Study of impact of Nutrition on Oral Health of college students and the role of Information Technology to control and enhance Oral Health

Dr. Sabita Ram[1], Dr. Vinita Gaikwad[2], Dr. Vaibhav Thakkar[3], Prof. Pankaj Mudholkar[4], Dr. Janaki Iyer[5], Dr. Prachi Gaikwad[6]

[1,3,5,6] *MGM Dental College & Hospital, Navi Mumbai, Maharashtra, India*

[2, 4] *Thakur Institute of Management Studies, Career Development & Research Mumbai, Maharashtra, India*

(E-mail: timscdr.director@thakureducation.org)

***Abstract*—**Good nutrition is the keys to a healthy life. Balanced diet plays a pivotal role in maintaining a health you. Foods rich in vitamins and mineral ensure not only a healthy body but also a healthy mind. Essential nutrients can best be retrieved from natural fruits, vegetables, whole grains, dairy products and also from fish, meat and chicken.

Balanced diet is not only beneficial for healthy systemic function but also affects the oral health. Information Technology can be used to enhance ones knowledge about Oral care. Also, use of Mobile devices empowered by IT will help in providing relevant inputs required for good Oral Health.

The study would help to understand the nutritional habits of the students and the role of Information Technology to control and enhance the impact of nutrition on Oral Health of college students.

Keywords*—Information Technology (IT), Nutrition, Oral Health, DNS, OHI, DMFT, Sweet Score*

I. INTRODUCTION

Oral Healthcare is still an ignored area and it is observed that a visit to the dentist is only paid when a severe need arises. However, by that time it is too late and an ample damage is already registered. Oral Health can definitely be improved by not only paying regular visits to the family Dentist twice a year (or as need arises) but also by maintaining good eating habits and nutritional discipline in the normal day to day diet. Over and above in the age of fast food and the easy access to the same with the help of mobile devices and smart phones which are empowered by Information Technology (IT), not much can be expected but the enhancement and deterioration of oral health due to indulgence in unmindful eating. However, if given a second thought, conscience efforts can be made to monitor the food intake by using IT enabled smart devices like Mobile phones with an attempt of bringing positive impact on the Oral Health.

Advances in Information Technology year by year have lead to new and improved applications of IT in dental education. There are lots of challenges and opportunities in the field of Oral Health for improving support, clinical care, education, and research with the help of IT.

The information about the nutrition and the oral healthcare is available online. The students must be aware about the sources, websites and mobile apps from which they access the information which will be used in enhancing nutritional habits. Dentists use electronic dental records, digital radiology and other IT tools daily.

The use of Information Technology in Dentistry with respect to the dentists and the students will benefit in the following way-

1. Information Technology helps in managing dental data and supporting clinical decision making in the context of the Oral Health.
2. The websites, mobile apps and other IT sources might be used in developing good nutritional habits.
3. Information Technology will help students in accessing information on symptoms of oral diseases and precautionary measures which will help them in taking care of their oral health.

II. AIMS AND OBJECTIVES

The aim of the research is to study the impact of Nutrition on Oral Health of college students and the role of IT to control and enhance Oral Health.

Objectives of the research involve the study of:

- To study the relevance of Nutrition on the Oral Health amongst college going students in Mumbai city (Respondents)
- To determine the dental caries experience of the participants using DMFT Index.
- To determine the Oral hygiene status of the participants using OHI-S Index.
- To assess the Decay promoting potential (Sweet score) of the participants diet.

- To assess the impact of daily Nutrition on Oral Health of the Respondents
- To determine the use of IT amongst the respondents for monitoring and ensuring good Oral Health

III. REVIEW OF LITERATURE

Mc Grath C, Sham AS, HoDK, Wong JH, evaluated dental neglect and its association with self reported oral health status including oral health related quality of life. The result showed that socio demographic variations in dental neglect exist in relation to age, income and educational attainment levels. These findings had implications in planning and evaluating oral health promotions activities as well as producing population norms for future comparison, international and transcultural comparisons. [1]

Dental Neglect is the failure to fulfill the known knowledge of oral health care for proper maintenance of oral cavity [2].

Prevention is the better option than cure. People need to be very much attentive and meticulous to maintain oral health for the prevention of oral disease. Prevention of oral disease is no doubt very much effective, efficient, adequate and acceptable universal habit implicated to pave the way to a better oral health. Dental professionals and audio visual media provide the necessary dental care measures [3]. But, the truth is that a very few people take adequate regular home dental care and do not take periodic/yearly dental check up by dental professionals to keep their oral cavity healthy.

