar), bacterial colonies were picked from MSA plate and cultured on Todd-Hewitt medium, opaque colonies were observed.

(ii) For confirmation: The following tests were taken: gram staining: gram positive cocci, catalase test: bubble formation was not observed hence oxygen was not released so it gave a negative catalase test, haemolysis on blood agar plate: it showed gamma haemolysis., growth on bile esculin agar: no growth, bacitracin resistance: growth observed and arginine hydrolysis: no zone of hydrolysis observed.

Streptococcus mutans in saliva of all the participants was determined by using a colony counter and the number of colony forming units was counted. Microbial counts were expressed as colony-forming units per ml of saliva.[11]

Statistical Analysis: This was performed using SPSS version 22 (IBM Corporation). The mean and standard deviation for *Streptococcus mutans* count in samples were determined using descriptive statistics and comparative analysis between study and control group was done by unpaired t-test (Student's t test). The level of significance was set at $p \leq 0.05$.

RESULTS

In this clinical study, the mean salivary Streptococcus mutans count was measured at three different time phases, i.e. at baseline, after 1 hour and on 7th day. At baseline the mean salivary Streptococcus mutans count was, for post consumption probiotic chewable (study group) and plain vitamin D chewable (control group), 200.4 (±7.79) and 197.4 (±7.60); after 1 hour, 193.8 (±8.22) and 204 (±5.56); and on 7th day, 37.6 (±10.83) and 195.2 (±10.70), respectively. (Figure 1)

It was observed that, the comparison between study and control group of the mean salivary S. mutans count was statistically significant (p<0.000*) on 7th day (Table 1).

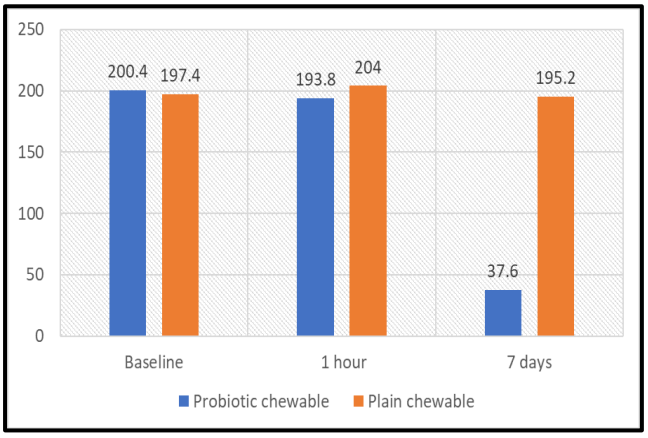

Figure 1. Progressive Decline in The Levels of Streptococcus Mutans at Baseline, 1 hour and after 7 Days of Dental Probiotic Chewable Consumption which was Statistically Significant.

DISCUSSION

Probiotic technology presents with a breakthrough approach for the upkeep of oral health by using natural beneficial bacteria that are commonly found in healthy oral cavities so as to produce natural defence against those harmful bacteria posing as a threat to the dentition and therefore the surrounding structures. The oral ecology is benefitted by probiotics which cause prevention of the adherence of other bacteria and also alters the protein composition of salivary pellicle.[4]

Grover and Luthra[12] (2011) reported various direct and indirect means in support of the hypothetical mechanism of probiotic action in mouth. The direct

	Group	n	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	p value
						Lower	Upper		
Baseline	Study	5	200.4000	7.79744	3.48712	-8.23097	14.23097	0.616	0.555
	Control	5	197.4000	7.60263	3.40000				
After 1 hour	Study	5	193.8000	8.22800	3.67967	-20.44551	0.04551	-2.296	0.051
	Control	5	204.0000	5.56776	2.48998				
After 7 days	Study	5	37.6000	10.83051	4.84355	-173.30793	-141.89207	-23.136	0.000*
	Control	5	195.2000	10.70981	4.78957				

Table 1. *Streptococcus mutans* Level Estimation in Saliva before and after Consumption of Chewable Probiotics among School Children

interactions in dental bacterial plaque includes binding of oral microorganisms to protein, production of chemicals that inhibits oral bacteria, action on plaque formation and its complex ecosystem by competing and intervening with bacterial attachments. Several indirect probiotic actions are modulation of systemic immune function, enhances local immunity, regulates mucosal permeability and effects on the non-immunologic defence. It also functions as antioxidants and neutralizes free electrons thus prevents plaque formation.

Probiotics lower the pH in order that microorganism cannot form bacterial plaque and calculus that causes oral inflammation.[13] The present study has tried to work out the effect of probiotic on salivary oral microflora. The commercially available probiotic product that has been used for this clinical study purpose consistspredominantly of Lactobacillus acidophilus and Streptococcus salivarius M 18.

Hatakka K et al. were the primary ones to report a dietary Lactobacillus strain, L. rhamnosus GG on its caries inhibiting ability in vivo. The probiotic milk used in their study showed a moderate tendency to decrease S. mutans levels, which were semi-quantitatively detected in a pooled saliva-plaque sample employing a diagnostic test.[14]

Di Pierro F et al. performed a clinical study using probiotic containing salivarius M 15 and concluded that after 90 days of treatment with this oral probiotic, it has increased the probabilities of avoiding new cavities in children. This outcome is taken into account thanks to the precise anticariogenic characteristics of strain M 18 that, after colonizing the oral mucosa, is able to release bacteriocins, limiting the growth of *S. mutans* and *S. sobrinus*, and therefore the enzymes dextranase and urease, catalysing the breakdown of dextran (aiding solubilization of plaque) and the hydrolysis of urea (increasing saliva pH).[15]

Sudha et al.[16] conducted study on 5-13 years age group which showed higher prevalence of decay in 5-7 years age group compared to that of 8-9 and 11-13-years age group. In our study, children of 6-12 years were selected as at this age the permanent teeth are erupting, so the chances of the new surfaces being colonized by pathogenic bacteria would be greater. Therefore, it might be helpful in long run to implement preventive measures during this age range.[16]

Various studies have been carried out in India to evaluate and validate the beneficial effect of probiotic milk, curd and ice-creams on the oral ecology. However, not many studies have been performed using commercially available children's chewable dental probiotics. Therefore, our study was done to estimate the effect of one such commercially available children's chewable dental probiotic on the level of salivary mutans streptococci. Children accepted the given product with ease as it was vanilla flavoured and in shape and form of animals that suited well with their taste.

