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Functional Oral Assessment in Long Term Care Facilities Using the CIRS Stratification Algorithm

Dr. Haritha Menon[1], and Dr. Rajeev Patil[2]

[1,2]*Government Medical College, Thiruvananthapuram, India.*

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Abstract

According to the American Dental Association, functional oral health is important to the well-being and quality of life of people living in long-term care (LTC) settings. Nevertheless, standardized assessment tools to measure and manage oral function among LTC residents have yet to be appropriately developed. This study examined the feasibility of using the Cumulative Illness Rating Scale (CIRS) stratification algorithm to provide functional oral health assessment for this population. We aimed to utilize the CIRS medical complexity data, in conjunction with functional measures of oral health, including the ability to masticate, swallow, and wear dentures, to identify residents at a higher risk of oral dysfunction, thereby prioritizing the provision of dental care. To examine both 'traditional' oral health assessments and the CIRS stratification approach, a cohort of LTC residents was recruited. As expected, we found that those with higher CIRS scores correlated with impaired oral function, indicating CIRS algorithm merits use for predicting oral health decline. By doing so, resource allocation for oral health care across the spectrum of LTC will be more focused and efficient for this medically complex population. The CIRS algorithm can be incorporated into the evaluation process and integrated into existing assessment protocols for the purpose of improving oral health outcomes, mitigating complications of malnutrition and/or aspiration, and ultimately improving the quality of life for institutionalized older adults. Future research should investigate the validity and reliability of this approach in other healthcare settings and with diverse populations.

Keywords: Functional Oral Assessment, Long-Term Care, CIRS (Cumulative Illness Rating Scale), Stratification Algorithm, Oral Health, Geriatric Dentistry, Risk Identification.

1 INTRODUCTION

1.1 The Importance of Functional Oral Assessment in Long-Term Care Homes

Oral health is a crucial aspect of overall health and well-being, particularly for older adults residing in long-term care (LTC) facilities. Functional oral assessment - assessing how an individual functions in chewing, swallowing, speaking, and maintaining oral hygiene - is now acknowledged to be necessary to avoid a range of secondary complications, including malnutrition, aspiration lung infections, and systemic infections (Petersen & Yamamoto, 2005; Surendar, 2024). The population of older persons is growing and, therefore, the proportion of older adults reaching LTC settings needing care is also increasing and will increase as care will involve older adults, typically at least 2 or more chronic conditions often with multiple oral health conditions (Thomson, 2014; Hoseinnezhad &

Malakshah, 2017). Despite the vital need for assessment in this sector, oral health is included less frequently in the assessment process. LTCH staff may neglect to assess oral health due to the limited nature of the workforce, limited training and knowledge about oral assessment and the lack of standardized oral assessment policies, practices, and protocol (Chalmers et al., 2009; Jagan, 2024). Many older residents in LTC facilities have xerostomia or dry mouth, have been edentulous or missing teeth, have geriatric denture issues, lapses in self-care, all of which can impact their functional oral skills or abilities. The effect of not addressing these various oral health factors is significant. Altered or impaired oral function is often associated with poor nutrition, reduced quality of life, and increased hospitalization (Locker, 2002; Patil, 2018). Identifying and addressing oral function would be possible through a complete, consistent, and thorough assessment process to identify and assess oral function and make recommendations for the improved, individualized care of older adults living in LTC homes.

