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Comparative Evaluation of Povidone-Iodine and Honey Dressings in the Management Outcomes of Cervicofacial Necrotizing Fasciitis

Kesiena Seun Yarhere[1], Achemoche Paul Saiki[2], Aimuamwosa Dennis Osagie[3], Tochukwu Malachy Odo[2], Efetobo Victor Orikpete[4*]

[1]Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, College of Health Sciences, University of Port Harcourt, Port Harcourt, Rivers State, Nigeria
[2]Department of Oral and Maxillofacial Surgery, University of Port Harcourt Teaching Hospital, Port Harcourt, Rivers State, Nigeria
[3]Alberta, Canada
[4]Department of Oral Pathology, Oral Medicine and Oral Radiology, Faculty of Dentistry, College of Health Sciences, University of Port Harcourt, Port Harcourt, Rivers State, Nigeria
Email: *efetobo.orikpete@uniport.edu.ng

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Abstract

Background: Cervicofacial necrotizing fasciitis (CNF) is a rapidly progressive, life-threatening soft tissue infection requiring prompt surgical and medical management. Following surgical debridement, wound care plays an important role in infection control and tissue healing. In resource-limited settings, commonly used dressing materials include povidone-iodine and honey. However, comparative evidence regarding their effectiveness in the management of CNF remains limited. **Objective:** This study aimed to compare the effect of honey and povidone-iodine wound dressings on the duration of hospital stay and mortality outcomes in patients treated for cervicofacial necrotizing fasciitis. **Methods:** A retrospective comparative cohort study was conducted at the Department of Oral and Maxillofacial Surgery, University of Port Harcourt Teaching Hospital, Nigeria. Records of patients managed for cervicofacial necrotizing fasciitis between January 2020 and December 2025 were reviewed. Eligible cases included patients who underwent surgical debridement and received postoperative wound dressing with either honey or povidone-iodine. Data collected included demographic characteristics, defect size, comorbidities, complications, microbiological findings, duration of hospital stay, and treatment outcome. Statistical analysis was performed using SPSS version 26. Continuous variables were assessed for normality using the Shapiro-Wilk test. The Mann-Whitney U test was used to compare hospital stay between groups. Mul-

tiple linear regression was used to evaluate predictors of hospital stay, while binary logistic regression was used to assess predictors of mortality. Statistical significance was set at $p < 0.05$. **Results:** Thirty patients met the inclusion criteria, comprising 18 (60.0%) managed with honey dressings and 12 (40.0%) treated with povidone-iodine. The overall mean age was 61.4 ± 17.9 years, and 56.7% were male. The median duration of hospital stay was shorter among patients treated with honey (8 days) compared with those treated with povidone-iodine (13 days); however, this difference was not statistically significant ($p = 0.329$). In multiple linear regression analysis, wound dressing material did not independently predict hospital stay ($p = 0.523$). The overall mortality rate was 26.7%, with slightly higher mortality in the povidone-iodine group (33.3%) compared with the honey group (22.2%). Logistic regression analysis showed that the occurrence of complications was the only significant predictor of mortality (OR = 10.03; 95% CI: 1.51 - 66.68; $p = 0.017$), whereas the type of dressing material was not significantly associated with survival outcomes. **Conclusion:** Although honey dressings demonstrated slightly shorter hospital stay and lower mortality compared with povidone-iodine, these differences were not statistically significant. Clinical outcomes in cervicofacial necrotizing fasciitis appear to be influenced primarily by the occurrence of complications rather than the choice of dressing material.

Keywords

Cervicofacial Necrotizing Fasciitis, Honey, Wound Dressing, Povidone-Iodine, Necrotizing Soft Tissue Infection

1. Introduction

Necrotizing fasciitis is a rapidly progressive, life-threatening soft tissue infection characterized by widespread fascial necrosis, vascular thrombosis, and systemic toxicity. When it involves the head and neck region, it is referred to as cervicofacial necrotizing fasciitis (CNF) [1]-[5]. This condition is relatively rare, accounting for less than 5% of all cases of necrotizing fasciitis [4]; however, it poses an even greater risk due to the proximity to vital anatomical structures such as the airway, mediastinum, and major neurovascular bundles of the head and neck. CNF is characterized by rapid bacterial proliferation, release of bacterial toxins and occlusion of nutrient vessels resulting in tissue hypoperfusion and skin necrosis, often extending beyond the initially apparent area of involvement. Release of inflammatory mediators may result in systemic response which often could lead to septic shock [6]-[9].

Despite advances in medical care over the last few decades, the mortality rates associated with cervical necrotizing fasciitis remain high, ranging from 19% to 40% [9]-[11], and even as high as 80% in the absence of early surgical or medical intervention [12]. The condition is more frequently observed in the elderly and

neonates, typically occurring in the presence of comorbidities such as malnutrition, obesity, uncontrolled diabetes mellitus, malignancies, alcoholism, drug abuse, HIV infection, chronic liver disease and kidney disease [10]. However, around 25% to 33% of patients with CNF have no identifiable systemic predisposing factor [5] [6] [13] [14]. Cervicofacial necrotizing fasciitis usually arises as a complication of untreated or poorly treated odontogenic infections, although trauma, tonsillar infections, and postoperative contamination have also been implicated [4] [15] [16]. Similar to most odontogenic infections, CNF is mostly a polymicrobial infection involving both aerobic and anaerobic microorganisms [4] [8] [17]. The infection spreads rapidly along fascial planes, leading to extensive tissue destruction that is often more severe than the early clinical findings suggest [18] [19]. Once a diagnosis of CNF is made, treatment should commence immediately, as delays in diagnosis or treatment often lead to development of complications such as septic shock and mediastinitis and overall poorer outcomes [20].