Oral health education should be incorporated in the educational curriculum from the beginning, so that young generation may be taught about the dental ailments which they may likely to encounter, if they fail to take adequate precaution from early childhood [4].

Oral hygiene is totally related with the behavioral aspect of the person concerned. In order to take care of his/her teeth a person needs to have a positive attitude towards dental health [4]. It has been observed that dental neglect is associated with illiteracy amongst low socio economic class and the prevalence of oral diseases are highest amongst them [5]. But on the contrary the professionals who will hold a respectable position in our country in distant future, whether they are practicing healthy oral health care practices or not has to be assessed. The aim of the study was to assess dental negligence and oral health status by using Dental Neglect Scale questionnaire among different professionals of Indore city.

The objectives of this study were to validate the Indian translation of the Dental Neglect Scale (DNS) among a sample of parturient Indian women and to investigate dental neglect as a possible risk indicator in adverse birth outcomes. This study showed that there was a high level of dental neglect and negative dental beliefs in addition to poor oral health status among the women who have implications for dental practice. There is need for the dental profession to educate not only the women, but also the obstetrics community regarding the importance of maintaining good oral health during pregnancy.[6]

The concept of dental neglect may allow a better understanding of the complex relationship between individual behavior environmental factors and dental caries in children. The results of this study indicate that denial neglect in children is a distinct. The Dental Neglect Scale may have applicability in predicting and understanding variation in dental health, and in designing and targeting dental health promotion strategies. [7]

A study was done to countercheck dental neglect in children and it was concluded that Owing to the physical barriers to treatment, as well as to a variety of societal factors, recognition and reporting of dental neglect is a complex process. However, once pathology has been explained to the parent and the obstacles to care have been removed, dental neglect can be identified. [8]

The childhood nutrition education is imperative in health promotion and disease prevention. The Report concludes 'that overconsumption of certain dietary components is now a major concern for Americans'. While many food factors are involved, chief among them is the disproportionate consumption of foods high in fat, often at the expense of foods high in complex carbohydrates and fiber that may be more conducive to health. [9]

A study on familial and cultural perceptions and beliefs of oral hygiene and dietary practices among ethnically and socioeconomically diverse groups. Factor analysis identified those attitudes, towards tooth brushing, sugar snacking and childhood caries. Attitudes were significantly different in families from deprived and non-deprived backgrounds and in families of children with and without caries. Parents' perception of their ability to control their children's tooth brushing and sugar snacking habits were the most significant predictors of whether or not favorable habits were reported. Some differences were found by site and ethnic group. This study supports the hypothesis that parental attitudes significantly have an impact on the establishment of habits favorable to oral health. An appreciation of the impact of cultural and ethnic diversity is important in understanding how parental attitudes to oral health vary. Further research should examine in a prospective intervention whether enhancing parenting skills is an effective route to preventing childhood caries. [10]

A study on Culture and its Influence on Nutrition and Oral Health was conducted and found that the nutritional habits differ depending on culture and religious beliefs. The dentist as a member of the health team can and in fact, is expected to impart sound nutritional information to his patients, particularly if it has an oral relevance. It is essential to have knowledge of the culture, nutrition and its effect on oral disease. [11]

Dental decay also results in tooth loss, which reduces the ability to eat a varied diet. It is, in particular, associated with a diet low in fruits, vegetables and non-starch polysaccharides (NSP), and with a low plasma vitamin C level. [12, 13]

NSP intakes of less than 10g/d and fruits and vegetable intakes of less than 160g/d have been reported in edentulous subjects. Tooth loss may, therefore, impede the achievement of

dietary goals related to the consumption of fruits, vegetables and NSP. Tooth loss has also been associated with loss of enjoyment of food and condenses to socialize. It is; therefore, clear that dental diseases have a detrimental effect on quality of life both in childhood and older age. [13-15]

Some human studies show that the frequency of sugars intake is an important aetiological factor for caries development. [16, 17]

The primary evidence for the belief that the prevalence of dental caries is directly related to the frequency with which sugar is eaten. This study showed caries development was low when sugars were consumed up to four times a day at mealtimes. [18]