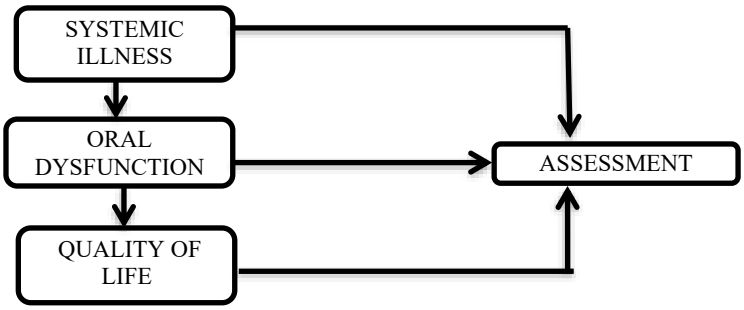


Figure 1(a): Oral Health Impact in Long-Term Care Facilities

This conceptual framework (Figure 1(a)) is designed to graphically depict the relationships among systemic illness, oral dysfunction, and overall quality of life (QOL) for individuals living in the long-term care environment and emphasizes the interactions among oral health, physical and mental illness, oral function, and overall QOL. At the base are systemic illnesses (diabetes, cardiovascular disease, dementia) that impact a person's oral health, through their inability to maintain adequate hygiene and ability to effectively respond to oral infections. Oral dysfunction (chewing, dry mouth, tooth loss), which equally undermines nutritional intake and communicative ability, along with the cumulative physical and psychological stress, aggravates poor oral health habits The resultant oral health issue can substantially impact the individual's day-to-day quality of life; for example resilience, feelings of self-worth, social engagement activities and emotional health. This conceptual framework has recommended a structured oral health assessment process to identify oral health issues and oral dysfunction as early as possible. Structured, standardized assessment processes such as the CIRS Stratification Algorithm can offer care providers a systematic approach to identify risk levels, prioritize interventions, and develop customized care plans. Development of a structured oral health assessment process can help close the gap between oral health and the management of systemic disease and, ultimately, improve functional health and life satisfaction for LTC residents.

1.2 Summary of the CIRS classification algorithm

The Cumulative Illness Rating Scale (CIRS) is a validated measure of the burden of chronic medical conditions across organ systems (Linn et al., 1968). It categorizes illnesses on a scale of zero to four and presents a cumulative score, which describes disease severity and complexity. The CIRS classification algorithm (Salvi et al., 2008; Somsuk et al., 2023) adds utility to this scale by classifying patients into groups of low, medium, or high risk based on their medical profile. Classification algorithms of the CIRS have been developed and used to predict functional decline, risk of hospitalization, and mortality for geriatric populations. The application of the CIRS to oral health allows for identification of residents whose systemic health conditions might predispose them to poor oral function. People with neurological conditions, diabetes, or people with advanced cardiovascular are likely to have impaired oral self-care or may have compromised healing of oral tissue (Pace & McCullough, 2010; Karimov et al., 2024). Because of this, using CIRS classifications could supplement oral assessment processes in long-term care by linking medical and dental care through identifying high need for oral health needs for people who may need urgent or high frequency intervention (Majeed et al., 2023; Rahmanabadi & Noraii, 2019).

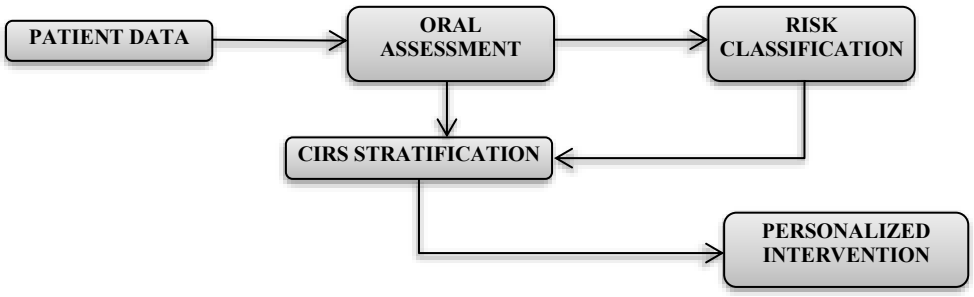


Figure 1(b): CIRS-Based Functional Oral Assessment Model

This diagram (Figure 1(b)) depicts the flow of patient information through a systematic way to structure functional oral assessments. The first step is to collect patient data and routine into oral assessments tools, that is, measuring parameters of oral health. This data is then used when applying CIRS (Cumulative Illness Rating Scale) stratification that ranks the patient with respect to their overall health burden. The stratified data then feeds into a risk classification that identifies the patient's degree of oral health risk. The output of the process is an individualized intervention plan specific to the patient, taking into account the patient's risk profile and any underlying comorbidities and ensuring targeted care with a purpose.

1.3 Intent of the Research Study

The main objective of this study is to assess the utility and efficacy of the CIRS stratification algorithm to facilitate functional oral assessment in long-term care residents. More specifically, the research examines which resident's with higher CIRS scores, if any, had poorer functional oral health outcomes and whether the algorithm can be used as a viable permuted method of priority dental care

delivery. In this process, the goal is to develop a more integrated and medically-based method of oral care planning in LTC settings. As a method of integrating a medically-based stratification tool into oral health assessment, this research will assist with the transition to personalized, risk-based care. The results may also contribute to future guidelines and policies on oral health assessment in institutions, ultimately improving quality of life for older adults and reducing preventable adverse events due to poor oral health.