In the present clinical study, on comparing the mean salivary mutans streptococci at baseline, after 1 hour, and after 7 days of consumption of probiotic and plain non-probiotic chewable, the result was found to be statistically significant after 7 days ($P \leq 0.05$) period. This was in accordance with the study done by Caglar E et al.[10] in which the dissolution of probiotics from a lozenge administered medical device has been shown

to significantly (P<0.05) reduce salivary mutans streptococci following a 10-day sucking of the test medical device in contrast to the control medical device.

Marked reduction in salivary S. mutans (P ≤ 0.05) was seen in our clinical study after consumption of dental probiotic chewable that was also in accordance with the study done by Kavitha M et al.[17] in which after consumption of probiotic containing lozenge twice daily (once in morning and once in the evening post brushing) for 1 month, when compared to baseline, a significant reduction of salivary S. mutans was recorded after 1 month intervention and 6 months follow-up.

Our results were also in accordance to previous studies performed by Chinnappa et al.[18], Caglar et al.[19], Cildir SK et al.[20], Ahola et al.[21] and Jindal et al.[22] in which a statistically significant reduction of salivary S. mutans was recorded after probiotic yogurt consumption (p ≤ 0.05).
Singh et al.[23] also reported a remarkable statistically significant reduction in mutans streptococci count (P ≤ 0.05) probiotic ice-cream ingestion which is in accordance to the results of the present study. However, our results were in contrast to an earlier study performed by Chuang et al.[24] which showed no differences in the counts of mutans streptococci between probiotic and control groups.

The decrease in levels of salivary S. mutans in the present study can be considered due to the probable mechanism of action of probiotics that is bacterial adhesion, capability to early colonize in oral cavity, interspecies interaction and immunomodulation.

In the present study, few of the limitations that can be rendered are as follows: firstly, the sample size considered was small. Secondly, the placebo chewable were not identical in form and taste with the probiotics. And lastly, mutans streptococci present in the saliva can only be thought to be an intermediate endpoint for caries. It remains to be investigated whether or not this really is helpful for the patients.[9]

Thus, the current clinical study proves that short term administration of probiotics resulted in significant reduction of cariogenic bacterial count of S. mutans. Prolonged administrations of probiotic preparations may act as a preventive role against caries development. Therefore, long term clinical trials with a larger sample size on effects of children's dental probiotic chewable in inhibiting the bacterial count of S. mutans would be commendable.

CONCLUSION

Keeping in mind the phrase, "Prevention is better than cure.", the use of probiotic chewable tablets could be implemented for the prevention of dental caries in children. Probiotics help in replacing pathogenic microorganisms by probiotic healthy bacteria, thereby preventing enamel demineralization that ultimately leads to the development of dental caries. The present in-vitro examination showed that commercial probiotics are rather efficient against inhibition of S. mutans. However, more research with a larger sample size and long-term clinical trials is required. It is also important to understand that the efficacy of probiotics proven hence is only against a particular caries causative strain and the thus clinical trials against other caries causing strains and micro-organisms needs to be carried out.

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REFERENCES

1. Dash TR, Verma T, Suvarna M, Ghosh S, Singh N, Pradhan A. Probiotics and Oral Health. Int J Oral Health Med Res 2015;2(2):123-5.
2. Sareen M, Roy S, Singh SK, Gupta A. A review on probiotics and their implications in dentistry. Journal of Dental Sciences 2012;1(2):7-10.
3. Hill C, Guarner F, Reid G, Gibson GR, Merenstein DJ, Bruno Pot, et al. The International Scientific Association for Probiotics and Prebiotics consensus statement on the scope and appropriate use of the term probiotic. Nat Rev Gastroenterol Hepatol. 2014;11(8):506-14. http://dx.doi.org/10.1038/nrgastro.2014.66.
4. Dhawan R, Dhawan S. Role of probiotics on oral health: A randomized, double-blind, placebo-controlled study. J Interdiscip Dent. 2013; 3:71-8
5. Singh K, Kallali B, Kumar A, Thaker V. Probiotics: A review. Asian Pacific Journal of Tropical Biomedicine 2011;1:S287–S290.
6. Siddiqui M, Singh C, Masih U, Chaudhry K, Hegde DY, Gojanur S. Evaluation of Streptococcus mutans levels in saliva before and after consumption of probiotic milk: A clinical study. J Int Oral Health. 2016;8(2):195–8.

