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INTERDISCIPLINARY PRACTICE FOR THE MANAGEMENT OF NUTRITIONAL DEFICIENCIES IN PATIENTS WITH ORAL AND DENTAL COMPLICATIONS

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Abstract
This research examines whether combining specialists in dentistry, nutrition, pharmacy, nursing, and lab services would help treat the problem of malnutrition in hospitalized people with oral health problems. For a period of six months, using a quasi-experimental before and after study design at a tertiary hospital, we saw great improvement in several nutritional parameters including serum albumin, hemoglobin, vitamin D, vitamin B12 and iron levels. Overall oral health also improved in the respondents according to the Oral Health Impact Profile OHIP-14 who reported on all aspects of oral function and well-being. Focus, interviews gave evidence of increased food and intake, less pain among the patients and higher satisfaction with the approach in provision of care though it took time and resources such effect was noted. These findings support the need for healthcare collaboration that focuses on patient centered care and poses questions for future studies that should evaluate the sustainability of such initiatives and how to resolve organizational obstacles.

Keywords: Hospitalized Patients, Multidisciplinary Care, Tertiary Hospital, Interdisciplinary Collaboration, Oral Health, Nutritional Deficiencies

Introduction
Nutritional deficiencies are common among oral and dental patients and are in fact more likely to make recovery more complex. Such a relationship suggests the need for an interdisciplinary approach given the divide across disciplines. In addition, malnourishment can increase oral health challenges that might compromise patients 'overall health (Lindmark et al., 2018). Other encouraging findings are: poor self-care can impede adequate diet intake due to a diminished ability or pain when chewing, sore throat or other problems preventing patients from consuming varying necessary nutrients (Touger-Decker & Mobley, 2013). The very close correlation between nutrition and oral care suggests an interdisciplinary care model for these patients.

Sending a referral to various areas such as nutrition, oral health, pharmacy medical care has proven to be effective across various condition in treating such patients in a hospital setting where one takes care of patients with complex multiple health conditions thereby increasing effectiveness of nutrition (Vanderwee et al., 2010). Each of these professionals has something different to offer. For instance, dentists have the scope to relieve patients of their oral pain leading to an improved ability to eat, pharmacists can change therapy depending on the status of the oral health of the patient along with providing the nurses and lab staff with insight on the chemical level of the patient's body to confirm a successful treatment.

Although the gains from interprofessional teamwork are evident, there has been little research specifically evaluating the effectiveness of such collaborations with respect to management of nutritional deficiencies and disorders associated with oral health. This study seeks to bridge that gap by looking at how the use of an integrated care model that includes oral health such as dental care, nutrition, pharmacy and lab services improves patient outcomes. Given the roles of each professional, the key objectives of the study are to seek ways and means of improving nutritional health and oral health care in a hospital or institutional setting, and as a result make these patients recover and have a better quality of life.

Literature Review

The connection between oral health and nutrition is not something new. Studies indicate that oral health, in particular among certain subgroups such as hospitalized patients and elderly people, is both the effect and cause of malnutrition (Touger-Decker & Mobley, 2013). Oral issues like a fraction of teeth present, disease of the gums, or xerostomia may pose challenges in the conquest of chewing and swallowing, which leads to one's inability to consume crucial micro and macronutrients (Sischo and Broder, 2011). Weaknesses in nutrition do not aid the situation however, as it also deteriorates immune responses making conditions of oral health worse and simultaneously creating a cycle that affects one's wellness (Lindmark et al., 2018). Based on these factors, an interdisciplinary and integrative view may be beneficial in order to suffice the dietary needs of patients that find it difficult to practice oral hygiene.

It can be stated that there is a clear link that explains how poor oral hygiene can influence a person's eating habits as well as the amount of nutrients they consume. For instance, poor oral practices in Kaur et al. (2021) had resulted in interference in such essential foods that are needed for recovery nutrition and immune nutrition; this was evident in people who had difficulty chewing and attaining lots of fruits and veggies, and meat. Moreover, lack of sufficient mouth hygiene has also been associated with low levels of saliva production which contributes to alteration in taste as well as difficulty swallowing and this has been proven to lower dietary variety and quality (Locker, 1992).

Equally as important, maintaining oral hygiene is linked to practicing good nutrition. A lack of essential nutrients including vitamins A, C, D, calcium and zinc increases the chances of developing gum diseases, and infections (Chen et al., 2016). There is also evidence from Lindmark et al. (2018) that older people with malnutrition experience more gum disease and oral infections than well-nourished people. This indicates that sufficient nutrition could perhaps avert or ameliorate some of the problems related to oral health, which warrants for managed care.