A study conducted on Diet, nutrition and the prevention of dental diseases recommends reducing the frequency with which they consume foods containing free sugars to four times a day and thereby limit the amount of free sugars consumed. In countries where fluoride toothpaste is available/affordable, individuals should be encouraged to brush their teeth with a fluoride toothpaste twice a day. [19]

The integration of oral health and nutrition health promotion and disease management, including screening, assessment, education, and counseling as part of treatment provided by dietetics practitioners and oral health professionals supports collaborative, comprehensive, and cost-effective care. Health professions organizations can seek avenues and mechanisms to support consumer health education that includes oral health and nutrition tailored to the needs of all populations. Dissemination of nutrition and oral health resources can enhance opportunities for collaborative research and education that will be robust and in sync with national agendas to improve the health of the nation. [20]

Ready access to information and beliefs about the value of such information dramatically affect the doctor-patient relationship. Some physicians and dentists are concerned about patients who present with information they have received from the Internet, while others embrace the role of the Internet with their patients and provide health information and links to preferred sources of health information on their own Web sites.

The rapid expansion and exposure of information technology has affected modern life across a broad spectrum. Health and medical sector also get gear up with advances in modern technology and application of computers. Despite the significant conceptual breakthroughs of the 1960s, all medical informatics, including dental, have faced major impediments in the shape of systems performance and integration issues [21].

With level access to information, patients are more actively participating in their health care. Access to information about the full range of treatment options is enabling patients to collaborate with their dentist in deciding on a course of treatment [22]. Internet-based applications used by a dental practice might include: email or secure messaging; a practice Web site or portal; online scheduling, pre-registration, and pre-visit preparation; patient access to personal dental records; and tele-dentistry. Email communication can prove to be an extremely important relationship builder [23]. Convenience, communication, personal knowledge, and trust can all be positively affected with the use of Internet-based applications [24].

Providing patients with direct access, via the Internet, to their own personal dental health records can enhance the dentist-patient relationship. Allowing patients direct access to their dental records reduces the asymmetry of power and knowledge and enables patients to feel more in control, which leads to more trust in the relationship. Studies have demonstrated that when patients are given access to their records, they find it easier to talk to their doctors [25], and the access facilitated "useful discussions" [26] Other studies have shown that patients who had access to their medical records expressed increased confidence and trust in their doctors (Baldry et al., 1986; Miller et al., 1987).

IV. METHODOLOGY

The research is survey based which was conducted at Thakur Institute of Management Studies, Career Development & Research (TIMSCDR) by Mahatma Gandhi Missions Dental College & Hospital (MGMDCH) to study the role of Information Technology to control and enhance the impact of Nutrition on Oral Health of college students in Mumbai.

The literature review does not support sufficient data to understand the use of Information Technology by student fraternity to control and enhance the impact of nutrition on oral health. Hence, Quantitative approach was implemented to understand the same. Survey method was used to get data. Administration of Questionnaire and Face-to-face Interviews with the prospective respondents i.e. college students was conducted to get appropriate information.

The target population was the college students from various streams like Engineering, MCA, MBA, B.Sc., B. Com. etc. from Mumbai. Before the start of the survey the respondents were made aware about the study and its relevance to them.

A well designed pretested questionnaire was administered amongst the respondents so as to gather knowledge about the role and awareness of IT by them in strengthening good nutritional habits which might have an impact on oral healthcare. The Questionnaire had majorly objective responses. Only 136 students from various streams were able to submit information by answering the questionnaire.

An initial consent was acquired from the dean to carry out the well designed survey. Before the start of the survey the respondents were made aware about the study and its relevance to them in their respective domains. A proper date and time was decided to conduct the survey so as to get the desired and relevant responses.

V. RESULT AND DISCUSSION

A study was conducted at TIMSCDR in Mumbai. A view of 136 students was taken, to conduct this study of "Role of Information Technology to control and enhance the impact of Nutrition on Oral Health of college students in Mumbai" through questionnaire.

The responses were recorded from the respondents regarding their oral health and nutritional habits. It was found

that 50% of the students are brushing their teeth twice a day [Fig. 1]. This shows that only half the respondents make an attempt of brushing their teeth twice a day in order to improve their oral hygiene.