7. Broekaert IJ, Walker WA. Probiotics and chronic disease. J Clin Gastroenterol. 2006;40:270-4.
8. Allaker RP, Stephen AS. Use of probiotics and oral health. Curr Oral Health Rep. 2017;4:309-18.
9. Bhalla M, Ingle NA, Kaur N, Yadav P. Mutans streptococci estimation in saliva before and after consumption of probiotic curd among school children. J Int Soc Prev Community Dent. 2015;5(1):3134
10. Caglar E, Kuscu OO, Cilder SK, Kuvvetli SS, Sandali N. A probiotic lozenge administered medical device and its effect on salivary mutans streptococci and lactobacilli. Int J Paediatr Dent. 2008;18(1):35-9.
11. Wan AK, Seow WK, Walsh LJ, Bird PS. Comparison of five selective media for the growth and enumeration of Streptococcus mutans. Aust Dent J 2002;47(1):21-6.
12. Grover HS, Luthra S. Probiotics: The nano soldiers of oral health. J Indian Acad Clin Med 2011;13(1): s48-54.
13. Ishihara K, Miyakawa H, Hasegawa A, Takazoe I, Kawai Y. Growth Inhibition of Streptococcus Mutans by Cellular Extracts of Human Intestinal Lactic Acid Bacteria. Infection and Immunity 1985;49692-694.
14. Hatakka K, Savilahti E, Pönkä A, Meurman JH, Poussa T, Näse L, et al. Effect of long term consumption of probiotic milk on infections in children attending day care centers: Double blind, randomised trial. Br Med J. 2001; 322:1327
15. Di Pierro F, Zanvit A, Nabili P, Risso P, Fornaini C. Cariogram outcome after 90 days of oral treatment with Streptococcus salivarius M18 in children at high risk for dental caries: results of a randomized, controlled study. Clin Cosmet Investig Dent. 2015;7:107-3.
16. Sudha P, Bhasin S, Anegundi RT. Prevalence of dental caries among 5-13-year-old children of Mangalore city. J Indian Soc Pedod Prev Dent. 2005;23(2):74-9.
17. Kavitha M, Prathima G S, Kayalvizhi G, Sanguida A, Ezhumalai G, Ramesh V. Evaluation of Streptococcus mutans serotype e, f and k in saliva samples of 6-12-year-old school children before and after a short-term daily intake of the probiotic lozenge. J Indian Soc Pedod Prev Dent. 2019; 37:67-74.
18. Chinnappa A, Konde H, Konde S, Raj S, Beena JP. Probiotics for future caries control: A short-term clinical study. Indian J Dent Res. 2013;24(5):547-9.
19. Caglar E, Sandalli N, Twetman S, Kavaloglu S, Ergeneli S, Selvi S. Effect of yogurt with Bifidobacterium DN-173 010 on salivary mutans streptococci and lactobacilli in young adults. Acta Odontol Scand. 2005;63:317–20.
20. Cildir SK, Germec D, Sandalli N, Ozdemir FI, Arun T, Twetman S, et al. Reduction of salivary mutans streptococci in orthodontic patients during daily consumption of yoghurt containing probiotic bacteria. Eur J Orthod. 2009;31:407–11.
21. Ahola AJ, Yli-Knuuttila H, Suomalainen T, Poussa T, Ahlström A, Meurman JH, et al. Short-term consumption of probiotic-containing cheese and its effect on dental caries risk factors. Arch Oral Biol. 2002;47(11):799-804.
22. Jindal G, Pandey RK, Agarwal J, Singh M. A comparative evaluation of probiotics on salivary mutans streptococci counts in Indian children. Eur Arch Paediatr Dent 2011;12(4):211-5.
23. Singh RP, Damle SG, Chawla A. Salivary mutans streptococci and lactobacilli modulations in young children on consumption of probiotic ice-cream containing Bifidobacterium lactis Bb12 and Lactobacillus acidophilus La5. Acta Odontol Scand. 2011;69(6):389-94.
24. Chuang LC, Huang CS, Ou-Yang LW, Lin SY. Probiotic Lactobacillus paracasei effect on cariogenic bacterial flora. Clin Oral Investig. 2011;15(4):471-6.

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ORIGINAL RESEARCH

QR CODE

Knowledge, Attitude and Practice of Health Care Ethics Among Medical, Dental and Nursing Colleges Students and Faculty in Visakhapatnam: A Questionnaire Study

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ABSTRACT

BACKGROUND: Dental ethics revolves around the extent to which actions within the dental practice promote good and reduce harm.
AIM: The study aims to assess the knowledge, attitude, and practice among the medical, dental, and nursing college students and faculty Visakhapatnam.
MATERIALS AND METHODS: The 26-item questionnaire, self-administered, semi-structured, was designed to access the student's and faculty's knowledge, attitudes, and practices in the globe of healthcare ethics. With all the exclusion and inclusion criteria, the total sample derived as 1190. Statistical analysis was done using the SPSS Software Version 21.0 with the significant p-value at ≤ 0.05. Descriptive statistics, chi-Square test and ANOVA test used to compare the knowledge attitude and practice of dental, medical, and nursing students and faculty.
RESULTS: Out of 1,190 participants, 456 participants belonged to medical out of which 239 are females, and 217 are males, 424 participants are from the specialty dental, 248 are females, and 176 are 310 participants belong to nursing in which 230 females and 80 males. The knowledge and attitude of dental college interns and postgraduates showed no significant difference in the Hippocratic oath, Nuremberg code, ICMR guidelines, Helsinki declaration with p-value 0.971, 0.899, 0.506, and 0.768. The knowledge and attitude of medical college interns and postgraduates showed a significant difference in the Hippocratic oath, Nuremberg code, ICMR guidelines with p-values 0.002, 0.040 and 0.011, respectively. The knowledge and attitude of final years showed considerable differences from the third years of nursing.
CONCLUSION: The knowledge and attitude of health care ethics are significantly more in medical postgraduates than the medical interns, showed no significant difference in dental interns and graduates, and showed significant differences in nursing students.

KEYWORDS: Ethics, Knowledge, Attitude, Questionnaire, Students, Faculty

INTRODUCTION

Bioethics is a relatively new subspecialty in the medical field. It is still in its infancy in many parts of the world.[1] Healthcare ethics is not routinely taught to medical professionals. There are reports that even the word "ethics" has completely ignored during the undergraduate medical curriculum.[2] The same may be right with other healthcare providers' training, such as nursing professionals and other paramedical professionals. Hence it is not surprising that the theory and application of healthcare ethics in day-to-day practice are still unknown to many healthcare providers. In such a situation, the practice of ethics in healthcare will very much be influenced by the cultural background and beliefs of the people in every region.[3]

Ethics is a generic term referring to the ethicalness in civilization and the rules, customs, and beliefs of that society. It agreed that 'morality' is all about right and wrong based on socially approved norms of human conduct. From childhood, we learn moral rules along with other social practices. Later in life, we can distinguish between general social rules held by all members of society, and specific social regulations or ethical guidelines binding the members of particular groups such as a health care profession.[3] Healthcare ethics deals with how providers apply a moral code of conduct to patients in a healthcare setting, taking into account the patients' self-respect, individuality, safety, and welfare. Clinical ethics refers to the ethics of activity in the clinical context, which, if practiced, will lead to more ethical care. For a clinical crew to practice clinical ethics, their clinical expertise and subject training need to be honed by appropriate clinical ethics training.[4] Therefore, they are expected to know ethical principles and apply them in their practice. There are reports of malicious tactics patterns of medical students and medical and dental practitioners with patients as well as colleagues. Reports have stressed the need to incorporate ethical and legal issues into their curricula. Further, it has observed that health training in India provides little guidance for these professionals to resolve the ethical dilemmas they encounter.[5,6]

With this background, the present study aimed

to enlighten the knowledge, attitude, and practice regarding health care ethics among medical, dental, and nursing students and faculty in Visakhapatnam. Andhra Pradesh.