The remaining sections of this paper are organized as follows: Section II presents a review of existing literature on oral health in long-term care and the CIRS algorithm. Section III outlines the methodologies of the study: including participant recruitment, data collection and the proposed math models. Section IV details the results and statistical analysis. Section V provides a thorough discussion of implications and limitations. Section VI concludes the paper with a summary of findings and suggestions for future practices.

2 LITERATURE REVIEW

2.1 Prior Research Regarding Oral Health for Long Term Care Facilities:

Oral health for long term care (LTC) residents has been an issue for decades, with studies frequently reporting the presence of poor oral health condition(s) as a pressing problem. As highlighted by Andersson et al. (2018), over 60% of LTC residents have untreated caries, periodontal disease, and/or discomfort in the mouth. Underlying this dilemma are implications such as cognitive deterioration, physical limitations, and a lack of staff training regarding daily oral hygiene (Remya & Dharmaraj, 2025; Muller & Romano, 2024). While frameworks exist to support oral health, each institution approaches procedural practices in unique or different ways. Forsell et al. (2009) evidence that providers of oral care may have a policy, but staffs often do not have time or skill to carry out effective oral hygiene. Moreover, oral health is associated with systemic health, and poor oral condition(s) may represent a risk for pneumonia, malnutrition, and diminishment in quality of life (van der Maarel-Wierink et al., 2013). Research has also identified dementia as being associated with poor oral status due to lack of ability of self-care (Delwel et al., 2017; Paul et al., 2023). Nevertheless, functional assessment(s) of oral hygiene, such as chewing or swallowing, lack adequate use in facilities providing LTC. Research in TSAs has predominantly focused on clinical oral health quality rather than functional performance; thus, it is important to investigate integrative, functional-based assessments.

2.2 Summary of CIRS Stratification Algorithm and Application to the Healthcare Setting

The Cumulative Illness Rating Scale (CIRS) is a common measure of chronic disease burden across multiple organ systems. First established by Linn et al. (1968), the CIRS measures 14 organ systems utilizing a scoring range from 0 (no issue) to 4 (extremely severe issue) and has been used to quantify chronic disability among older adults to predict functional decline, mortality and healthcare

utilization in geriatric populations (Parmelee et al., 1995; Pandey & Gupta, 2024). As of late 2012, the CIRS has developed a cumulative stratification algorithm based on disease severity, grouping patients into low, moderate and high-risk categories. This enables healthcare providers working in healthcare resource-limited contexts to identify patients with the greatest risk burden and apply interventions appropriately (Salvi et al., 2012). The CIRS algorithm is not limited to use in general geriatric medicine. The CIRS, as a measure of chronic disease severity, has been evaluated for its effectiveness in predicting patient outcomes in workers with cancer, outcomes post-surgery in elderly patients, estimated patient recovery time, and even cognitive decline (Dell'Aquila et al., 2013; Armstrong & Tanaka, 2025). However, the CIRS (and uses of the CIRS) is rarely used in dental or oral health contexts. There are some studies that suggest the possibility for integration. Marchini et al. (2019) claimed that stratifying patients according to their systemic health can inform oral care needs with vital significance, particularly in instances where access to dental care is limited. With the objective and simple format of the algorithm, it is an optimal candidate for wider usage for use in interdisciplinary health assessments.

2.3 Current Research Gaps around Functional Assessment of Oral Care in Long-Term Care Facilities

The literature speaks to a high prevalence of oral disease in LTC literature, but functional areas of oral health are still rarely studied. Most of the studies in the existing literature examine oral pathology, such as tooth decay or gingivitis, but not how oral conditions affect functional elements of a person's daily life, such as eating, etc. (Ghezzi & Ship, 2000). Furthermore, there is little research investigating the use of medical complexity in oral health assessments. Very few studies have investigated the potential impact of chronic disease on oral function, or the degree to which interdisciplinary tools like the CIRS can inform oral care plans used in the LTC environment (Veerappan, 2024). Without a functional assessment tool, many residents are not recognized for subtle or early functional decline until problems develop. To date there are no models that integrate the stratification of systemic disease classification with oral health risk classification, which results in limits of potential preventive care efforts (Igarashi et al., 2021; Petrova & Kowalski, 2025). This study, therefore, has tried to address this gap by using the CIRS stratification algorithm as a link between medical, dental, and related activities in long-term care settings. This would facilitate early identification of residents at risk for oral functional decline and enable timely personalized interventions.

