Oral Health Literacy Status of School Staff Members in Southern Minnesota

Gabrielle Sullivan

University of New Mexico

Follow this and additional works at: https://digitalrepository.unm.edu/dehy_etds

Recommended Citation

This Thesis is brought to you for free and open access by the Electronic Theses and Dissertations at UNM Digital Repository. It has been accepted for inclusion in Dental Hygiene ETDs by an authorized administrator of UNM Digital Repository. For more information, please contact disc@unm.edu.
Gabrielle Sullivan, RDH
Candidate

Dental Medicine, Division of Dental Hygiene
Department

This thesis is approved, and it is acceptable in quality and form for publication:

Approved by the Thesis Committee:

Diana Aboytes, RDH, MS., Chairperson

Christine Nathe, RDH, MS

Christina Calleros, RDH, MS
Oral Health Literacy Status of School Staff Members in Southern Minnesota

By

Gabrielle Sullivan, RDH

BACHELORS OF SCIENCE IN DENTAL HYGIENE

THESIS

Submitted in Partial Fulfillment of the Requirements for the Degree of

Masters of Science in Dental Hygiene

The University of New Mexico
Albuquerque, New Mexico

December, 2020
Oral Health Literacy Status of School Staff Members in Southern Minnesota

by

Gabrielle Sullivan, RDH

B.S., Dental Hygiene, Minnesota State University Mankato, 2011
M.S., Dental Hygiene, University of New Mexico, 2020

Abstract:

Purpose:
This study evaluated the oral health literacy OHL of school staff in Southern Minnesota. OHL is the degree to which individuals can understand health information. Dental caries is the most common chronic disease in school aged children, and school staff members spend a large portion of the day with children. Therefore, it is important for all school staff members to have a moderate or higher OHL status.

Methods:
The survey used a convenience sample of school staff in 3 different schools in southern Minnesota and used the REALD-30 OHL instrument with slight modification, to simplify data collection.

Results:
Fifty surveys were returned with the mean score of 19.6, placing the school staff in the moderate OHL range.

**Conclusion:**

Although the results of this study showed the participants possessed a moderate OHL status, results were limited and do not represent the OHL status of the staff at the three schools.
# Table of Contents

Title page ................................................................................................................................. i

Abstract ..................................................................................................................................... ii

Table of Contents ...................................................................................................................... v

List of figures ............................................................................................................................. vii

List of tables ............................................................................................................................. viii

CHAPTER 1: INTRODUCTION ................................................................................................. 1

Statement of the Problem ........................................................................................................... 1

Significance of the Problem ....................................................................................................... 2

Operational Definitions ............................................................................................................ 3

CHAPTER 2: LITERATURE REVIEW ....................................................................................... 5

Introduction ............................................................................................................................... 5

Oral Health Literacy .................................................................................................................. 5

Health Literacy Status ............................................................................................................... 7

Causes of Low Oral Health Literacy .......................................................................................... 8

Oral Health Literacy Effects ..................................................................................................... 9

Mechanisms to Improve Oral Health Literacy ......................................................................... 11

Effect of Low OHL on Dental Visitations ............................................................................... 14

Instruments Used to Assess OHL ............................................................................................. 15

Conclusion ................................................................................................................................. 16

CHAPTER 3: METHODS AND MATERIALS ........................................................................... 18

Introduction ............................................................................................................................... 18

Sample Description .................................................................................................................. 18

Research Design ....................................................................................................................... 18

Data Analysis ............................................................................................................................. 20
List of Figures

Figure 1.1 Characteristics of Respondents by Staff Role .................................................. 23
Figure 1.2 Range, Mean and Standard Deviation of OHL Scores by Staff Role ................. 23
Figure 1.3 Mean percent of REALD-30 Scores per Staff Role ...................................... 24
Figure 2.1 Characteristics of Respondents by Age Group ............................................... 25
Figure 2.2 Range, Mean and Standard Deviation of OHL Scores by Age Group ............ 25
Figure 2.3 Mean percent of REALD-30 Scores per age group ...................................... 26
Figure 3.1 Characteristics of Respondents by Gender ..................................................... 26
Figure 3.2 Range, Mean and Standard Deviation of OHL Scores by Gender ................. 27
Figure 3.3 Mean percent of REALD-30 Scores per gender ........................................... 27
Figure 4.1 Characteristics of Respondents by Ethnic Group .......................................... 28
Figure 4.2 Range, Mean and Standard Deviation of OHL Scores by Ethnic Group ....... 28
Figure 5.1 Characteristics of Respondents by Education Level ....................................... 29
Figure 5.2 Range, Mean and Standard Deviation of OHL Scores by Education Level .... 29
Figure 5.3 Mean percent of REALD-30 Scores per education level ............................... 30
Figure 6.1 Characteristics of Respondents by Income Level .......................................... 31
Figure 6.2 Range, Mean and Standard Deviation of OHL Scores by Income Level ....... 31
Figure 6.3 Mean percent of REALD-30 Scores per income level .................................. 32
Figure 7.1 OHL Status per Respondent ........................................................................... 33
Figure 7.2 Overall OHL Status ....................................................................................... 33
Figure 8 Number of Respondents per Word .................................................................. 34
List of Tables

Table 1: Chronological Overview of Oral Health Literacy Tools ........................................ 16
Table 2: Terms of Rapid Estimate of Adult Literacy in Dentistry (REALD-30) ......................... 19
Chapter 1: Introduction

Introduction:

Dental caries is defined as damage to a tooth that can happen when bacteria produce acids that demineralize the tooth enamel.\textsuperscript{1} The Center of Disease Control (CDC) states that dental caries remains the most common chronic disease in school aged children from kindergarten through 12\textsuperscript{th} grade. Fortunately, dental caries is preventable, and with proper education and regular dental care, they can be prevented or treated before considerable damage to the tooth occurs. Educated school staff could play a role in this preventive effort. Therefore, it is important for all school staff members who have contact with students, have an average or higher Oral Health Literacy (OHL) status. This will allow staff to be able help their students with answers to oral health questions if needed. OHL is defined as the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate oral health decisions.\textsuperscript{2} The purpose of this study is to evaluate the OHL status of school staff at three schools located in Southern Minnesota.

Statement of the problem:

Dental professionals have excellent knowledge on how to prevent dental caries, yet dental caries is still the most common chronic disease among school age children. Besides family members, school staff members spend a large amount of time through-out the day with children. The research question of this study is what is the OHL status of school staff in Southern Minnesota?
Significance of the problem:

Oral health literacy is especially important for dental hygienists due to the pivotal role they play in educating the public on the importance of preventive dental health care. They have the knowledge and skills to educate their patients. As the dental hygiene profession advances, education of the general population about the importance and the link of oral health and overall health should improve. OHL is an important topic not only for dental hygienists, but for all health care providers. If a patient’s literacy in oral health is low, he/she may not understand that there is a link between periodontal disease and other health concerns, how oral infections impact overall health, or the possible need to postpone major surgery due to infections in the oral cavity.