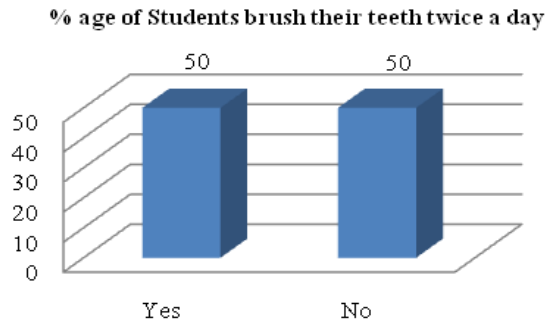

Fig. 1 Percentage of Students brush their teeth twice a day

It was found that most of the students consume homemade food thrice a day which itself proves that respondents have good nutritional habits [Fig. 2]

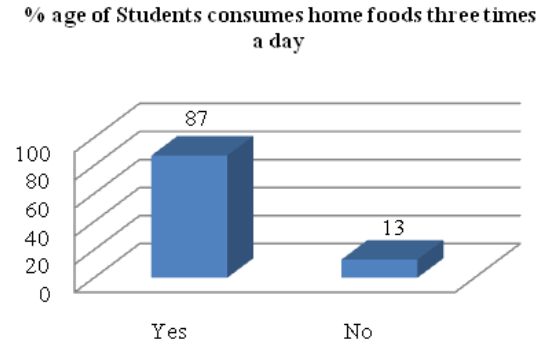

Fig. 2 Percentage of Students consuming homemade foods three times a day

The study depicts that the students are also consuming junk foods at specific intervals and only 3% students never consume junk food which reveals that there is a need in educating the students, the impact junk food has on their health. [Fig. 3]

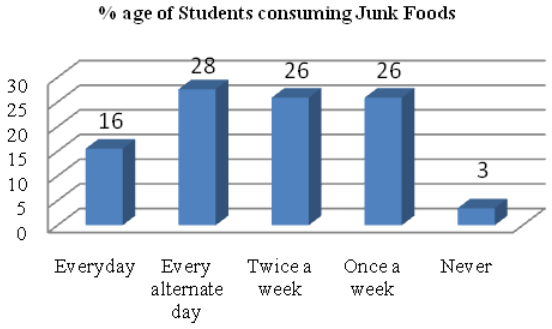

Fig. 3 Percentage of Students consuming junk foods

It was found from the study that only 9% of the students are paying regular visits to dentists regarding Oral Health. 91% of the students do not keep a follow up about their oral health. Students should be made aware about their oral health status and the effect poor dietary habit has on their teeth. To avoid poor dental status, students should regularly perform oral health checkup at least once in a year. [Fig. 4]

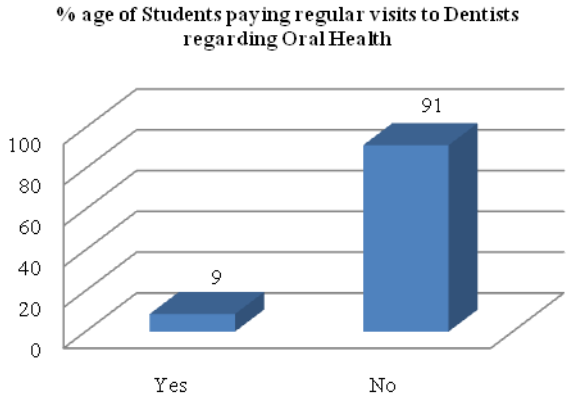

Fig. 4 Percentage of Students paying regular visits to dentists regarding Oral Health

The study also reveals that very few of the students are paying attention towards their oral health. As shown in fig. 5, it was found that approximately none of the students are paying attention towards oral health and not paying any visits to Dental Clinics until and when there occurs any dental problems.

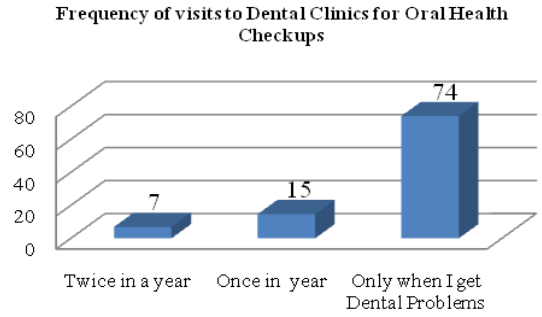

Fig. 5 Frequency of visits to Dental Clinics for Oral Health Checkups

It was found from the study that only 27% students access oral health related information using IT. Students should be made aware about the availability of the websites, mobile applications which provide information for having healthy lifestyle and dietary habits which lead in improving oral health, [Fig. 6]