Preparedness for the anticipated joint interventions by health care providers from other fields tends to yield desirable results. As an example Azzolino et al. (2019) demonstrated that groups of health care providers, including, dentists, dieticians, and pharmacists together, made it possible for the care to focus on the entire oral and nutritional experience of the patient. Oral health issues can be addressed by customizing dietary restrictions or medications that cause dry mouth, for example. Nurses and lab specialists do their share of the work by supervising the nutrition of patients and making corrections when it is due (Vehkalampi et al., 2015).

The implementation of structured team protocols has been associated with greater nutritional and oral health. It was noted by Gerrish et al. (2016) that patients had greater nutrition and oral hygiene when a particular team employed a structured method. Such teamwork activities have also been associated with faster recovery and reduced duration of hospitalization by meeting both nutrition and oral hygiene needs at the same time (Vanderwee et al., 2010).

However, the collaboration across different specialties and disciplines is a known concern for the effectiveness of interdisciplinary care. Particularly in a crowded hospital setting, collaborating with other professionals is difficult when a patient presents with multiple issues that require different forms of intervention. Studies point out barriers like poor communication between departments, lack of standardized care protocols, and limited awareness of each discipline's purpose (Mitchell et al., 2011). There are also issues of time, and resources including staff that prevent the practice of collaborative care models (Saint-Pierre et al., 2018). Awareness and removing these barriers and pitfalls is a key factor in making interdisciplinary care work efficiently and effectively.

The research points out relationship between nutrition and oral health in a way that demonstrates their interdependence as far as health and recuperation are concerned. An interdisciplinary approach seems to be the best way to tackle these issues, but putting this sort of care into action can be complicated. This study grapples with the existing body of knowledge by investigating how an interdisciplinary approach that incorporates dental, nutrition, pharmacy, nursing, and laboratory services may enhance the efficacy of patient management. The aim is to evaluate effective approaches and determine other aspects of relevance that are often overlooked in multi-disciplinary collaboration within the hospital setting.

Methodology

This study employed a multimethod approach in assessing the effectiveness of a multi disciplinary intervention in addressing the factors that lead to malnourishment of patients with oral health challenges. The intervention involved dentistry, nutrition, pharmacy, nursing and laboratory services and was integrated over a period of 6 months in a tertiary referral hospital. the study was conducted in granted ethical clearance and all participants volunteered.

Overview of The Study

The study employed a quasi-experimental pre-post intervention design that targeted patient’s nutritional status and oral health. Quantitative information was obtained from biochemical and dietary assessment, while qualitative information was provided by the patients and healthcare practitioners engaged in the intervention through interviews.

Participant Recruitment

Physical suspicion of a patient with integrated scales such as gum disease, dry mouth or noticeable loss of teeth caused great concern towards their eating habits and so they were chosen from hospitalised patients with a moderate to grave oral health. Moreover, these patients aged 18 or above who had nutritional deficiencies in them were also included in the study. However, other patients who were severely cognitively impaired, those who were in palliative care or patients who couldn’t give consent during the study were excluded. A total of 60 patients were selected from the set of criteria out of which these patients volunteered to partake in the study.

Intervention Protocol

The intervention was a combined approach which included:

1. Dental Care: Factors affecting consumption such as oral hygiene were examined by the dentists, and treatment Care such as scaling was encompassed.

2. Nutritional Counseling: Evaluation of diet of each patient was carried out and detailed individual meal plans especially designed for easy to consume nutrient-rich food were developed. Follow ups were done to ensure the patient is not missing the scheduled appointment and make changes if needed.
3. Pharmacy Review: It was decided that each patient's record complies with a medication profile and any drug that could compromise moist oral tissues such as those medications which may dry the mouth; requiring modification if possible with the primary care team.
4. Nursing and Laboratory Monitoring: Nurses were responsible for following up on compliance with the dietary plan and maintaining oral hygiene, whereas lab specialists were responsible for implementing baseline, initiation and follow up conditions which includes tests for important nutrients like albumin, vit B12 and D, hemoglobin and iron levels.

All the program witnessed spanned six weeks and during this period patients had a well-coordinated care from the multi-disciplinary team. The team would hold weekly meetings where they would review the care provided for the patients and make any necessary changes.

Data Collection
Quantitative Data: Baseline risk and biochemical markers were collected at the commencement of the program and after the program, the MUST tool was also used to evaluate dietary risks. The set of OHIP-14 was employed to quantify health consequences of oral health including impacts on the patients wellbeing.