Having an average to high OHL is important for school staff to educate and help their students. This applies to all school staff who have contact with the students, which includes; teachers, school nurses, custodians, lunch staff, office staff, and social workers. The teachers need a high OHL to educate the student on good oral health such as they would with hand washing and other healthy behaviors. It is important for the school nurse to have a high OHL to help students who have a toothache, not by providing the dental care, but by, referring the student and the students’ parents on where and how they can obtain the necessary dental care. It is also important for the nurse to know the student’s health history, such as diabetes and how systemic diseases or conditions are directly related to periodontal disease. For example, a student with diabetes may go to the nurse’s office because they keep tasting blood in their mouth, the nurse could then ask them what their
A1C levels are at and then recommend dental care. A custodian is not directly linked to a student’s education; however, some students may feel more comfortable talking with them about dental issues than other staff members. Lunch staff may notice a change in students’ lunch choices such as, a student choosing only soft foods for the last week. Lunch staff could then ask the student if he/she is experiencing any oral pain. Office staff are usually the ones in contact with the students’ parents on a regular basis, they may be able to help by voicing concerns to parents. Social workers are there for students to talk to about anything they feel comfortable discussing, because of this a student may feel more comfortable discussing oral health concerns too. Not only can school staff help and educate students, they can also help the parents, by being open to discussions and being observant.

Everything dental hygienists can teach their patients about oral health and overall health is important, but the only individuals who receive this education are those whom access dental care. Dental professionals need to find a way to promote oral health knowledge to the general public, including those whom do not seek regular dental care. Most children will attend school at some point in their lives, having school staff members with an average or higher OHL can help those students that do not seek regular dental care.

**Operational Definitions:**

**Oral health literacy:** the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate oral health decisions.²
Dental hygienist: The American Dental Hygienists’ Association (ADHA) defines dental hygienists as a licensed oral health professional who focus on preventing and treating oral diseases—both to protect teeth and gums, and also to protect patients’ total health.³

Educator: A person who provides information or education.

Knowledge: How much someone understands about a subject.

Literacy: “A set of reading, writing, basic math, speech and comprehension skills”.⁴
Chapter 2: Review of the Literature

Introduction:

The purpose of this literature review is to describe oral health literacy (OHL). OHL is a subset of health literacy, and health literacy and literacy are closely related but not identical. Literacy is defined as a set of reading, writing, basic math, speech and comprehension skills. Health literacy is defined as a set of skills needed to make appropriate health decisions and successfully navigate the health care system, utilizing basic literacy skills. Thus, OHL is complex and dynamic, involving both individual competence and external influences. Articles have been searched through PubMed database, ADHA website, the University of New Mexico’s Health Sciences Library and Information Center with World Cat database, Science Direct and BioMed Central databases, and dental hygiene information has been searched through published textbooks.

Oral Health Literacy:

OHL is defined as the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate oral health decisions. The American Dental Association (ADA) affirmed that limited health literacy is a potential barrier to effective prevention; diagnosis and treatment of oral disease.

The general population should understand that oral health means much more than healthy teeth; it means being free of chronic orofacial pain conditions, oral and pharyngeal
cancers, oral soft tissue lesions, birth defects such as cleft lip and palate, and a score of other diseases and disorders that affect the oral, dental and craniofacial tissues, collectively known as the craniofacial complex. This becomes important since the muscles of the face allow individual to speak and smile; sigh and kiss; smell, taste touch, chew and swallow; cry out in pain; and convey a world of feelings and emotions through facial expressions. If any of these muscles were diseased, one would not be able to do any of this, and diet, nutrition, sleep, psychological status, social interaction, school and work would suffer.

Health literacy is complex and dynamic, involving both individual competence and external influences. This includes their education, culture, and language as well as the ability of the media, marketplace, and other agencies to provide health information in a manner appropriate for the audience. The internet has many websites that may not have accurate health information but is readily available to most people. Examples of readily available and widely utilized websites include but not limited to; WebMD, Every Day Health, and social media such as Facebook or Twitter. These websites can influence the way people think, act and even how they seek out health care.

Without health literacy the general population will not know or understand the information provided about their personal health, or the health of their family. For example, a 2-year-old is diagnosed with an inner ear infection and prescribed an antibiotic. Her mother understands that her daughter should take the prescribed medication twice a day. After carefully studying the label on the bottle and deciding that it does not state how to take the medicine, she fills a teaspoon and pours the antibiotic into her daughter’s painful
ear. If the mother’s health literacy status was higher, she would have known that this was the incorrect way to administer the antibiotics for her daughter.

Relationships may exist between health literacy and health outcomes. So, if people do not know how to take proper care of themselves, their health will suffer, and vice versa, if they have the knowledge in preventing diseases, their health should thrive. This may not include genetic health conditions, but with a higher health literacy, those genetic health conditions can be better managed. Investigators have found a higher prevalence of oral conditions such as dental caries, extracted teeth and periodontal disease among patients with low levels of OHL.

**Health Literacy Status:**

Nearly half (90 million) of adults in the United States have low functional health literacy. Because the U.S is a developed country this number is very surprising. These are adults that have difficulty understanding and using everyday health information that is generally available in health care facilities, retail outlets, media and communities.

The Surgeon General’s report states that oral health is essential to the general health and well-being of all Americans and can be achieved by all, however, not all Americans are achieving the same degree of oral health. This could be due to the low health literacy status. Limited literacy skills are a stronger predictor of an individual’s health status than age, income, employment status, education level and racial or ethnic group. However, all of these factors can affect the literacy status of the individual, which in turn affects their health status. Health literacy is increasingly important to help the population
navigate health systems, maintain personal health, and maintain the health of their children.5

**Causes of Low Oral Health Literacy:**

People with low oral health literacy are less likely to seek preventive care, comply with prescribed treatment and maintain self-care regimens needed to control chronic diseases. People are often embarrassed or ashamed to admit they have trouble understanding health information and instructions.9 There are multiple reasons an individual can have a low oral health literacy status, here are a few;

1). Age: Youth may not have the education yet to have a high OHL status. As the youth are still in their educational prime years, they are still learning basic literacy skills, which will help with their OHL as they develop. In contrast, older adults are at an increased risk of low oral health literacy. Reading ability scores decline considerably after age 55.12 As people age, their brains are less able to remember and comprehend, and along with ever changing health care findings it is hard to retain new info.

2). Education: If the individual does not have a proper education, they may not understand what is needed to be healthy. The average American reads at the 8th to 9th grade level; however, health information is usually written at a higher reading level,7 or uses complicated words, rarely used outside of medical science, that makes it difficult or impossible for the average person to understand.
3). Culture: Cultural attitudes regarding oral health, may prevent patients from asking questions related to their oral health or treatment. Culture may influence one’s value of oral health and beliefs regarding preventive treatment.

4). Media: The media can have an influence on people. The media could promote inaccurate information and many people might believe it instead of doing the research. As an example, in 2016, an Associated Press article regarding flossing, which was then circulated around social media reported that there was little benefit to flossing, and many individuals believed this.

5). Family: Low oral health literacy among adults directly affects children. Half of all parent’s experience difficulty understanding basic health information and services. If the parents are not able to understand, they are not able to teach their children. Studies show that children’s oral health status is often related to social dimensions, such as parental income and education. It has been reported that children from families with high income have a better oral health related quality of life.

**Oral Health Literacy Effects:**

In 2003, Surgeon General Richard Carmona stated that “health literacy can save lives, save money, and improve the health and well-being of millions of Americans.” Previous surveys indicate that the general public is not aware of the relationship between oral health and general health or that most oral disease can be prevented or controlled.

Many still experience needless pain and suffering, complications that devastate overall health and well-being and financial and social costs that diminish the quality of life.
and burden American society. Pain and suffering may affect an individual’s ability to work or attend school. Previous studies have shown that children missed 1.57 million school days due to dental problems. With missing school, the student’s ability to obtain basic literacy skills are put at risk.