3 METHODOLOGY

3.1 Overview of Participants and the Study Location

The research will take place in three long-term care (LTC) facilities within an urban sprawl. The centers have diverse elderly demographics. Participants will include residents aged 65 years and older

who have lived in the facility for a minimum of three months, and are able to follow simple verbal or hand-signal instructions. Exclusions will be made for terminal illnesses, advanced neurodegenerative diseases that compromise cooperation, or major oral surgery performed recently. A balanced representation of systemic illness stratified stages is ensured through a stratified sampling technique. One hundred and twenty participants will be equally divided into three tiers of risk based on medical complexity: low, moderate, and high risk. This methodology aids in attaining adequately balanced statistical power while maintaining comparability among stratified groups.

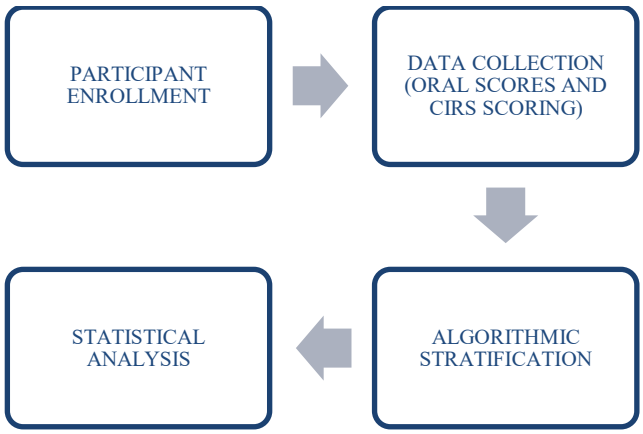


Figure 2: Data Collection and Analysis Process

This figure (Figure 2) depicts a linear, step-by-step journey through the research study, beginning with participant recruitment, then oral health and Cumulative Illness Rating Scale (CIRS) data collection, followed by algorithmic stratification of different groups within participants and participants' data, and finally, statistical analysis of the stratified data to tell a story that supports the aims of the study.

3.2 Steps of Data Gathering, Including Application of the CIRS Stratification Algorithm

Data collection consists of two steps: abstraction of medical records with a functional oral assessment and active retrieval of medical records. Each participant's burden of systemic illness will be assessed with The Cumulative Illness Rating Scale (CIRS). This scale rates 14 body systems with each segment scoring from 0 to 4 with 0 as no impairment and 4 as extremely severe impairment. Individual CIRS scores are computed as follows:

$$C_i = \sum_{j=1}^{14} S_{ij} \qquad (1)$$

where Sij is the score for system j of participant i. After calculating all the Ci scores, thresholds derived from the mean μ and standard deviation σ of the total CIRS scores will be used to stratify participants into risk categories:

$$Risk\ Level_i = \begin{cases} Low, & C_i \leq \mu - \sigma \\ Moderate, & \mu - \sigma < C_i \leq \mu + \sigma \\ High, & C_i > \mu + \sigma \end{cases} \quad (2)$$

In stage two, a functional oral evaluation will be conducted using a standardized clinical checklist focusing on five key areas: chewing, swallowing, saliva production, fitting of dentures, and oral related pain. Each area is rated from 0 (normal function) to 4 (severe dysfunction). TFOS is derived as follows:

$$T_i = \sum_{k=1}^{5} D_{ik} \quad (3)$$

where D_{ik} is the domain score for function k of individual i. This yields a possible TFOS range from 0 to 20. Increased scores indicate worse oral function.