MATERIALS AND METHOD

Study Design: An observational study was conducted using a pre-tested and pre-validated questionnaire among the students and faculty of four medical colleges, two dental colleges, and three nursing colleges in Visakhapatnam.

Ethical clearance: The study design was reviewed and approved by the Institutional Ethical Committee. The study's permission for the conduct was obtained from the concerned authorities of all the participating institutions, and written informed consent obtained from the study subjects after explaining them the purpose and methodology of the study.

Data Collection: The questionnaire was adopted from Chandrashekar et al. and Hariharan et al. and modified accordingly.[7,10] The 26-item questionnaire was a self-administrated, semi-structured one with both open and close-ended questions accomplish to appraise the student's and faculty's knowledge, attitudes, and practices in the globe of healthcare ethics. The demographic variables included were the year of the study, age and gender, and specialty.

Inclusion & Exclusion criteria: The participants studying in respected professional colleges around Visakhapatnam and those holding a degree of MS/MD/MDS with being in the teaching profession and those who are willing to participate in the study and present on that day of the study were included in the study. The participants who did not consent to participate were excluded from the study.

Study Participants: A total number of 1200 sample were approached (convenience sampling), in which 456 participants were from the medical speciality; 424 participants were from dental speciality, and 310 belonged to the nursing speciality. With all the exclusion and intrusion criteria, the final sample derived as 1190.

Statistical Analysis: The statistical analysis was done by the SPSS Version 21.0, and the p-value set at p≥0.05. Descriptive statistics were applied. Comparison of knowledge, attitude, and practice with dental and medical and nursing students was done by chi-square test while the comparison of knowledge, attitude, and practice with dental; medical and nursing faculty through one-way ANOVA.

RESULTS

In table 1 Out of 1,190 participants 456 were in the medical specialty in which 320(70.2%) were under graduates and 64(14.0%) were post graduates and 72(15.7%) were faculty; 217(47.5%) were males and 239(52.4%) were females. Among 424 participants in dental specialty, 270(63.4%) were undergraduates; 80(18.8%) were post graduates and 74(17.4%) were faculty; 176 (41.5%) were males and 248 (58.4%) were females. 310 were in specialty of nursing in which 155(50.0%) were in final year and 125(40.3%) were in third year and 30(9.7%) were faculties. The mean age of all the participants were 27.5±8.5 years.

Demographic data		Dental (n=424) (%)	Medical (n=456) (%)	Nursing (n=310) (%)
Mean Age		27.5±8.5		
Gender	Males	176 (41.5%)	217(47.5%)	80(25.8%)
	Females	248 (58.4%)	239(52.4%)	230(74.1%)
Year of study	Interns/final years/third years	270(63.4%)	320(70.2%)	155(50.0%) 125(40.3%)
	PG's	80(18.8%)	64(14.0%)	--
	Teaching Staff	74(17.4%)	72(15.7%)	30(9.7%)

Table 1. Geographic Distribution of the Study Population

Table 2 describes knowledge; attitude and practice of the studied population in which dental postgraduates and interns had no significant difference in the knowledge regarding Hippocratic oath (p>0.971); Nuremberg code (p>0.899); ICMR and Helsinki declaration (p>0.768). Most of the dental postgraduates had the attitude that they had better knowledge than patients (p>0.654) and there was significant difference between practice scores of dental postgraduates with comparison of dental interns (p>0.02) and most of dental postgraduates and interns have a practice of approaching the colleges for health care problem.

It was observed that medical postgraduates and interns had statistical difference in knowledge about the Hippocratic oath (p<0.002); Nuremberg code (p<0.04); ICMR guidelines (p<0.011); Helsinki

QUESTION	DI	DP	pV	MCI	MCPG	pV	NTY	NFY	pV	MF	DF	NF	pV
KNOWLEDGE													
Do you know about Hippocratic oath? Yes	91.5%	91.3%	0.971	97.8%	98.2%	0.002	52.4%	88.6%	0.001	98.0%	75.6%	70.6%	0.001
Do you know about Nuremburg code? Yes	45.2%	70.0%	0.899	98.4%	98.2%	0.040	91.7%	41.8%	0.001	96.7%	94.7%	82.4%	0.001
Do you know about ICMR 2017 guidelines? Yes	19.9%	23.1%	0.506	90.6%	98.2%	0.011	85.7%	57.1%	0.024	96.7%	92.7%	84.4%	0.001
Do you know about 2008 Helsinki Declaration? Yes	97.6%	98.1%	0.768	83.4%	98.2%	0.001	41.9%	58.1%	0.017	96.7%	93.7%	85.4%	0.087
Do you entertain patients' questions during their visits? Yes	20.3%	21.2%	0.861	90.6%	98.2%	0.032	40.8%	59.7%	0.005	96.7%	95.7%	86.4%	0.087
Have you attended training in bio ethics? Yes	48.0%	49.0%	0.855	83.4%	98.2%	0.029	40.3%	59.7%	0.002	96.7%	94.7%	87.4%	0.001
Is there an ethical committee in your institution? Yes	73.6%	75.6%	0.280	97.5%	98.2%	0.004	72.2%	27.8%	0.001	96.7%	95.7%	88.4%	0.001
How important is knowledge of ethics to you in your work? Very Moderately A little Not at all	1.6% 1.6% 46.3% 2.4%	1.3% 1.9% 49.0% 28.5%	0.983	2.1% 1.1% 95.0% 1.8%	98.2% 0.2% 1.2% 0.2%	0.001	32.2% 39.7% 19.2% 10.2%	60.3% 22.1% 14.2% 4.2%	0.025	96.7%	92.7%	87.4%	0.001
How often do you come across any ethical issues? Daily Weekly Monthly Yearly Never	0.3% 0.3% 0.3% 49.2% 42.3%	0.6% 0.4% 5.5% 48.2% 43.3%	0.674	92.2% 2.1% 1.1% 2.1% 1.1%	98.2% 0.2% 1.2% 0.2% 1.5%	0.04	4.4% 4.4% 11.2% 68.8% 11.4%	39.7% 19.2% 10.2% 31.3% 0.6%	0.004	96.7%	91.7%	89.4%	0.001