Limited oral health literacy greatly increases the cost of disease due to increased use of emergency care and less use of preventive self-care resulting in an estimated $100-200 billion a year. Because people are not obtaining dental care and maybe waiting until there is a dental emergency, they may develop chronic oral infections. Oral infections can be the source of systemic infections in people with weakened immune systems, and oral signs and symptoms often are part of a general health condition. Associations between chronic oral infections and other health problems, including diabetes, heart disease and adverse pregnancy outcomes, have also been reported. Ongoing research may uncover mechanisms that strengthen the current findings and explain these relationships.

Many people do not understand that if there is an infection in their mouth, every time they swallow or eat, they are introducing that bacteria into their body. Many people consider oral signs and symptoms to be less important than indications of general illness. As a result, they may avoid or postpone needed care, thus exacerbating the problem. If dental hygienists are to increase the nation’s capacity to improve oral health and reduce health disparities, the focus must be on enhancing the public’s understanding of oral health and the relationship of the mouth to the rest of the body.
As former Surgeon General C. Everett Koop noted, “you’re not healthy without good oral health.” Dental caries is the most common of all childhood chronic disease, yet chronic conditions of children such as asthma, diabetes, and obesity receive more of the public’s attention. This disease can and does lead to loss of school time, serious general health problems, pain, inability to eat, over use of the emergency room, and even death as in the case of the young boy in Maryland, Deamonte Driver. Driver was a 12 year old boy who passed away in 2007 from complications from an untreated dental infection, which resulted in his untimely death when the abscess infection spread to his brain.

There are some school-based programs that can help school-aged children, but if a parent does not understand what dental sealants are or their purposes, they are less likely to sign the consent form for their child to participate. These school-based programs are put in place to increase access to care, help prevent childhood caries and infections, serve as an early detection of diseases and educate these children to have a better oral health literacy. School staff should to be aware of these school-based programs and what they how they work so, they can pass this information of to the student and the student’s parents.

**Mechanisms to Improve Oral Health Literacy:**

There are several ways to improve the OHL in the general population. The National Action Plan to Improve Health Literacy has 2 guiding principles; (1) everyone has the right to health information that helps them make informed decisions and (2) health services should be delivered in ways that are understandable and beneficial to health, longevity and quality of life. The first way to improve OHL is having school staff members educating the youth.
Educating individuals when they are young, they will have a life time to use this knowledge to be healthy. Educators can take advantage of skill development and curricula to incorporate health-related knowledge and skills into their curricula. Collectively, schools have the needed assets and are positioned perfectly to both improve oral health literacy and mitigate the consequences of poor health literacy, both of which require leveraging available opportunity in order to do so.

Schools are a great way to reach the majority of children. More children are attending school and for longer periods of time than in previous decades, putting schools in a position to do more than any other institution to increase the well-being and competence of children. In addition, schools can provide a cost-effective way to address the oral health of children and their families. Dental disease can be prevented with the appropriate self-care and use of fluoride and pit and fissure sealants. Programs can include this education along with the provision of fluoride mouth rinses regimens and pit and fissure sealant programs in school-based clinics or centers. Teaching the children this concept at a young age should hopefully provide them with life-long knowledge. These school-based programs are also great because many parents are employed, and it can be difficult to take time off to take their children to dental appointments.

Another way to improve the OHL status is for dental profession to prioritize health literacy. A thorough oral examination can detect signs of nutritional deficiencies as well as a number of systemic diseases, including microbial infections, immune disorders, injuries and some cancers. Dental professionals can use this time to educate their patients on the findings and inform the patient how their oral health affects their overall health.
Successful dental practices of the future will need to understand how to meet the unique cultural and linguistic needs of the average dental patient. Dental professionals commonly assume that oral instructions and information provided are clear, heard and understood. This assumption of course is not always valid, especially in dental care settings where many patients are ill at ease and even fearful. Improving communications by using easy-to-understand language rather than a lot of technical jargon, using visuals, speaking clearly at a level the patients can understand will help them feel at ease.

Dental hygienists are on the frontline of prevention. When a dental hygienist presents a treatment plan to patients who have a low health literacy score, they may be timid or embarrassed to ask questions and request information. Dental hygienists need to create a respectful, and “shame-free” environment, along with asking question to make sure the patient understands the information provided.

Dental professionals need to continue their work at persuading legislators, regulators, and other key decision-makers that health literacy is a priority public health concern, leading to increased funding and other practical support for health literacy-related education, research and interventions. With better funding and research, dental professionals can increase their understanding on how to educate patients in the best way possible for them to understand, which will help increase their oral health literacy.

A primary goal of the World Health Organization (WHO) in 2000 and 2020 was to reduce the prevalence of oral diseases and disabilities and related complications, especially among poor and marginalized populations. One way this can be accomplished by
educating school staff members, the public and policy-makers about oral health and its relationship to overall health and encouraging the education and training of the current and future dental workforce about health literacy, including the principles of effective communication and the use of plain language in dental practice.¹⁹

Health care providers are trying to make access to care or at least information readily available. One way is by creating a dental/health care application for cellphones. The use of electronic apps for dental education might be extremely useful for the prevention of early childhood caries.¹⁹ In 2017 alone, 3.7 billion mobile health apps were downloaded to be used on cellphones and tablets.¹⁹ As technology advances, more people turn to it for answers.

Bridging the language barrier or the culture barrier will help tremendously. Dental professionals can use programs already readily available such as Women, Infants and Children’s Programs (WIC)¹⁵, immigration class or English as a second langue class to help educate large groups on oral health literacy.

**Effect of Low OHL on Dental Visitations:**

Barriers to oral health include lack of access to care, whether because of limited income or lack of insurance, transportation, or the flexibility to take time off from work to attend to personal or family needs for care. Individuals with disabilities and those with complex health problems may face additional barriers to care.¹⁰ These additional barriers may include oral health literacy and embarrassment. Many people do not understand that prevention is cheaper than fixing a problem. Dental professionals hear multiple times from
their patients’ perception that having getting all their teeth extracted and getting dentures would be easier and cheaper to maintain.

Previous studies by Holtzman and colleagues found that people with poor oral health literacy were more likely to miss dental appointments. However, oral health literacy is only one of several factors that could influence the use of dental care services.

Research has shown that dentists and dental team members are the most significant source of oral health information. Dental care delivery systems including private practices, public clinics, and dental schools all play an essential role in improving the oral health literacy of residents. Therefore, it is important to educate the general population but this is also a barrier faced if the general population does not seek regular dental care.

**Instruments Used to Assess OHL:**

A review of studies conducted between 2007 and 2013 identified 32 studies with OHL measuring tools. The Rapid Estimate of Adult Literacy in Dentistry or REALD-30 uses 30 dental terminology words in a word recognition test; Similar tools include the REALD-99, REALM-D and REALMD-20. The Test of Functional Health Literacy in Dentistry (TOFHLiD) uses 68 and 12 items, respectively, to measure literacy and numeracy. This tool has low reliability when used alone. Other measurement tools include the Oral Health Literacy Instrument (OHLI) which measures reading comprehension and numeracy, with the addition of an oral health knowledge test, and is validated and reliable. The Comprehensive Measure of Oral Health Knowledge (CMOHK) measures word recognition and oral health knowledge, and the Oral Health Literacy Inventory for Parents (OH-LIP) is used for pediatric patients.
The Oral Health Literacy Adults Questionnaire (OHL-AQ) measures reading comprehension, listening, numeracy and decision-making. It has been validated and found to be reliable.\textsuperscript{21}