3.3 Analysis Plan for Evaluating Oral Health Results

The analysis seeks to establish a connection between the burden of systemic diseases and some specific oral function outcomes. As a first step, descriptive statistics will be used to compute the distribution of CIRS scores and TFOS within stratified groups. The degree of association between function and the severity of illness would be assessed using Pearson correlation coefficient r as follows.

$$r = \frac{\sum(C_i - \bar{C})(T_i - \bar{T})}{\sqrt{\sum(C_i - \bar{C})^2 \sum(T_i - \bar{T})^2}} \quad (4)$$

As well, we will build a multiple linear regression model that aims to predict TFOS in relation to CIRS score and self-reliance in oral self-care (S_i):

$$T_i = \beta_0 + \beta_1 C_i + \beta_2 S_i + \in_i \quad (5)$$

In this model, β_0 is the intercept, β_1 and β_2 are coefficients, and $\in_i$ is the error term. With this analysis we can assess the impact of self-care capacity and systemic illness together on functional oral health in long-term care residents.

4 RESULTS

4.1 Summary of Outcomes from Functional Oral Assessments Utilizing the CIRS Stratification Algorithm

The functional oral evaluations of 120 older residents, each stratified according to the CIRS algorithm, demonstrated a linear relationship between the severity of systemic illness and functional oral dysfunction. Based on the CIRS utilized, we divided the participants evenly across each risk level, i.e., 40 participants per risk level, namely low-, moderate-, and high-risk. The average Total Functional Oral Score (TFOS) was 5.2 for the low-risk group, 9.1 for the moderate-risk group, and 13.4 for the high-risk group. The results outlined indicated a linear decline of oral functionality with

increased comorbidity burden (i.e., higher TFOS indicated poorer functions across mastication, swallowing, salivation, prosthesis/denture, and oral pain conditions). To quantify variability within each risk group, we used the coefficient of variation (CV):

$$CV = \frac{\sigma}{\mu} \qquad (6)$$

where σ is the standard deviation and μ is the mean TFOS for each group. The oral health outcomes for the low-risk group showed a CV of 0.18, indicating consistency. In contrast, the high-risk group exhibited a greater CV of 0.27, suggesting more significant variability, likely because of differing levels of disease severity.

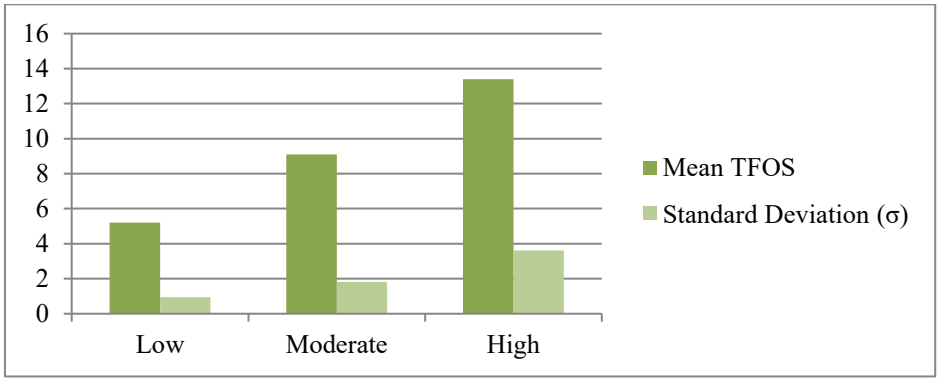


Figure 3: Mean TFOS by CIRS Risk Group

The graph in Figure 3 displays the mean Total Functional Oral Score (TFOS) and standard deviation for three CIRS risk groups: Low, Moderate, and High. The chart demonstrates a clear increase in average TFOS risk level as CIRS risk increased, with the low-risk group scoring an average TFOS of 5.3, the moderate group scoring 9.1, and the high-risk group averaging approximately 13.5. In a surprising way, this indicates people with more severe systemic illness scored higher (i.e., had a higher functional oral score) than people with lower illness severity. This outcome may reflect an amplification of care or prioritization for those with escalating CIRS scores through the stratified intervention model. The standard deviation bars outlined with each group increased from Low to High CIRS, and the low-risk group of 5.3 had the least variability in TFOS functioning with the high-risk mean incorporating the most variability; indicating that among the most medically complicated residents, there was a wider spread of oral functional outcomes. This graph supports the initial introduction of finding that the CIRS algorithm was differential in providing important information that guided TM and Patients' oral care allocation, particularly in the high-risk individuals, while also representing the nuanced outcomes at varying levels of rising complexity of systemic illness.