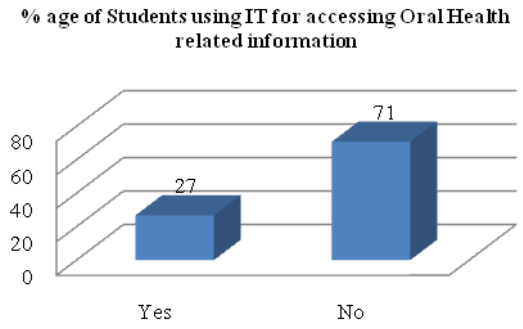

Fig. 6 Percentage of Students using IT for accessing Oral Health related information

Most of the students access information on oral health from Google Search. Very few students access such information from any other mobile applications, websites or social media tools. The survey analysis showed that 50% of the students are accessing information from Google Search. [Fig. 7]

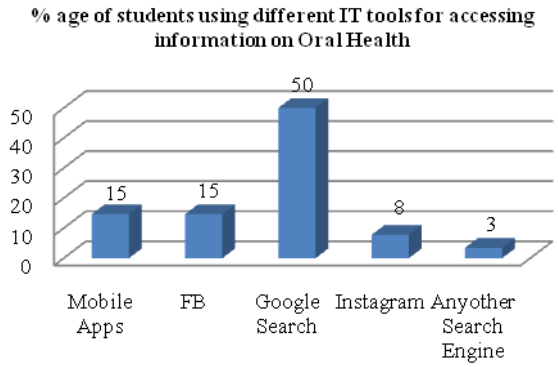

Fig. 7 Percentage of Students using IT tools for accessing Oral Health related information

Information is published online using IT tools in various ways through website, mobile apps etc., but it was found that the students are in dilemma of implementing such information in their day to day dietary habits. [Fig. 8]

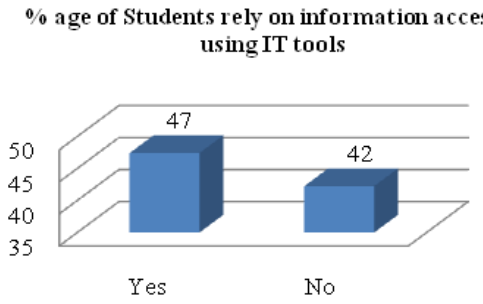

Fig. 8 Percentage of Students rely on information accessed using IT tools

Information is available about all the aspects of oral health but the students are not aware about the right website, mobile apps and other sources where such information is published. It was found from the study that 80% of the students rely on their doctors rather than on the information present on the various websites. [Fig. 9]

The Dentists should realize the opportunity social media provides in order to communicate with patients and should use this opportunity to create awareness amongst the patients regarding usage of IT for improving oral healthcare. Considering that patients rely on the information provided by the Dentists more than information on the search engines, the Dentists can publish their videos and other related information on nutritional habits and its impact on oral healthcare on their website, mobile applications and blogs.

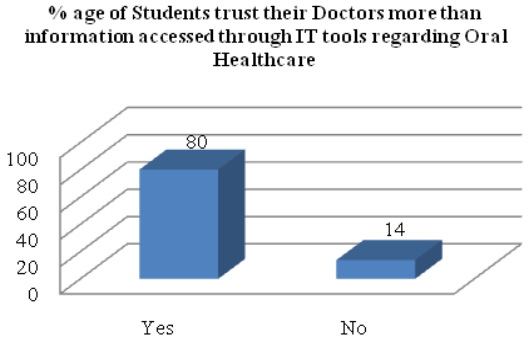

Fig. 9 Percentage of Students trust their doctors more than information accessed through IT tools regarding Oral Healthcare

Survey proves that 77% of the students are willing to use mobile applications providing updates on oral health.[Fig. 10] Concerned authorities and dental professionals should take necessary steps for providing relevant information on oral health through mobile applications. This will help students in accessing information on symptoms of some of the diseases and precautionary measures which will help them in taking care of their oral health.