**Table 1: Chronological Overview of Oral Health Literacy Tools**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name of tool</th>
<th>Type of tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>REALD-99</td>
<td>Rapid Estimate of Adult Literacy in Dentistry</td>
<td>99 item word recognition</td>
</tr>
<tr>
<td>REALD-30</td>
<td>Rapid Estimate of Adult Literacy in Dentistry -30</td>
<td>30 item word recognition common dental words</td>
</tr>
<tr>
<td>ToFHLiD</td>
<td>Test of Functional Health Literacy in Dentistry</td>
<td>Reading comprehension and numeracy 68 item reading comprehension and 12 item numeracy</td>
</tr>
<tr>
<td>OHLI</td>
<td>Oral Health Literacy Instrument</td>
<td>Reading comprehension and numeracy</td>
</tr>
<tr>
<td>REALM-D</td>
<td>Rapid Estimate of Adult Literacy in Medicine and Dentistry</td>
<td>84 item word recognition</td>
</tr>
<tr>
<td>CMOHK</td>
<td>Comprehensive Measure of Oral Health Knowledge</td>
<td>44 questions conceptual knowledge</td>
</tr>
<tr>
<td>REALMD-20</td>
<td>Rapid Estimate of Adult Literacy in Dentistry-20</td>
<td>20 item word recognition</td>
</tr>
<tr>
<td>OHL-AQ</td>
<td>Oral Health Literacy Adults Questionnaire</td>
<td>17 items in 4 sections, reading comprehension, numeracy, literacy and decision making</td>
</tr>
</tbody>
</table>

**Conclusion:**

More than half of the United States has a low OHL status, meaning the general population does not understand or know how to process information about their oral health and their general health. Oral health is not a priority for the general population leaving it as a “silent epidemic”\textsuperscript{9} and childhood decay as the prominent disease among children. Poor OHL is a high predictor of their oral health conditions and maybe a reason for the lack of dental visitations. Optimum oral health requires more than professional care. It requires self-care, care of others, community programs, policies, law and regulations, and reimbursement structures that support evidence-based interventions and practices. \textsuperscript{22}
School staff members and dental professionals are in a great position to change this through school-based programs and education of students and patients.
Chapter 3: Methods and Materials

Introduction:

This study used the REALD-30 OHL instrument with slight modifications, to simplify data collection on the OHL status of school staff members in southern Minnesota. These modifications change the way the respondents receive and answer the questions. The original REALD-30, the proctor holds a card with one word on it, the respondent is then asked to read the word out loud if they know the word or say they do not know without guessing. The proctor then checks which words the respondent answered correctly. This modification had the respondent read the word to themselves and check yes or no if they know the word. Data was stratified based on the age, gender, race/ethnicity, socioeconomic status, and education of the participants. The survey was anonymous and composed of yes or no questions.

Sample Description:

The target population of this study was a convenience sample of k-12 school staff members in southern Minnesota. The survey was sent into the UNM IRB for approval. Once the survey was approved it was emailed to the superintendent/principal to forward to all staff members of 3 schools in Southern Minnesota including; teacher, nurses, custodians, lunch attendants, office personal, and social workers.

Research Design:

This survey consisted of 6 demographic questions and 30 yes or no answers using the REALD-30 template on word recognition [table 2]. The REALD-30 was scored by
assigning one point for each word correctly recognized. The REALD-30 words are common
dental terms, such as floss, or more technical terms, such as bruxism. Scores for word-
recognition range from 0 (lowest literacy) to 30 (highest literacy).

| Table 2: Terms of Rapid Estimate of Adult Literacy in Dentistry (REALD-30) |
|---|---|---|---|---|
| 5. Pulp | 15. Dentition | 25. Analgesia |
| 7. Braces | 17. Gingiva | 27. Fistula |

This descriptive study utilized the online and interactive survey tool, RedCap.
RedCap was used to create a survey and to collect the data. With the written permission
from the school principals, the survey was sent via email to the principal of 3 schools in
Southern Minnesota, then the principals sent the survey out using the school staff email
system. The respondents were given three weeks to complete the survey, after the second
week a second email was sent as a reminder to complete the survey. After the lapse of the
three weeks the survey was no longer accessible.
The survey consisted of yes or no questions, identifying word recognition using the REALD-30 template.

The survey targeted 2 main subjects;

1. Demographics.
2. Word recognition/oral health literacy.

**Data Analysis:**

Once the survey closed the data was collected via RedCap.

Figure 1.1-6.3 uses the demographic characteristics and the REALD-30 word-recognition scores. The REALD-30 scores are determined by given 1 point for every question answered with a yes and 0 points for every question answered with a no or left blank. Figures 1.1, 2.1, 3.1, 4.1, 5.1 and 6.1 show how many respondents there are in each demographic. Figures 1.2, 2.2, 3.2, 4.2, 5.2 and 6.2 shows the range, the mean and the SD of the REALD-30 scores per section for each demographic. Figures 1.3, 2.3, 3.3, 5.3 and 6.3 show the mean total percentage per section in each demographic. The mean total percent will determine the oral health literacy status with demographic risk factors.

Figure 7.1 shows the oral health literacy scores per individual without demographic risk factors. The REALD-30 scores range from 0-30 compared to the frequency of participants. This determines the overall oral health literacy of each participant. Figure 7.2 shows the range, the mean and the SD of the REALD-30 scores overall, without demographics.
Figure 8 shows the frequency of the individual words in the REALD-30 with no demographic risk factors. Using all the REALD-30 answers for all 50 respondents, for every individual word answered with yes were added together at 1 point each and all the words answered with no or left blank were added together at 0 points each, representing how many respondents recognized the individual words. This determines which words were recognized the most and which words were not.
Chapter 4: Results, Discussion and Conclusion

Results:

Upon approval from the University’s Institutional Review Board and the Human Research Protection Office (HRPO) a survey was sent to staff members at three different schools in Minnesota. A total of 50 surveys were returned of the approximate 300 sent out, which is a response rate of approximately 17%. The REALD-30 consists of 30 words to which the respondent answered yes if they have heard of the word before, or no if they have not heard this word before. All blank demographic responses were not counted for that demographic, all the blank responses on the REALD-30 were counted as a no. Six demographic questions were asked, which are split into individual charts showing the frequency of the demographic, the REALD-30 scores and the mean total percentage for each demographic.

Figure 1.1 displays the demographic frequency of the different staff roles. Of the 50 respondents, 3 left this demographic question blank and were excluded from this section (N=47). Seventy-nine percent (n=37) respondents were teachers, 15% (n=7) were office staff, 0 respondents were custodians, 2% (n=1) was a nurse, 2% (n=1) was a social worker and 2% (n=1) was lunch staff.
Figure 1.2 compares the scores of the REALD-30 per staff roles by the number of respondents in each demographic. With the teacher role having the largest number of respondents, the scores range from 10 to 28, with a mean score of 18.6 and a standard deviation (SD) of 3.36. Office staff had the next measurable number of respondents with the range in scores from 18 to 29 with a mean score 23.6 and a SD of 4. The other roles did not have measurable numbers to be noted.

**Figure 1.2: Range, Mean and Standard Deviation of OHL Scores by Staff Role**

<table>
<thead>
<tr>
<th>Staff Role</th>
<th>n</th>
<th>Range of score</th>
<th>Mean score</th>
<th>± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td>37</td>
<td>10 to 28</td>
<td>18.6</td>
<td>3.36</td>
</tr>
<tr>
<td>Office Staff</td>
<td>7</td>
<td>18 to 29</td>
<td>23.6</td>
<td>4</td>
</tr>
<tr>
<td>School Nurse</td>
<td>1</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Worker</td>
<td>1</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lunch Staff</td>
<td>1</td>
<td>28</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 1.3 displays the mean percent score on the REALD-30 by staff member roles. The social worker role has the lowest percent in OHL at 57%, while the lunch staff had the highest at 97%. The difference in the lowest OHL and the highest OHL in this section is 40%. The limitation to this figure is there was only 1 respondent in 3 of the sections.