Qualitative Data: Twenty patients and ten healthcare providers provided qualitative data through semi-structured interviews. These interviews explored participants 'views on the effectiveness of the program, perceived benefits and challenges to the implementation of the program.

Data Analysis
Quantitative Analysis: To evaluate the effectiveness of the intervention, the authors employed paired t-tests for comparison of outcomes – nutritional and oral health status – considering baseline and end-line scores. The researchers reported effect sizes along with p-values to determine the threshold for significance, which they set at 0.05 or lower.

Qualitative Analysis: The interview data were analysed using thematic analysis. There were two researchers who abstracted codes from the transcripts, which recognized and reported different themes, and conflicts between them were settled by discussion.

Results and Outcomes
The impact of the intervention on nutritional and oral health of patients was immense, as revealed by serum nutrient levels and the risk of malnutrition related scores that showed improvement. In qualitative terms, both patients and health care professionals provided positive feedback on the approach, noting improved dietary intake and oral comfort, and general improved well-being. But, issues that needed to be addressed included the time available for everyone involved in the activity and difficulty in communication between team members.

Ethical Considerations
Patients were given the option to stop participating in a given study, and doing so would not affect the quality of care they are receiving. It was explained that confidentiality would be dealt with by disguising data and that interviews would always be carried out in a confined environment to promote frankness when responding.

Findings
Quantitative Findings

The intervention brought out considerable enhancement on nutritional and oral health outcomes of the participants.

Table 1: Baseline and Follow-up Matrix of Nutrition Outcomes

Nutritional Marker	Pre-Intervention Mean (SD)	Post-Intervention Mean (SD)	Mean Difference	p-value
Serum Albumin (g/L)	34.2 (5.1)	38.4 (4.9)	4.2	<0.001
Hemoglobin (g/dL)	10.8 (1.4)	12.3 (1.3)	1.5	<0.001
Vitamin D (ng/mL)	18.7 (6.5)	25.3 (5.8)	6.6	<0.001
Vitamin B12 (pg/mL)	297 (84)	415(72)	118	<0.001
Iron (mcg/dL)	55.6 (12.3)	76.9 (11.5)	21.3	<0.001

These results show that patients' nutritional status improved due to the intervention as evident by increased levels of albumin, hemoglobin, vitamin D, vitamin B12 and iron.

Table 2: The Pre and Post interventional status of the OHRQoL- OHIP14 Respondents.

OHIP-14 Domains	Pre Mean (SD)	Post Mean (SD)	Mean Difference	p-value;
Functional Limitations	3.8(0.9)	2.1 (1.0)	- 1.7	<0.001
Physical Pain	4.5(1.1)	2.2(1.0)	- 2.3	<0.001
Psychological Discomfort	4.1(0.8)	2.4(1.1)	- 1.7	<0.001
Physical Disability	3.9(0.7)	2.0(0.9)	- 1.9	<0.001
Psychological Disability	4.2(1.0)	2.3(1.0)	- 1.9	<0.001
Social Disability	3.7(0.9)	1.9(1.0)	- 1.8	<0.001
Handicap	3.6(0.8)	2.1(0.9)	-1.5	<0.001

Significant improvements in all interaction modes lead to involvement of other countries, reducing functional limitations, pain, psychological discomfort, and poor oral health among other areas.

Qualitative Findings’

The qualitative interviews point out three major themes, which have several sub-themes in each of them. Below are the themes and some quotes of the participants in order to make the reader to understand their insights.

Theme 1: Improved Nutritional Intake and Satisfaction

- Sub-theme 1.1: Better Appetite and Diet Variation”

“After the assistance, I was able to eat stuff I couldn’t earlier because of my teeth.” It has definitely changed a lot in my diet.” (Patient 5)

“Customized meal plans actually helped patients eat more and better, hence fueling their energies.” (Dietitian)

- Sub-theme 1.2: Relieved Pain While Eating

“Earlier eating was painful and I had to ignore some of the types of food, but the latter request brings in relief as now I am able to eat without having to struggle with pain.” (Patient 12)

“The dental care in question has lessened instances of pain suffered by the patients, thereby allowing them to stress-less follow complied diet plans.” (Nurse)

Theme 2: Benefits of Collaborative Care

- Sub-theme 2.1: Integrative Management with Collaborative Effort

“A joint team working on my treatment like a dentist, a dietitian, and everyone else looking after me, made me feel very much cared for.” (Patient 8)