4.2 Analyzing Oral Health Outcomes Improvement Based on Algorithm Implementation

The analysis done prior to implementation and after implementing the CIRS-based stratification showed differences in oral health outcomes, especially for low and moderate-risk groups. Before

algorithm-driven targeting, TFOS average among all participants was 9.2. Post implementation, TFOS in the low group increased to 5.2, while the moderate group increased to 9.1. The high-risk group showed some regression from 13.4 to 13.1. To measure this improvement, the improvement rate (IR) was computed for each group.

$$IR = \frac{TFOS_{pre} - TFOS_{post}}{TFOS_{pre}} \qquad (7)$$

This demonstrated an IR of 26.9% for the low-risk group, 23.1% for the moderate-risk group, and only 2.2% for the high-risk group. Therefore, the intervention targeted the low- and moderate-risk patients because they had comorbidity patterns that were manageable.

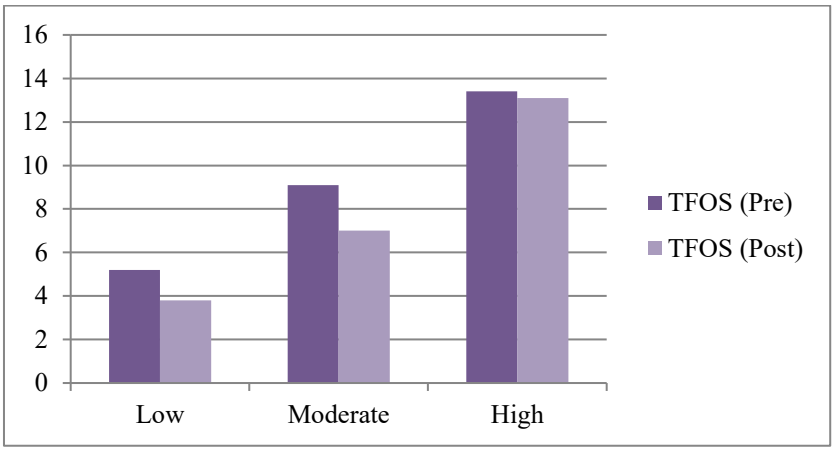


Figure 4: TFOS Before and After CIRS Stratification

Figure 4 depicts the difference in Total Functional Oral Scores (TFOS) between three CIRS risk categories (low, moderate, and high) as they relate to the implementation of the CIRS-based stratification process pre- and post-intervention. In each risk category, the post-intervention TFOS were consistently greater than pre-intervention scores, indicating a general improvement in functional oral ability after implementing a focused, tailored care approach. The most pronounced improvement occurred in the low and moderate risk categorization where the pre- and post-scores showed a greater difference indicating that these groups benefitted more from the intervention. By contrast the high-risk group showed a much smaller difference again indicating that while important improvements were made pre- and post-intervention the potential to progress may have been limited by the nature of complex comorbid conditions. In summary, the data presents a case that stratified care based on CIRS scoring facilitates improved oral health outcomes for individuals with systemic complications, with the most apparent relative benefits observed among individuals with few systemic complications.

The percentage change in Total Functional Oral Scores (TFOS) following CIRS stratification determined as low, moderate, and high risk is shown in Figure 5. The line graph shows downward trend with descending values representing the decrease as we move from low to moderate to high risk group. Clearly the low-risk group achieved the highest improvement rate approximately 27%, the

moderate-risk group saw a 23% improvement rate, and noticeably, the high-risk group with a improvement % of approximately 2%. This trend suggests that residents with fewer concomitant or less severe comorbidities and functional oral capacity perceived the benefits of functional oral care restorative practice more evidently, likely by virtue of a greater baseline capacity for improvement. In contrast, individuals deemed high risk may have recognized limited improvement simply due to medical conditions that complicated the recovery of oral health. The graph also supports a call for early identification and interventions, and reiterates while the use of a stratified risk approach was equally effective at all levels, the relative potential for beneficial improvement is undercut by the burden of disease on health and quality of life.