How often do patients ask you about their diagnosis?				3.2%	0.2%		4.2%	4.2%					
Never	0.4%	0.6%		13.2%	1.2%	0.006	34.4%	61.5%	0.164	96.7%	92.7%	90.4%	0.001
Seldom	45.1%	45.2%	0.809	85.9%	98.2%		61.5%	38.5%					
Always	54.5%	54.8%											
How often do you discuss your daily cases with your colleagues?													
Seldom	12.2%	8.3%		15.2%	2.2%	0.015	45.8%	54.8%	0.027	96.7%	91.7%	85.4%	0.001
Always	87.8%	91.3%	0.394	85.5%	98.2%		54.5%	45.5%					
How did you acquire your knowledge of bioethics?													
During training	0.4%	0.01%		92.2%	98.9%	0.024	41.9%	58.9%					
Experience at work	44.1%	54.2%	0.438	7.4%	0.2%		30.2%	31.2%	0.073	96.7%	92.7%	91.4%	0.001
Lectures/Seminar	1.1%	0.4%		1.2%	0.2%		24.5%	19.2%					
One's own reading	6.2%	1.9%		0.2%	0.1%		13.2%	10.2%					
Others (internet, court reports, newspapers, etc)	48.2%	45.2%		1.2%	1.2%		1.2%	0.2%					
Have you taken informed consent from patients?													
No	0.1%	0.2%		5.5%									
Verbal	44.7%	44.2%	0.877	13.4%	0.2%	0.031	24.5%	24.5%	0.001	96.7%	93.7%	89.4%	0.001
Signed	55.3%	55.8%		84.7%	3.4%		13.2%	13.2%					
					97.9%		39.6%	60.4%					
Does your institute have separate committees for reviewing animal and human research projects?													
Yes	98.2%	97.8%		2.2%	1.2%	0.027	13.8%	13.8%	0.064	96.7%	94.7%	85.4%	0.001
No	0.4%	1.2%	0.804	4.2%	3.2%		3.2%	24.3%					
Not sure	1.4%	1.0%		94.4%	96.6%		75.7%	61.2%					
ATTITUDE													
Doctors know the best irrespective of patients' opinion													
Slightly agree	38.2%	24.2%		41.6%	37.8%		73.6%	38.3%					
Agree	21.5%	38.5%	0.532	15.0%	15.0%		13.8%	13.8%	0.001	96.7%	96.7%	91.4%	0.001
Slightly disagree	39.8%	15.2%		3.1%	3.1%	0.100	8.6%	71.5%					
Disagree	0.4%	8.1%		3.2%	3.2%		3.2%	8.6%					
Not sure	0.1%	14.0%		31.7	31.7		0.8%	3.2%					

Patient should always be informed of wrongdoing												
Slightly agree	24.2%	24.0%		46.9%	48.4%		0.3%	0.2%				
Agree	26.0%	26.0%	0.547	15.0%	16.1%		88.6%	95.9%	0.029	96.7%	96.7%	90.4%	0.001
Slightly disagree	15.4%	17.8%		3.2%	13.1%	0.882	8.6%	1.2%				
Disagree	15.5%	15.6%		31.7	3.2%		1.2%	0.2%				
Not sure	18.9%	16.6%		3.2%	19.2%		0.2%	3.0%				
Patients' wishes should always be adhered to												
Slightly agree	24.3%	5.3%		33.4%	49.3%		87.0%	94.3%	0.034	96.7%	96.7%	89.4%	0.001
Agree	67.1%	3.2%	0.916	15.0%	15.0%	0.624	8.6%						
Slightly disagree	5.3%	1.2%		3.1%	3.1%		1.2%						
Disagree	3.2%	67.3%		3.2%	3.2%		0.2%						
Not sure	1.2%	24.3%		31.7	31.7		0.1%						
Confidentiality cannot be maintained in modern care and should be abandoned												
Slightly agree	26.8%	3.1%		56.6%	62.2%		8.6%	1.2%				
Agree	24.2%	3.2%	0.352	15.0%	15.0%	0.754	1.2%	0.2%	0.001	96.7%	96.7%	88.4%	0.001
Slightly disagree	23.1%	31.7%		3.1%	3.1%		0.2%	0.1%					
Disagree	18.2%	62.2%		3.2%	3.2%		0.1%	2.2%					
Not sure	8.1%	2.2%		31.7	31.7		81.3%	94.3%					
Consent is required only in case of operations and not for tests and medications												
Slightly agree	23.1%	3.1%		45.5%	52.2%		8.6%	0.2%				
Agree	18.0%	3.2%	0.082	15.0%	15.0%	0.688	1.2%	1.2%	0.001	96.7%	96.7%	86.4%	0.001
Slightly disagree	7.2%%	31.7%		3.1%	3.1%		0.2%	0.2%					
Disagree	24.2%	2.2%		3.2%	3.2%		82.9%	2.2%					
Not sure	27.5%	32.7%		31.7	31.7		0.1%	96.2%					
Certain medical practitioners charge more from rich patients to compensate for treating the poor Do you agree with this?												
Slightly agree	37.3%	41.3%		15.0%	15.0%		8.6%	1.2%				
Agree	23.1%	3.1%		3.1%	3.1%		1.2%	0.2%				
Slightly disagree	18.2%	3.2%	0.023	3.2%	3.2%	0.966	0.2%	2.2%	0.001	96.7%	96.7%	85.4%	0.001
Disagree	8.1%	31.7%		31.7	31.7		0.1%	2.1%					
Not sure	24.0%	2.2%		45.5%	52.2%		79.7%	94.3%					