“The weekly meetings of the resource end of the patient’s case management on the part of the pharmacist and other allied contributed largely on the strategy moderation and its improvement. So, it was particularly necessary.” (Pharmacist)

- Sub-theme 2.2: Improved Inter Provider Liaison

“Being on the same page with colleagues certainly saves us time to treat the problem and most importantly it eradicates drawing tension between us that comes with being provided contradicting information and advices to the patients.” (Nurse)

“This work division provided us to solve problems in an instant and adapt the work plans as required.” (Dentist)

Theme 3: Challenges in Undertaking Collaborative Care

- Sub-theme 3.1: Time and Workload Problems

"I had the impression it was a bit tough to be in contact with other members, especially due to our normal work." (Nurse)

"We wanted to ensure good care, but quick life made it difficult to be present at the meetings." (Nutritionist)

- Sub-theme 3.2: Inadequate Staff

"In some instances, we did not have sufficient resources or supplements for the diet regimen." (Nutritionist)

"The intervention was good, but probably more staffing and resources would have expanded successful implementation." (Pharmacist)

Discussion

The team-based interventions reviewed in this paper targeted symptoms of oral health deficiencies of hospitalized patients that are associated with malnutrition. There were marked improvements in the nutrition and oral health of the patients that went through this approach which underscores the importance of working across disciplines to resolve complex health problems. Other studies endorse the findings of this study concerning the importance of working in a team to improve patients ’ outcomes (Touger-Decker & Mobley, 2013; Azzolino et al., 2019).

Interpretation of Quantitative Findings

The satisfaction of the patients and the improved clinical indicators suggest that the intervention as a whole improved the nutritional status of the patients who were engaged as it increased serum albumin and hemoglobin levels and intake of vitamin D, B12, and iron, which further boosted the patients ' overall well-being. It has been proven that these nutrients are very important for good immune system function as well as for effective recovery (Moynihan, 2005). The amount of pain that patients experienced prior to chewing their food greatly affected their dietary habits, however, with better oral health, as illustrated by the OHIP-14 scores, there were noticeable changes. These findings correspond with the work of other researchers, indicating that, removing oral pain leads to an overall improvement in nutrition intake (Kaur et al., 2021).

Reflections on the Qualitative Data

The qualitative results gave the patients and providers an additional voice in their overall experiences with the intervention. Patients claimed that their nutrition intake and pain during eating was relieved which substantially enhanced their QoL. The healthcare workers stressed on the importance of communicating routinely and working as a team in order to provide optimal care services. Nevertheless, it was reported that time and workload were potential risks to the full execution of the intervention. These barriers correspond to the findings of Mitchell et al. (2011), which depicted that excessive workloads impede effective interdisciplinary primary healthcare. These issues, however, may require a readjustment of management strategy concerning staff and resources in order to facilitate co-case management.

Implications for Clinical Practice

This study has important implications for the design and professional practice in that it approaches the obstinacy of nutrition and oral health in the context of a well-defined framework, and strengthens the argument for a team-based and systematic approach towards the management of hospitalized patients with oral health issues. Standard operating procedures for inter-disciplinary working relationships could go a long way in enhancing collaboration among hospitals by incorporating regular team sessions, operating from a common patient files and templates as well as role clarifications. Also, enacting training measures which promote teamwork may help improve communication among healthcare providers working with the same patient, resulting in better health outcomes.

Limitations and Recommendations for Future Research

A single site of the research that is a single hospital sampled in this study constitutes a possible restriction on the applicability of the findings in other settings. Future studies should seek to include a wider sampling of hospitals to allow for broader conclusive results. Further to this, while both the quantitative and qualitative approaches were adopted, the qualitative approach was equally under-sampled. Increasing the qualitative part can make other views to be represented. Lastly, this study aimed only at short-term benefits, hence, more multidisciplinary approaches 'effects for patients should be sought in the future regarding the long-term changes.

Conclusion

Taking into account the findings of this study, a multidiscipline team approach can be effectively used as an intervention strategy in overcoming nutritional problems that arise as a result of poor oral care. The substantial accomplishments that were achieved both in nutrition and oral care outcomes suggest that the problem can be better managed through collaborative care rather than uncoordinated care where each discipline acts independently. There are however barriers like time and resource constraints, but from the responses of the patients and the health care providers, integrative care works. Taming such barriers will help health care facilities improve the practicality of

multidisciplinary approaches to care and consequently manage better patient outcomes which are often able to enhance the quality of life of the patients.

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