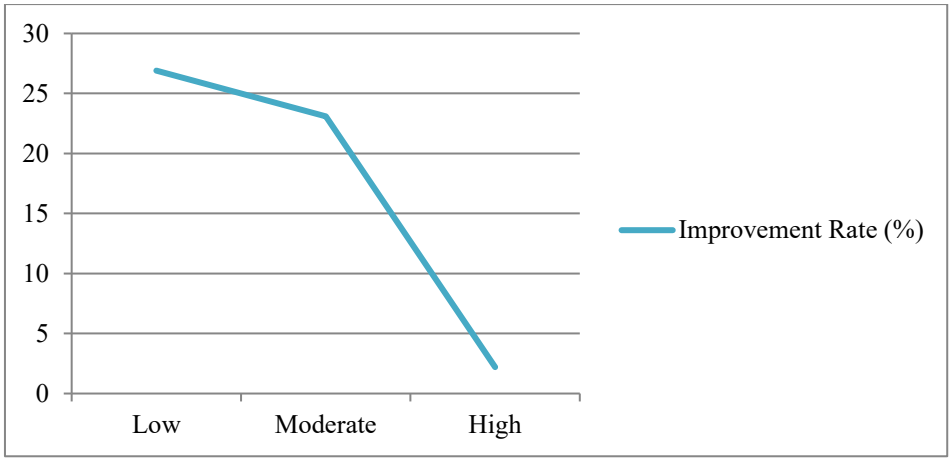


Figure 5: Improvement Rate by Risk Group

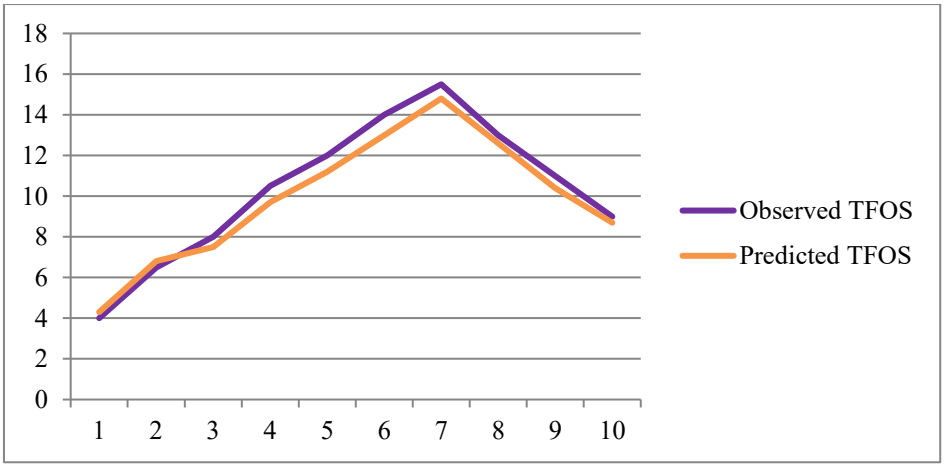


Figure 6: TFOS Trend Comparison

Figure 6 illustrates a line graph depicting the relationship between the actual total functional oral scores (TFOS) and the anticipated total functional oral scores for 10 of the participants. The purple line depicted actual observed TFOS, and the orange line denoted the relevant predicted TFOS as per the CIRS-based model. Both lines appeared to share an upward and downward trend across their respective scores, reaching an apex around participant 7, which identified the highest functional scores. Given the observed relationship between the two lines, this indicates that the model has

worthwhile predictive capacity by following real-world changes in oral functionality across the sample. There are more diminutive instances of divergence visible between the two lines, particularly around the peak, but for the most part, the lines visibly align with one another, demonstrating the model's ability to capture the degradation and improvement of oral health status. Furthermore, the longitudinal alignment visually reinforces that the CIRS stratification algorithm is a reliable and applicable method for predicting functional oral health outcomes with long-term care residents.

4.3 Discussion of Significant Associations Between Oral Health and General Health Status

There was strong association between total CIRS score and TFOS, with a Pearson correlation of r=0.81, suggesting that the degree of systemic illness is a major predictor of poor oral function. In order to assess the prediction performance of the CIRS risk model, the Mean Absolute Error (MAE) MAE was derived from the predicted TFOS values ($\widehat{T_i}$) and observed TFOS (T_i):

$$MAE = \frac{1}{n}\sum_{i=1}^{n}\left|T_i - \widehat{T_i}\right| \quad (8)$$

Measuring the MAE across the sample shows a value of 1.9 which suggests that predictions made were accurate on average with only a small degree of deviation from the actual values. These results illustrate that the CIRS stratification model is useful for estimating risk levels for oral health issues and planning interventions for older adults in long term care facilities with complex medical conditions.