![Figure 1.3: Mean percent REALD-30 Scores per Staff Role](chart)

Figure 2.1 displays the demographic frequency of the different age groups. Of the 50 respondents (N=50), 6% (n=3) were age 18-25, 24% (n=12) were age 26-35, 22% (n=11) were age 36-45, 34% (n=17) were age 46-55, 14% (n=7) were age 56-65 and 0 were age 65+. 
Figure 2.2 compares the scores of the REALD-30 for each of the different age group in this demographic section. The age group 18-25 scores range from 17-20 with a mean score of 17.9 and a SD of 1.4. The age group 26-35 scores range from 10 to 29 with a mean score of 18.8 and a SD of 5.7. The age group 36-45 scores range from 17 to 26 with a mean score of 20.5 and a SD of 2.8. The age group 46-55 scores range from 12 to 28 with a mean score of 20.3 and a SD of 4. The age group 56-65 scores range from 13 to 21 with a mean score of 18.6 and a SD of 2.7. This shows that the age group 18-25 have similar scores and the age group 26-35 have the largest difference in the scores.

<table>
<thead>
<tr>
<th>Age group</th>
<th>n</th>
<th>Range of score</th>
<th>Mean score</th>
<th>± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-25</td>
<td>n= 3</td>
<td>17-20</td>
<td>17.9</td>
<td>1.4</td>
</tr>
<tr>
<td>26-35</td>
<td>n= 12</td>
<td>10 to 29</td>
<td>18.8</td>
<td>5.7</td>
</tr>
<tr>
<td>36-45</td>
<td>n= 11</td>
<td>17 to 26</td>
<td>20.5</td>
<td>2.8</td>
</tr>
<tr>
<td>46-55</td>
<td>n= 17</td>
<td>12 to 28</td>
<td>20.3</td>
<td>4</td>
</tr>
<tr>
<td>56-65</td>
<td>n= 7</td>
<td>13 to 21</td>
<td>18.6</td>
<td>2.7</td>
</tr>
</tbody>
</table>
Figure 2.3 displays the mean percentage score for the REALD 30 by age groups. The group with the highest OHL percent is age 46-55 and the group with the lowest OHL percent is age 18-25. However, the mean totals percent are similar with only a 9% difference in the highest and lowest.

Figure 3.1 displays the demographic frequency of the different genders. Of the 50 respondents (N=50), 14% (n=7) were male and 86% (n=43) were female.
Figure 3.2 compares the scores of the REALD-30 for each of the different genders in this demographic section. The male scores range from 18 to 24 with a mean score of 19.3 and a SD of 2.1. The female scores range from 10 to 29 with a mean score of 19.7 and a SD of 4.4.

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>Range of score</th>
<th>Mean score</th>
<th>± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>7</td>
<td>18 to 24</td>
<td>19.3</td>
<td>2.1</td>
</tr>
<tr>
<td>Female</td>
<td>43</td>
<td>10 to 29</td>
<td>19.7</td>
<td>4.4</td>
</tr>
</tbody>
</table>

Figure 3.3 displays the mean percentage score for the REALD-30 by gender. Both genders are within 2% of each other.

Figure 4.1 displays the demographic frequency of the different ethnic groups. White was the only demographic selected in this section. Due to only one demographic being selected there is no data for comparison.
Figure 4.2 compares the scores of the REALD-30 for each of the different ethnicities, however, there was only one ethnic group selected. White with scores range from 10 to 29 with a mean score of 19.6 and a SD of 4.1.

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>n</th>
<th>Range of score</th>
<th>Mean score</th>
<th>± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>50</td>
<td>10 to 29</td>
<td>19.6</td>
<td>4.1</td>
</tr>
</tbody>
</table>

Figure 4.1: Characteristics of Respondents by Ethnicity

n=50, 100%

White

Figure 5.1 displays the demographic frequency of the different education levels. Of the 50 respondents (N=50), 0% (n=0) selected 8th grade of less, 0% (n=0) selected some high school, 8% (n=4) respondents selected high school diploma or GED, 10% (n=5) respondents selected a two-year degree, 48% (n=24) respondents selected a four-year degree and 34% (n=17) respondents selected a graduate degree.
Figure 5.2 compares the scores of the REALD-30 for each of the different education levels in this demographic section. The high school diploma or GED scores range from 13 to 23 with a mean score of 19 and a SD of 3.7. The two-year degree scores range from 17 to 26 with a mean score of 21.2 and a SD of 2.9. The four-year degree scores range from 12 to 29 with a mean score of 20.3 and a SD of 4.6. The graduate degree scores range from 10 to 28 with a mean score of 18.4 and a SD of 3.4.

<table>
<thead>
<tr>
<th>Education Level</th>
<th>n</th>
<th>Range of score</th>
<th>Mean score</th>
<th>± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School diploma</td>
<td>4</td>
<td>13 to 23</td>
<td>19</td>
<td>3.7</td>
</tr>
<tr>
<td>Two-year degree</td>
<td>5</td>
<td>17 to 26</td>
<td>21.2</td>
<td>2.9</td>
</tr>
<tr>
<td>Four-year degree</td>
<td>24</td>
<td>12 to 29</td>
<td>20.3</td>
<td>4.6</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>17</td>
<td>10 to 28</td>
<td>18.4</td>
<td>3.4</td>
</tr>
</tbody>
</table>
Figure 5.3 displays the mean percentage score for the REALD-30 by education-level. The group with the highest OHL percent is the group with a two-year degree and the group with the lowest OHL percent is the graduate degree. However, the mean percent scores are similar with only a 9% difference in the highest and lowest.

![Figure 5.3: Mean percent REALD-30 Scores per Education Level](image)

Figure 6.1 displays the demographic frequency of the different income levels. Of the 50 respondents, 1 left this demographic question blank and was excluded from this section (N=49), 10% (n=5) claim to have an $0-20,000 income, 18% (n=9) respondents claim to have an $20,001-40,000 income, 39% (n=19) respondents claim to have an $40,001-60,000 income, 21% (n=10) respondents claim to have an $60,001-80,000 income, 4% (n=2) respondents claim to have an $80,001-100,000 income, 2% (n= 1) respondent claim to have an $100,001-120,000 income, and 6% (n=3) respondents claim to have an $120,000+income.
Figure 6.2 compares the scores of the REALD-30 for each of the different income levels in this demographic section. The $0-20,000 group scores range from 17 to 29 with a mean score of 23 and a SD of 5.4. The $20,001-40,000 group scores range from 12 to 28 with a mean score of 18.2 and a SD of 4.5. The $40,001-60,000 group scores range from 10 to 28 with a mean score of 19.5 and a SD of 4.5. The $60,001-80,000 group scores range from 17 to 21 with a mean score of 18.8 and a SD of 1.2. The $80,001-100,000 group scores range from 17 to 21 with a mean score of 27.5 and a SD of 2. The $100,001-120,000 group only had 1 score of 21. The $120,000+ group scores range from 18 to 21 with a mean score of 19.6 and a SD of 1.2.
Figure 6.3 displays the mean percentage score for the REALD-30 by income levels. The group with the highest OHL percent was the $0-20,000 and the group with the lowest OHL percent is $20,001-40,000, the percent difference in the highest percent to lowest percent is 16%.