Ethical conduct is important only for avoiding legal action													
Slightly agree	25.0%	13.5%		73.8%	75.5%		77.2%	91.7%					
Agree	13.1%	3.1%	0.617	15.0%	15.0%	0.276	1.2%	1.2%	0.001	96.7%	96.7%	89.4%	0.001
Slightly disagree	13.2%	3.2%		3.1%	3.1%		0.2%	0.2%					
Disagree	31.7%	31.7%		3.2%	3.2%		2.2%	4.7%					
Not sure	17.0%	2.2%		31.7	31.7		12.1%	2.2%					
Child should never be treated without concern of the parents													
Slightly agree	15.0%	13.5%		52.2%	56.7%		74.8%	60.9%					
Agree	23.1%	23.1%	0.713	15.0%	15.0%	0.708	1.2%	1.2%	0.008	96.7%	96.7%	92.4%	0.001
Slightly disagree	37.3%	47.3%		3.1%	3.1%		0.2%	0.2%					
Disagree	18.2%	18.2%		3.2%	3.2%		2.2%	2.2%					
Not sure	8.1%	8.1%		31.7	31.7		12.1%	12.1%					
Do you have any clinical ethics or research ethics class?													
Yes	19.4%	18.3%	0.654	52.2%	73.2%	0.932	68.3%	71.3%	0.001	96.7%	96.7%	92.4%	0.001
No	80.6%	81.7%		42.9%	27.2%		31.7%	28.7%					
If so, how many hours or classes													
One hour/ 3classes/month	3.2%	2.2%		40.8%	8.2%		11.1%	5.5%					
Two hours/ 2 classes/month	5.3%	6.4%	0.735	20.2%	12.2%	82.2%	12.2%	91.7%	0.581	96.7%	96.7%	92.4%	0.408
30 minutes/ 1 class/month	90.2%	(91.3%)		42.2%	79.5%		77.2%	2.8%					
PRACTICE													
When people holding certain religious beliefs refuse to take blood, undergo surgery or accept treatment, what is your stand?													
Respect the patient's decision	0.8%	0.9%		6.3%	0.8%		13.8%	5.5%		0.0%	0.0%	0.0%	
Try to perform the procedure forcibly	18.3%	5.8%	0.002	1.6%	0.7%	0.122	71.5%	90.4%		0.0%	0.0%	0.0%	
Refer to a doctor who shares the patient's beliefs	65.9%	68.3%		87.8%	92.0%		8.6%	2.2%	0.002	96.7%	96.7%	92.7%	0.001
Any other (specify)	0.8%	20.2%		4.4%	6.1%		3.2%	2.2%		0.0%	0.0%	0.0%	

If you encounter any ethical problem, who will you approach?													
colleague	66.1%	68.3%		81.9%	93.2%		5.2%	3.1%		0.3%	0.2%	0.1%	
Supervisor	0.8%	0.0%		1.6%	0.2%		0.4%	0.4%		0.2%	0.2%	0.1%	
Head of department	5.7%	5.8%		5.6%	0.4%		82.1%	90.4%		0.1%	0.2%	0.2%	
Hospital administrator	18.0%	20.2%		1.3%	0.1%		1.8%	0.2%		23.3%	24.3%	13.3%	
Ethics committee	7.8%	4.8%		4.7%	0.5%		7.9%	0.2%		72.4%	72.4%	70.4%	0.001
Professional association	0.8%	0.0%	0.001	0.6%	0.6%	0.001	1.1%	0.1%	0.014	0.4%	0.2%	6.0%	
Priest	0.0%	0.0%		0.0%	0.2%		0.4%	5.0%		0.4%	0.1%	12.1%	
Textbooks, the internet	0.0%	0.0%		0.0%	0.0%		0.4%	0.2%		0.2%	0.1%	0.4%	
close friend/family	0.8%	1.04%		1.3%	0.1%		0.4%	0.2%		0.1%	0.1	0.3%	

Table 2. Knowledge, Attitude and Practice of Health Care Ethics in the study population (DI: Dental College Interns, DP: Dental College postgraduates, MCI: Medical College Interns, MCPG: Medical College postgraduates, NTY: Nursing College Third Year, NFY: Nursing College Final Year, MF: Medical Faculty, DF: Dental Faculty, NF: Nursing Faculty, pV: p value)

declaration ($p<0.01$) and there was no significant difference between the attitude towards the information of wrong-doing to the patients. There was a significant difference in the practice of health care ethics and most of the medical postgraduates approached the concerned the head of the department for any ethical problems ($p>0.001$).

Among nursing college third years and final years, knowledge regarding Hippocratic oath ($p>0.01$); Nuremberg code ($p>0.001$); ICMR guidelines ($p>0.024$) and Helsinki declaration ($p>0.017$) had a significant difference. There was no significant difference between knowledge regarding asking the patients for diagnosis and regarding the animal and human research ethical committee ($p<0.0064$). There was a significant difference between the attitude and practice of health care ethics ($p>0.001$) and the approach of the hospital administrator for any ethical committee problems ($p>0.014$)

Among the faculty of medical; dental and nursing colleges, it was observed that medical faculty and dental faculty had better knowledge regarding the Hippocratic oath; Nuremberg code; ICMR guidelines and Helsinki declaration regarding the attitude and practice most of the dental and medical faculty has a significant difference.

Figure 1 describes the health care ethics that most of the medical post graduates would practice ($p<0.001$);most of dental postgraduates and interns ($p<0.002$) would practice with the patient beliefs with reference to certain doctor whom belief. The nursing students would like to practice the procedure forcibly ($p<0.002$).