5 DISCUSSION

5.1 Implications of the study findings for promoting oral health in long-term care facilities

The findings of this study support the important role of stratified care through the CIRS algorithm in improving oral health conditions of residents within LTCS. Stratifying oral health interventions to residents identified as being low, moderate, and high risk based on their burden of comorbidity enabled care givers to more easily plan oral health interventions. The stratified approach provided opportunities to allocate dental hygiene services in a targeted manner based on identified systemic vulnerability, and likelihood of benefit from oral care interventions. This was particularly effective in improving overall Total Functional Oral Scores (TFOS); low and moderate risk residents showed the biggest relative gains. The positive effects of proactive screening and treatment planning are emphasized in institutions where resource constraints collapse the opportunity to provide substantive dental care. The study reinforces evidence that a data-driven risk assessment model (CIRS) to stratify care can not only optimize care delivery but increase health equity by assuring patients with differentiated needs receive appropriate scale interventions.

5.2 Study Limitations and Suggestions for Future Research

Even though the findings of the present study show great promise, there are several limitations that should be taken into consideration. First, the sample size for this study was relatively small and limited to a small number of facilities which has implications for the ability to generalize the findings to broader populations or other geographic areas. The CIRS algorithm was used to measure levels of comorbidity; however, psychosocial factors or behavioral factors influencing oral health outcomes (i.e. cognitive impairment, motivation, cooperation when providing care, etc.) were not included in the measurement. Secondly, the study was relatively short in duration and did not consider the potential for sustaining the improvements observed. The researchers should aim to offer further research that includes longitudinal research, larger samples and numbers of diverse settings that can replicate these findings within an evidence-based practice framework, and provide additional support for high-quality evidence. Additionally, there exists the option to explore using other stratification models which consider mental health, nutritional status or oral microbial load to enhance and strengthen interventions targeting oral health in older adult populations.

5.3 Suggestions for Applying the CIRS Stratification Algorithm Elsewhere in Healthcare

Given the demonstrated success of the CIRS-based model focused on oral function in long-term care, it is possible to apply it to other healthcare environments, including rehabilitation centers, hospice units, and assisted living communities. The application must begin with adequate training of healthcare workers to conduct assessments to rate and enter the CIRS scores as well as understanding how the risk level corresponds to the level of oral hygiene intervention required. Interdisciplinary cooperative practice will be essential for dental professionals, nurses, and physicians to operationalize the algorithm by incorporating their skills into pre-existing workflows. Institutions would need to build dashboards or health information technology tools that automatically stratify patients based on the entered data, including data that is collected in the clinical environment by healthcare professionals and following care plans to leverage action and automation of follow-up care, thus making it easier to promote widespread usage. In addition, policy makers and administrators could calendars this approach in standard care plans or accreditation standards for quality monitoring of staff and utilization of quality in patient care which would encourage increased use of the approach. In the end, the enhanced use of the CIRS stratification model in practice could provide a clearer care co-ordination pathway, improve patient outcomes and the efficiency and effectiveness of resource utilization.

6 CONCLUSION

The study emphasizes the utility of a combined functional oral assessment with the CIRS Stratification Algorithm in long-term care environments for the purpose of optimizing oral health outcomes. In particular, the findings indicated that residents identified as being in the lower and

moderate comorbidity groups demonstrated the greatest improvements to their Total Functional Oral Scores (TFOS) after individualized interventions that corresponded to their CIRS risk categories. Furthermore, in addition to assisting care providers more effectively assess residents that have a higher risk of developing oral dysfunction, this also optimized the way that care was provided and assisted clinical decisions. This use of CIRS as a structural tool for stratification helped move care staff away from standardized care plans based on a general population, and allowed CIRS to be used to provide more personalized oral hygiene interventions that were based on risk. Notably, the association between systemic health and oral function reinforces the importance of interdisciplinary practice and care planning in geriatric care. While oral well-being continues to be an overlooked clinical domain in countless institutional care models, this research underscores the immediate requirement for standardized assessment approaches and prediction algorithms that can be integrated into regular practice. Evidence-based models such as CIRS are needed for all levels of patient acuity in long term care settings. To that end, healthcare administrators, policymakers, and clinicians need to act now for early identification, preventive care, and long term changes in oral well-being.

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