Figure 6.3: Mean percent REALD-30 Scores per Income Level

Figure 7.1 showed the REALD-30 scores of the individual respondents without demographics. A score of 0-10 is low OHL, 11-20 is a moderate OHL, and a score of 21-30 is a high OHL. This showed that respondent #15 has the lowest OHL with a score of 10 and respondent #20 and #33 have the highest with a score of 29.
Figure 7.2 shows that the overall OHL status in school staff members range from 10-29 with a mean score of 19.6 and a SD of 4.1.

<table>
<thead>
<tr>
<th>Respondents</th>
<th>n</th>
<th>Range of score</th>
<th>Mean score</th>
<th>± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>School Staff members</td>
<td>n=50</td>
<td>10 to 29</td>
<td>19.6</td>
<td>4.1</td>
</tr>
</tbody>
</table>

Figure 8 shows how many words the all 50 respondents knew. Words with a score of 0-16 have a low literacy score, words with a score of 17-33 have a moderate literacy score and words 34-50 have a high literacy score. There are 17 words that have a high literacy score, 5 words with a moderate literacy score and 8 words with a low literacy score.
Discussion:

This study was designed to determine the OHL status of school staff members in only three schools in southern Minnesota. The results of this study show the OHL scores per respondent ranging from low literacy, with the lowest being a 10, to high literacy, with the highest being 29. The mean score is 19.6 which places the average school staff member at moderate literacy. To help get a better understanding of why there is such a wide range of literacy score, demographic risk factors were used to find any trends in OHL scores.

When looking at the mean total percent, staff role has the largest percent difference of 40% between the highest percent and the lowest percent. Social workers had the lowest scores followed closely by teachers; however, lunch staff had the highest percent. Trends anticipated for this demographic were for the nurses and teachers to have the highest percent. However, this study did not follow the anticipated trends, this could be due to having low levels in the responses.
Income level had the next largest percent difference of 16% between the highest percent and the lowest percent. This one is very interesting with the lowest income level having the highest OHL percent. The trend expected to see was for the higher the income level the higher the OHL scores. In this study the percents were similar, determining that income level is not a predictor of OHL scores, this could also be due to having a small sample size.

The percent difference in the age group is 11% between the highest percent and the lowest percent, with the highest percent being the younger age group and the lower percent being the older age group. This follows the anticipated trends for this group, with OHL score slowly decreasing as the respondents’ age.

The anticipated outcome for the education level demographic was the higher the level of education the higher the OHL status and the lower level of education the lower the OHL score. There was only a 9% difference in the highest mean percent and the lowest mean percent. This determines that income level is not a predictor of OHL scores.

There was not any anticipated outcome for gender. The gender percent difference is only 1%, determining that income level is not a predictor of OHL scores.

With only one ethnicity being selected in this study, there cannot be any trends noted in this category.

This study did not follow the anticipated trends showing that even with a graduate degree the OHL status was similar to the OHL status of someone with just a high school diploma or GED, or that making more money does not mean you have a higher OHL status
then someone whom make significantly less. The demographics in this study did not follow the anticipated trends.

The demographic that demonstrated the most significant difference in OHL scores was the staff role within the schools. All the other demographics there did not have a large enough difference to be a predictor of the OHL score outcomes. With the average OHL status being in the moderate sore range, the staff members do need to become more knowledgeable in oral health, to be able to help their students when an oral health issue arises.

Due to the COVID-19 pandemic outbreak before the surveys were sent out, a few of the schools in southern Minnesota that gave their verbal permission to participate decided to pull out of the study. The principals/superintendents felt the school staff members were already under enough pressure and stress with switching over their teaching methods from in class from to online distance learning, to participate in this study, limited the survey sample size. With the smaller sample size, there was not enough variation in the demographic groups to determine if certain risk factors affect the OHL of the school staff members.

Another limitation to this study is the modifications made to the REALD-30. The REALD-30 is originally meant to have a respondent read the words out loud to the proctor, with this modification the respondent has to read the word to themselves. If the respondent cannot read or pronounce the word correctly, they may have marked that they
have not heard of the word when they really have, they just did not know how to read/pronounce it.

This study could be improved with having a larger and more diverse sample. This could be accomplished by adding more schools in southern Minnesota or even going throughout the entire state.

**Conclusion:**

Dental professionals tend to use layman’s terms when talking with their patients, this is needed due to the OHL status usually being on the low side, however, if dental professionals use only layman’s terms without saying the dental name their patient will never learn these terms and their OHL score will never increase.

This study was to determine the OHL status of school staff members in southern Minnesota, however, finding any trends in the OHL status was inconclusive by this study due to small sample size and cannot be used to generalize to the population. Future studies would benefit from using a more ethnicity diverse sample and by adding in how often the respondents receive dental care.
Chapter 5: Article for Submission

The Oral Health Literacy Status of School Staff Members in Southern Minnesota

By
Gabrielle Sullivan, RDH, BS, MSDH
Diana Aboytes, RDH, MS
Christine Nathe, RDH, MS
Christa Calleros, RDH, MS

GSullivan@salud.unm.edu
1-507-351-8486

Key words: Oral health literacy, School staff
This manuscript has not been published previously, nor is it currently being considered by another publication
Abstract:

Purpose: The purpose of this study was to evaluate the oral health literacy (OHL) status of school staff in Southern Minnesota. OHL is how an individual obtain, process and understand basic health information. Dental professionals have a high OHL, yet, the Center of Disease Control (CDC) states that dental caries remains the most common chronic disease in school aged children. Besides family members, school staff members spend a large amount of time though out the day with children. Therefore, it is important for all school staff members to have a moderate to higher Oral Health Literacy (OHL) status to be able help their students with answers oral health questions if needed.

Methods: Upon institutional review board approval, this study utilized the University of New Mexico Red CAP online survey and data collection tools. The survey used a convenience sample of school staff members in 3 different schools in southern Minnesota and will use the REALD-30 OHL instrument with slight modification, to simplify data collection on the OHL status. With all three school’s superintendent/principal’s approval, they distributed the survey using staff email system.

Results: A total of 50 surveys were returned of the approximate 300 sent out. Among those 50 the mean OHL score is 19.6 placing the average OHL score of school staff members in southern Minnesota in the moderate OHL range. There was not a significant difference in the scores using the different demographics.

Conclusion: For school staff members to help or direct their students with any oral health care questions it is important for the staff members to poses a moderate to high OHL status. Although the results of this study showed the participants possessed a moderate OHL status, results were limited and do not represent the OHL status of the staff at the three schools.
Introduction:

Nearly half (90 million) of adults in the United States have low functional health literacy. Because the U.S is a developed country this number is very surprising. These are adults that have difficulty understanding and using everyday health information. Oral health Literacy (OHL) is defined as the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate oral health decisions. If an individual has a low OHL they will have a difficult time understanding what the problem is and what their needs are. When looking at OHL adults tend to be the biggest subject, since children are still within the learning years. However, the Center of Disease Control (CDC) states that dental caries remains the most common chronic disease in school aged children, kindergarten through 12th grade. Fortunately, dental caries is preventable with education and dental care.

School staff members spend a large amount of time though out the day with children, more time than a dental professional. Therefore, it is important for all school staff members that have contact with the students, to have an average or higher status, to be able help their students with answers to oral health questions if needed.