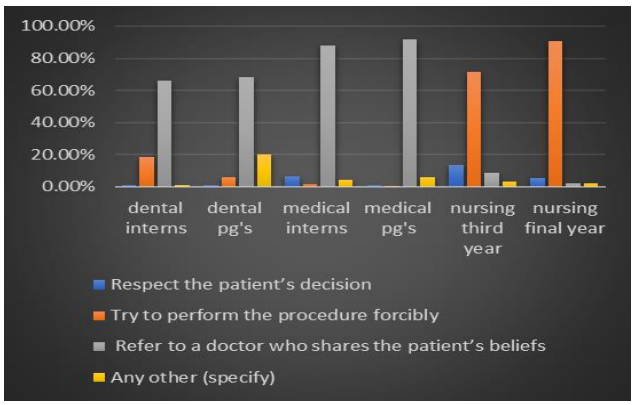

Figure 1. Practice of Health Care Ethics Patient's Holding Religious Beliefs among Dental, Medical and Nursing Interns and Post Graduates

Figure 2 describes practice of health care ethics most of the medical post graduates approach to the concerned the head of the department for any ethical problems ($p>0.001$); practice of dental postgraduates with comparison of dental interns ($p>0.02$) and most of dental postgraduates and interns have a practice of approaching the colleges for health care problem. and practice of health care ethics ($p>0.001$) and the approach the hospital administrator for any ethical committee problems ($p>0.014$).

Figure 3 describes the health care ethics that the medical, dental and nursing college faculty would like to practice the patient's belief with reference to the certain doctor whom belief.

Figure 4 represents the health care ethics that the medical, dental and nursing college faculty would like to approach the ethical committee head when they encounter any ethical dilemmas.

DISCUSSION

Health Care-ethics is a division of bioethics which deals with the ethical dimensions of day-to-day patient care. The attitudes towards informed consent, truth-telling, confidentiality, abortion, euthanasia, and treating a non-compliant patient are aspects of care ethics that may well be influenced by the social, cultural and religious background, and the gender of the healthcare. provider.[8]

The findings of the present study show that the medical interns and postgraduates' knowledge show the significant difference between the Hippocratic oath, Nuremberg code, ICMR guidelines, and Helsinki declaration and dental interns and graduates shows no significant difference which is relevant to the study done by Adhikari et al.[9] The knowledge of third years nursing students have lower experience compared with the final year students. Regarding the attitude of medical interns and postgraduates, there is a significant difference in some aspects such as the informing of the patient wrongdoing; consent requires for the medical investigations and confidentiality of the patient while dental interns and postgraduates do not have a significant difference between the attitude which is parallel to the study done by Anup et al. (2014)[5] and Seetharaman et al. (2006)[10] while there is no significant difference between the attitude of third and final year nursing college students. Lack of internship in the Nursing curriculum and absence of postgraduates in the selected colleges, the present study included only the third and final years. The present study says that the practice of health care ethics among medical interns and postgraduates has significant differences, and dental interns and graduates show a considerable difference.

Comparison of the medical; dental and nursing faculty shows no significant difference between the knowledge and attitude. But in some aspects regarding the health care ethics such as that the ICMR guidelines; Helsinki declaration there is little more knowledge to the medical faculty compared with the dental and nursing faculty. The problems encountered through health care ethics were more in the medical and dental faculty than in the nursing faculty. The practice also shows no significant difference between the medical and dental and nursing faculty. It also shows the close relationship between attitude and increases in age and work experience, which show similar findings conducted by Chopra M. et al. 2013 and Brogen SA in 2009.[11,12]

The knowledge and attitude of the postgraduates found to be more compared to undergraduates.

Limitations: As the study is questionnaire-based, the participants' responses may change after some time, which means the perception might change when the questionnaire administered for the second time. As it is

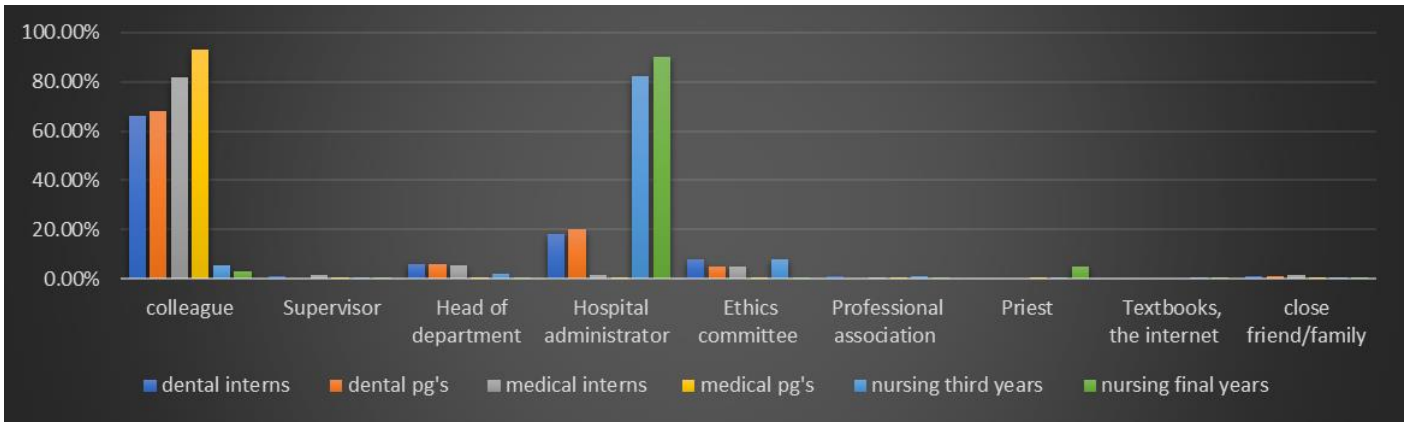

Figure 2. Practice of Health Care Ethics of Approaching the Ethical Dilemmas among Dental, Medical and Nursing Interns and Post Graduates

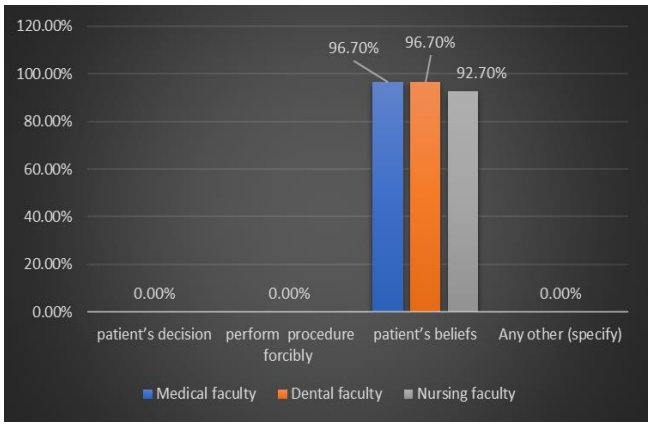

Figure 3. Practice of Health Care Ethics Patient's Holding Religious Beliefs among Dental, Medical and Nursing Faculty

a self-administrated questionnaire, there might be a chance of social desirability bias.