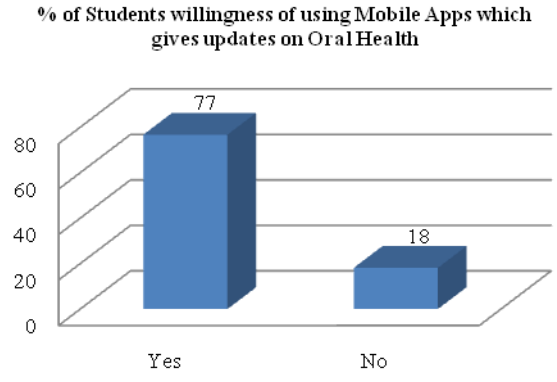

Fig. 10 Percentage of Students willingness of using Mobile Apps which gives updates on oral health

It was found from the study that students are willing to use mobile apps which provide timely information about the symptoms, precautionary measures about the oral healthcare. In order to provide recent information on the applications, the applications must be updated regularly. The mobile apps should provide timely reminders about their follow up visits to the dentists to keep a check on their oral health. 68% of the students agreed that the mobile apps must provide follow up reminders to visit their dentists. [Fig. 11]

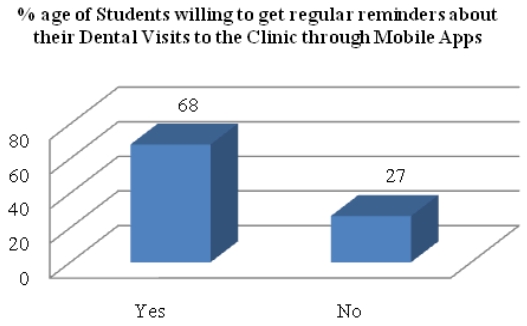

Fig. 11 Percentage of Students willing to get regular reminders about their dental visits to the Clinic through Mobile Apps

The dental checkup of the students was carried out for a all the 136 students and it was found that in terms of the DMFT Indices i.e. the decayed, missing and filled teeth status, 16% of the students have excellent oral health, 82% have fair oral health and 2% of them have a poor oral condition. The percentage of students having excellent, fair and poor DMFT (Decayed-Missing-Filled-Tooth) index is shown in fig. 12.

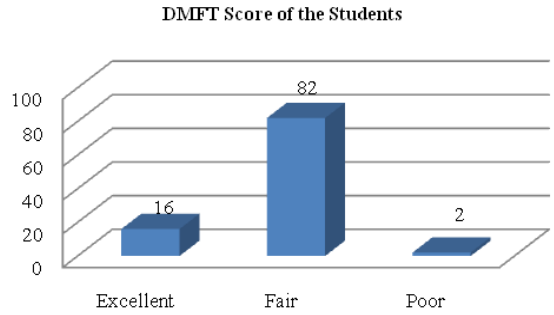

Fig. 12 DMFT Scores of the Students

It was found after the dental checkups of the students that the OHI-S (Oral Hygiene Index) score was Good for 66% of the students, fair for 14% and poor for 4%. [Fig. 13]

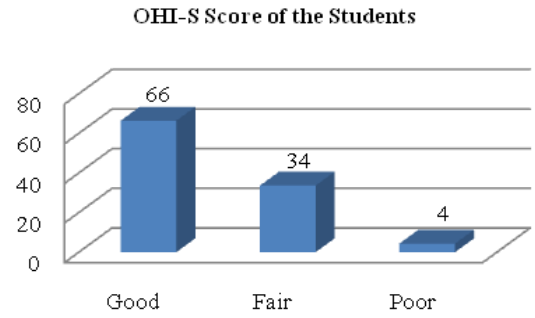

Fig. 13 OHI-S Scores of the Students

The Sweet Score of the students was calculated and it was found that 84% of the students have less sugar in their diet and hence have a healthy choice of diet and 16% of the students have significant sugar intake in their daily dietary routine thus they fall under the category of watch out zone.[Fig. 14]

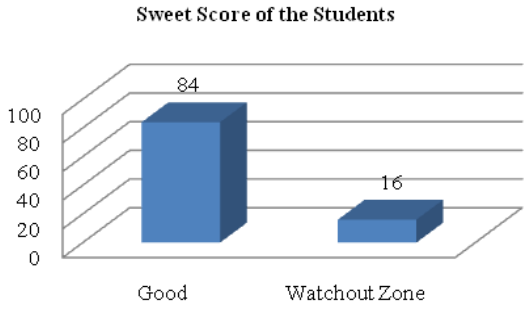

Fig. 14 Sweet Scores of the Students

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