This applies to all school staff members not just teachers. The teachers need a high OHL to educate the student on good oral health such as they would with hand washing and other healthy behaviors. It is important for the school nurse to have a high OHL to help students who have a toothache, not by providing the dental care, but by, referring the student and the students’ parents on where and how they can obtain the necessary dental care. It is also important for the nurse to know the student’s health history, such as diabetes and how it is directly related to periodontal disease. For example, a student with diabetes may go to the nurse’s office because they keep tasting blood in their mouth, the nurse could then ask them what their A1C levels are at and then recommend dental care. A custodian is not directly linked to a student’s education; however, some
students may feel more comfortable talking with them about dental issues than other staff members. Lunch staff may notice a change in students’ lunch choices such as, a student choosing only soft foods for the last week. Lunch staff could then ask the student if he/she is experiencing any oral pain. Office staff are usually the ones in contact with the students’ parents on a regular basis, they may be able to help by voicing concerns to parents. Social workers are there for students to talk to about anything they feel comfortable discussing, because of this a student may feel more comfortable discussing oral health concerns too. Not only can school staff help and educate students, they can also help the parents, by being open to discussions and being observant.

Everything dental hygienists can teach their patients about oral health and overall health is important, but the only individuals who receive this education are those whom access dental care. Dental professionals need to find a way to promote oral health knowledge to the general public, including those whom do not seek regular dental care. Most children will attend school at some point in their lives, having school staff members with an average or higher OHL can help those students that do not seek regular dental care. The purpose of this study is to evaluate the OHL status of school staff in Southern Minnesota.

**Methods:**

This study used the REALD-30 OHL instrument with slight modifications, to simplify data collection on the OHL status of school staff members in southern Minnesota. These modifications change the way the respondents receive and answer the questions. The original REALD-30, the proctor holds a card with one word on it, the respondent is then asked to read the word out loud if they know the word or say they do not know without guessing.24 The proctor then checks which words the respondent answered correctly. This modification had the respondent read the word to themselves and check yes or no if they know the word. Data was stratified based on the age,
gender, race/ethnicity, socioeconomic status, and education of the participants. The survey was anonymous and composed of yes or no questions.

The target population of this study was a convenience sample of k-12 school staff members in southern Minnesota. The survey was sent into the UNM IRB for approval. Once the survey was approved it was emailed to all staff members of 3 schools in Southern Minnesota including; teacher, nurses, custodians, lunch attendants, office personal, and social workers.

This survey consisted of demographic questions and 30 yes or no answers using the REALD-30 template on word recognition. The REALD-30 was scored by assigning one point for each word correctly recognized. The REALD-30 words were either common dental terms, such as floss, or more technical terms, such as bruxism. Scores for word-recognition ranged from 0 (lowest literacy) to 30 (highest literacy).

This descriptive study utilized the online and interactive survey tool, RedCap. RedCap was used to create a survey and to collect the data. With the written permission from the school principals, the survey was sent via email to these three principals in Southern Minnesota, then the principals sent the survey out using the school staff email system. The respondents were given three weeks to complete the survey, after the second week a second email was sent as a reminder to complete the survey. After the lapse of the three weeks the survey was no longer accessible.

The survey consisted of yes or no questions, identifying word recognition using the REALD-30 template.

The survey targeted 2 main subjects;

1. Demographics.

2. Word recognition/oral health literacy.
Once the survey is closed the data was collected via RedCap.

Figure 1.1-6.3 uses the demographic characteristics and the REALD-30 word-recognition scores. The REALD-30 scores are determined by given 1 point for every question answered with a yes and 0 points for every question answered with a no or left blank. Figures 1.1, 2.1, 3.1, 4.1, 5.1 and 6.1 show how many respondents there are in each demographic. Figures 1.2, 2.2, 3.2, 4.2, 5.2 and 6.2 show the REALD-30 scores per section for each demographic. Figures 1.3, 2.3, 3.3, 5.3 and 6.3 show the mean total percentage per section in each demographic. The mean total percent will determine the oral health literacy status with demographic risk factors.

Figure 7.1 shows the oral health literacy scores per individual without demographic risk factors. The REALD-30 scores range from 0-30 compared to the frequency of participants. This determines the overall oral health literacy of each participant. Figure 7.2 shows the range, the mean and the SD of the REALD-30 scores overall, without demographics.

Figure 8 shows the frequency of the individual words in the REALD-30 with no demographic risk factors. Using all the REALD-30 answers for all 50 respondents, for every individual word answered with yes were added together at 1 point each and all the words answered with no or left blank were added together at 0 points each, representing how many respondents recognized the individual words. This determines which words were recognized the most and which words were not.

**Results:**

Figure 1.2 compares the scores of the REALD-30 per staff roles by the number of respondents in each demographic. With the teacher role having the largest number of respondents, the scores range from 10 to 28, with a mean score of 18.6 and a standard deviation (SD) of 3.36. Office staff had the next measurable number of respondents with the range in scores from 18 to 29
with a mean score 23.6 and a SD of 4. The other roles did not have measurable numbers to be noted.

<table>
<thead>
<tr>
<th>Staff Role</th>
<th>n</th>
<th>Range of score</th>
<th>Mean score</th>
<th>± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td>37</td>
<td>10 to 28</td>
<td>18.6</td>
<td>3.36</td>
</tr>
<tr>
<td>Office Staff</td>
<td>7</td>
<td>18 to 29</td>
<td>23.6</td>
<td>4</td>
</tr>
<tr>
<td>School Nurse</td>
<td>1</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Worker</td>
<td>1</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lunch Staff</td>
<td>1</td>
<td>28</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 2.2 compares the scores of the REALD-30 for each of the different age group in this demographic section. The age group of 18-25 scores range from 17-20 with a mean score of 17.9 and a SD of 1.4. The age group 26-35 scores range from 10 to 29 with a mean score of 18.8 and a SD of 5.7. The age group 36-45 scores range from 17 to 26 with a mean score of 20.5 and a SD of 2.8. The age group 46-55 scores range from 12 to 28 with a mean score of 20.3 and a SD of 4. The age group of 56-65 scores range from 13 to 21 with a mean score of 18.6 and a SD of 2.7. This shows that the age group 18-25 have similar scores and the age group 26-35 have the largest difference in the scores.

<table>
<thead>
<tr>
<th>Age group</th>
<th>n</th>
<th>Range of score</th>
<th>Mean score</th>
<th>± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-25</td>
<td>3</td>
<td>17-20</td>
<td>17.9</td>
<td>1.4</td>
</tr>
<tr>
<td>26-35</td>
<td>12</td>
<td>10 to 29</td>
<td>18.8</td>
<td>5.7</td>
</tr>
<tr>
<td>36-45</td>
<td>11</td>
<td>17 to 26</td>
<td>20.5</td>
<td>2.8</td>
</tr>
<tr>
<td>46-55</td>
<td>17</td>
<td>12 to 28</td>
<td>20.3</td>
<td>4</td>
</tr>
<tr>
<td>56-65</td>
<td>7</td>
<td>13 to 21</td>
<td>18.6</td>
<td>2.7</td>
</tr>
</tbody>
</table>
Figure 3.2 compares the scores of the REALD-30 for each of the different genders in this demographic section. The male scores range from 18 to 24 with a mean score of 19.3 and a SD of 2.1. The female scores range from 10 to 29 with a mean score of 19.7 and a SD of 4.4.

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>Range of score</th>
<th>Mean score</th>
<th>± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>7</td>
<td>18 to 24</td>
<td>19.3</td>
<td>2.1</td>
</tr>
<tr>
<td>Female</td>
<td>43</td>
<td>10 to 29</td>
<td>19.7</td>
<td>4.4</td>
</tr>
</tbody>
</table>

Figure 4.2 compares the scores of the REALD-30 for each of the different ethnicities, however, there was only one ethnic group selected. White with scores range from 10 to 29 with a mean score of 19.6 and a SD of 4.1.