CONCLUSION

Health care ethics are one of the most neglected topics. The present study emphasizes that a significant proportion of the medical; dental and nursing students have aware of universally ethical principles of ethics, which are essential for clinical practice. However, some students feel difficulty in ethical dilemmas that are encounter.

Recommendations: The knowledge of healthcare ethics in curriculum and use of interactive techniques such as Seminars, Workshops, CME conferences would assist in bridging this gap to a certain extent at the undergraduate level and providing of journals, articles at the postgraduate level.

REFERENCES

1. Kesavan R, Mary AV, Priyanka M, Reashmi B. Knowledge of dental ethics and jurisprudence among dental practitioners in Chennai, India: A cross-sectional questionnaire study. J Oro Fac Sci. 2016;8:128-34.
2. Taruna D, Singh RNP, Suma BS, Mangal G. Dental Professionals Perspectives About the Consumer Protection Act and Ethical Practice in Patna, Bihar. European Journal of Pharmaceutical and Medical Research 2019:6(2):323-9.
3. Singh K, Shetty S, Bhat N, Sharda A, Agrawal A, Chaudhary H. Awareness of Consumer Protection Act among Doctors. J Dent (Tehran). 2010;7(1):19-23.
4. Gambhir RS, Dhaliwal JS, Anand S, Bhardwaj A. Knowledge and awareness of Consumer Protection Act among private dentists in Tricity, Punjab. J Family Med Prim Care. 2015; 4:347-51.
5. Anup N, Kumawat H, Biswas G, Pareek S, Tambi S. Knowledge, attitude & practices regarding Ethics & Law amongst medical and dental professionals in Rajasthan - A Questionnaire study. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) 2014;13(5): 102-9.
6. Mallela KK, Walia R, Devi CTM, Das M, Sepolia S, Sethi P. Knowledge, attitudes and practice about research ethics among dental faculty in the North India. J Int Oral Health. 2015;7(Suppl 2):52-6.
7. Janakiram C, Gardens SJ. Knowledge, attitudes and practices related to healthcare ethics among medical and dental postgraduate students in South India. Indian J Med Ethics. 2014; 11(2): 99-103. https://doi.org/10.20529/IJME.2014.025.

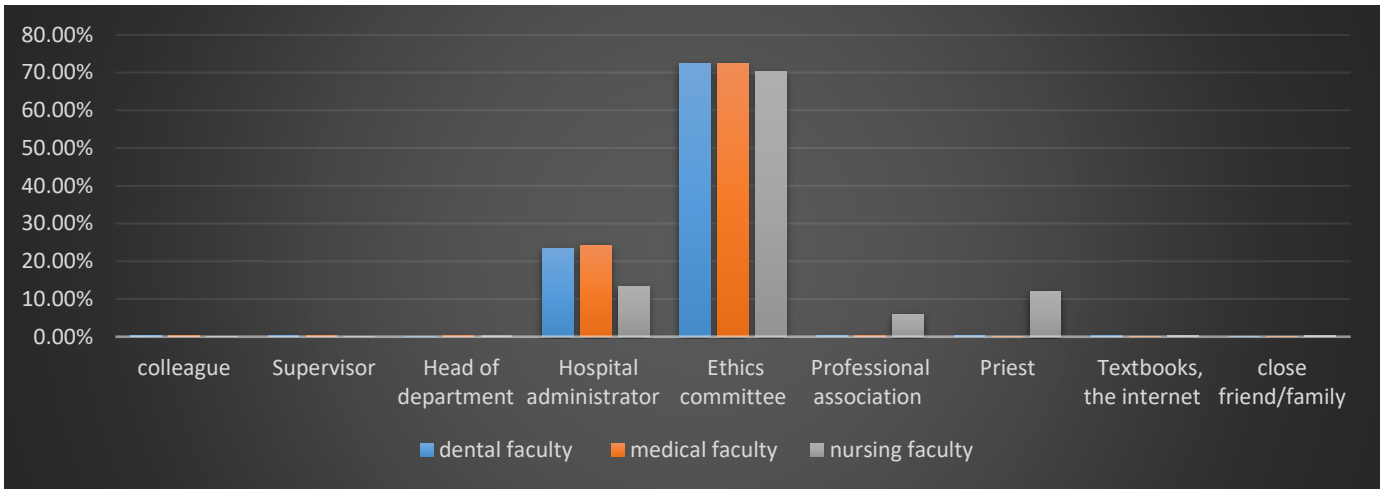

Figure 4. Practice of Health Care Ethics of Approaching the Ethical Dilemmas among Dental, Medical and Nursing Faculty

8. Hariharan S, Jonnalagadda R, Gora J. Knowledge, attitudes and practices of healthcare personnel towards Care-Ethics: A perspective from the Caribbean. The Internet Journal of Law, Healthcare and Ethics 2006;5(1):1-8.
9. Adhikari S, Paudel K, Aro AR, et al. Knowledge, attitude and practice of healthcare ethics among resident doctors and ward nurses from a resource poor setting, Nepal. BMC Med Ethics. 2016,17:68.
10. Hariharan S, Jonnalagadda R, Walrond E, Moseley H. Knowledge, attitudes and practice of healthcare ethics and law among doctors and nurses in Barbados BMC Medical Ethics. 2006;7:7-16.
11. Chopra M, Bhardwaj A, Mithra P, Singh A, Siddiqui A, Rajesh DR. Current status of knowledge, attitudes and practices towards healthcare ethics among doctors and nurses from Northern India - A multicentre study. Journal of Krishna Institute of Medical Sciences University 2013;2(2):102-7.
12. Brogan SA, Rajkumari B, Laishram J, Joy A. Knowledge and attitude of doctors on medical ethics in a teaching hospital, Manipur. Indian J Med Ethics. 2009;6(4): 194-7.

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