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>n</th>
<th>Range of score</th>
<th>Mean score</th>
<th>± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>50</td>
<td>10 to 29</td>
<td>19.6</td>
<td>4.1</td>
</tr>
</tbody>
</table>

Figure 5.2 compares the scores of the REALD-30 for each of the different education levels in this demographic section. The high school diploma or GED scores range from 13 to 23 with a mean score of 19 and a SD of 3.7. The two-year degree scores range from 17 to 26 with a mean score of 21.2 and a SD of 2.9. The four-year degree scores range from 12 to 29 with a mean score of 20.3 and a SD of 4.6. The graduate degree scores range from 10 to 28 with a mean score of 18.4 and a SD of 3.4.

<table>
<thead>
<tr>
<th>Education Level</th>
<th>n</th>
<th>Range of score</th>
<th>Mean score</th>
<th>± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School diploma</td>
<td>4</td>
<td>13 to 23</td>
<td>19</td>
<td>3.7</td>
</tr>
<tr>
<td>Two-year degree</td>
<td>5</td>
<td>17 to 26</td>
<td>21.2</td>
<td>2.9</td>
</tr>
</tbody>
</table>
Figure 6.2 compares the scores of the REALD-30 for each of the different income levels in this demographic section. The $0-20,000 group scores range from 17 to 29 with a mean score of 23 and a SD of 5.4. The $20,001-40,000 group scores range from 12 to 28 with a mean score of 18.2 and a SD of 4.5. The $40,001-60,000 group scores range from 10 to 28 with a mean score of 19.5 and a SD of 4.5. The $60,001-80,000 group scores range from 17 to 21 with a mean score of 18.8 and a SD of 1.2. The $80,001-100,000 group scores range from 17 to 21 with a mean score of 27.5 and a SD of 2. The $100,001-120,000 group only had 1 score of 21. The $120,000+ group scores range from 18 to 21 with a mean score of 19.6 and a SD of 1.2.

<table>
<thead>
<tr>
<th>Income Level</th>
<th>n</th>
<th>Range of score</th>
<th>Mean score</th>
<th>± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0-$20,000</td>
<td>5</td>
<td>17 to 29</td>
<td>23</td>
<td>5.4</td>
</tr>
<tr>
<td>$20,001-$40,000</td>
<td>9</td>
<td>12 to 28</td>
<td>18.2</td>
<td>4.5</td>
</tr>
<tr>
<td>$40,001-$60,000</td>
<td>19</td>
<td>10 to 28</td>
<td>19.5</td>
<td>4.5</td>
</tr>
<tr>
<td>$60,001-$80,000</td>
<td>10</td>
<td>17 to 21</td>
<td>18.8</td>
<td>1.2</td>
</tr>
<tr>
<td>$80,001-$100,000</td>
<td>2</td>
<td>17 to 21</td>
<td>27.5</td>
<td>2</td>
</tr>
<tr>
<td>$100,001-$120,00</td>
<td>1</td>
<td>21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$120,001+</td>
<td>3</td>
<td>18 to 21</td>
<td>19.6</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Figure 7.1 showed the REALD-30 scores without demographics. A score of 0-10 is low OHL, 11-20 is a moderate OHL, and a score between 21-30 is a high OHL. This showed that respondent #15 has the lowest OHL with a score of 10 and respondent #20 and #33 have the highest with a score of 29.
Figure 7.2 shows the OHL status in school staff members range from 10-29 with a mean of score of 19.6 and a SD of 4.1.

<table>
<thead>
<tr>
<th>Respondents</th>
<th>n</th>
<th>Range of score</th>
<th>Mean score</th>
<th>± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>School Staff members</td>
<td>50</td>
<td>10 to 29</td>
<td>19.6</td>
<td>4.1</td>
</tr>
</tbody>
</table>

Figure 8 shows how many words the all 50 respondents knew. Words with a score of 0-16 have a low literacy score, words with a score of 17-33 have a moderate literacy score and words 34-50 have a high literacy score. There are 17 words that have a high literacy score, 5 words with a moderate literacy score and 8 words with a low literacy score.
Discussion:

This study was designed to determine the OHL status of school staff members in only three schools in southern Minnesota. The results of this study show the OHL scores per respondent ranging from low literacy, with the lowest being a 10, to high literacy, with the highest being 29. The mean score is 19.6 which places the average school staff member at moderate literacy. To help get a better understanding of why there is such a wide range of literacy score, demographic risk factors were used to find any trends in OHL scores.

When looking at the mean total percent, staff role has the largest percent difference of 40% between the highest percent and the lowest percent. Social workers had the lowest scores followed closely by teachers; however, lunch staff had the highest percent. Trends anticipated for this demographic were for the nurses and teachers to have the highest percent. However, this study did not follow the anticipated trends, this could be due to having low levels in the responses.

Income level had the next largest percent difference of 16% between the highest percent and the lowest percent. This one is very interesting with the lowest income level having the highest
OHL percent. The trend expected to see was for the higher the income level the higher the OHL scores. In this study the percents were similar, determining that income level is not a predictor of OHL scores, this could also be due to having a small sample size.

The percent difference in the age group is 11% between the highest percent and the lowest percent, with the highest percent being the younger age group and the lower percent being the older age group. This follows the anticipated trends for this group, with OHL score slowly decreasing as the respondents’ age.

The anticipated outcome for the education level demographic was the higher the level of education the higher the OHL status and the lower level of education the lower the OHL score. There was only a 9% difference in the highest mean percent and the lowest mean percent. This determines that income level is not a predictor of OHL scores.

There was not any anticipated outcome for gender. The gender percent difference is only 1%, determining that income level is not a predictor of OHL scores.

With only one ethnicity being selected in this study, there cannot be any trends noted in this category.

This study did not follow the anticipated trends showing that even with a graduate degree the OHL status was similar to the OHL status of someone with just a high school diploma or GED, or that making more money does not mean you have a higher OHL status then someone whom make significantly less. The demographics in this study did not follow the anticipated trends.

The demographic that demonstrated the most significant difference in OHL scores was the staff role within the schools. All the other demographics there did not have a large enough difference to be a predictor of the OHL score outcomes. With the average OHL status being in the
moderate sore range, the staff members do need to become more knowledgeable in oral health, to be able to help their students when an oral health issue arises.

Due to the COVID-19 pandemic outbreak before the surveys were sent out, a few of the schools in southern Minnesota that gave their verbal permission to participate decided to pull out of the study. The principals/superintendents felt the school staff members were already under enough pressure and stress with switching over their teaching methods from in class from to online distance learning, to participate in this study, limited the survey sample size. With the smaller sample size, there was not enough variation in the demographic groups to determine if certain risk factors affect the OHL of the school staff members.

Another limitation to this study is the modifications made to the REALD-30. The REALD-30 is originally meant to have a respondent read the words out loud to the proctor, with this modification the respondent has to read the word to themselves. If the respondent cannot read or pronounce the word correctly, they may have marked that they have not heard of the word when they really have, they just did not know how to read/pronounce it.

This study could be improved with having a larger and more diverse sample. This could be accomplished by adding more schools in southern Minnesota or even going throughout the entire state.

**Conclusion:**

This study was to determine the OHL status of school staff members in southern Minnesota, however, finding any trends in the OHL status was inconclusive by this study due to small sample size and cannot be used to generalize to the population. Future studies would benefit from using a more ethnicity diverse sample and by adding in how often the respondents receive dental care.
References:

10. 2000 Surgeon General’s Reports on Oral Health in America
12. Luchynskyi, Tomira The Importance of Health Literacy. Dimensions of Dental Hygiene. 2015
17. Adams, Toni. Assessing the readability of patient education materials, and choosing the best messages for your patients