Previous studies have reported poorer outcomes in the elderly, in those with diabetes mellitus, immunosuppression, or renal impairment, and when there is delayed presentation, extensive tissue involvement or systemic complications such as sepsis or airway obstruction [4] [12] [21]. Prompt detection and intervention are therefore pertinent to reducing morbidity and mortality associated with CNF. Effective management requires early aggressive surgical debridement, broad-spectrum antimicrobial therapy, intensive supportive care, and meticulous wound management [4] [20]. Although surgical debridement is the mainstay of treatment, optimal postoperative wound dressing remains critical in promoting wound healing. Optimal wound management helps control local infection and promote granulation tissue formation and typically involves the use of antiseptic agents that help reduce microbial load. Systemic antibiotics, though essential, are ineffective within the necrotic zone due to hypoperfusion and the presence of microbial biofilms that hinder drug penetration. Therefore, local wound management strategies, particularly the use of topical antimicrobial agents, are of increasing interest in improving outcomes [22].

Common wound management materials include silver-based dressings, alginate dressings, honey, povidone-iodine, saline-soaked gauze and vacuum-assisted closure (VAC). Choice of dressing material should consider physical protection, antimicrobial action, exudate management, pain management, odour control and granulation tissue formation [23] [24]. In many low-resource environments, VAC, silver-based dressings and alginate materials may not be readily available.

Povidone-iodine is a topical antiseptic that has long been used because of its broad antimicrobial spectrum [25]. Povidone-iodine is effective against bacteria, fungi, viruses, protozoa and other microorganisms. It releases free iodine which penetrates microbial cell walls and disrupts protein and nucleic acid structures. It is also able to penetrate biofilms and necrotic tissue, and retains its activity in the presence of organic matter [26]. Despite its common use, organisms rarely develop stable resistance to povidone-iodine. However, prolonged use has been as-

sociated with potential cytotoxic effects on fibroblasts and keratinocytes that may delay wound healing, although evidence regarding this potential cytotoxicity remains conflicting [26].

These concerns have led clinicians to explore alternative dressing agents such as honey. Honey is a natural supersaturated sugar solution produced by bees from nectar and plant exudates [27]. Although the use of honey in wound care dates back to ancient history, its re-emergence has been driven by scientific evidence suggesting that it combines antimicrobial activity with enhanced tissue regeneration. Honey exerts antibacterial effects through several mechanisms including high osmolarity, hydrogen peroxide production, low pH, and the presence of bioactive compounds that promote angiogenesis and granulation tissue formation [28]-[30]. The slow and sustained release of low concentrations of hydrogen peroxide helps inhibit bacterial growth without causing tissue damage.

Some studies have reported favourable clinical outcomes using honey in burns, chronic ulcers, diabetic wounds and postoperative infections, with reduced infection rates and faster wound healing compared with other dressing agents [31] [32]. Honey may therefore serve as a viable alternative, particularly in low- and middle-income countries because it is readily available and affordable [28] [29]. However, the composition and quality of honey can vary significantly depending on geographic location, the source flora, production methods and storage conditions [33]. Concerns have also been raised about contamination of raw honey with Clostridium spores or variability in non-medical grade preparations [34] [35]. Medical-grade honey is processed and sterilized for clinical use and has demonstrated broad antimicrobial activity, including activity against clinical isolates of Pseudomonas aeruginosa and associated biofilms [36].

Given the significant morbidity and prolonged hospitalization associated with CNF, identifying safe and cost-effective wound dressing agents is clinically important. Despite increasing use of honey in wound care, studies comparing it with conventional agents such as povidone-iodine in cervicofacial necrotizing fasciitis remain limited. Comparative studies evaluating clinical outcomes such as duration of hospital stay and survival in CNF are few, particularly in sub-Saharan Africa [8] [15]. In Nigeria, where resource constraints often influence the choice of wound care materials, alternatives such as honey are increasingly explored. Honey and povidone-iodine are readily available in resource-limited settings, yet the choice of dressing material often depends on availability and anecdotal experience.

Therefore, this study aimed to compare the effect of honey and povidone-iodine wound dressings on the duration of hospital stay in patients treated for cervicofacial necrotizing fasciitis. In addition, the study evaluated the impact of these dressing agents on survival outcomes while controlling for other clinical confounders.

2. Methods

This was a retrospective, comparative cohort study conducted to evaluate the ef-

fectiveness of povidone-iodine and honey dressings in the management of cervicofacial necrotizing fasciitis (CNF). The study was carried out at the Department of Oral & Maxillofacial Surgery, University of Port Harcourt Teaching Hospital. The study population consisted of all patients managed for cervicofacial necrotising fasciitis (CNF) between January 1st 2020 and December 31st 2025. Diagnosis of cervicofacial necrotizing fasciitis was based primarily on clinical grounds, with confirmation at surgical exploration. Notable clinical features used in diagnosis included swelling, severe pain, skin discolouration, crepitus, visible fascial necrosis, relative lack of bleeding and the characteristic foul smelling "dishwater" fluid noted during exploration. Computed tomography was used as an adjunctive tool where available. All eligible cases of CNF during the study period were included in the study. Inclusion criteria were cases of CNF who underwent surgical debridement, and were managed post-operatively with either honey dressing or povidone-iodine dressing. Exclusion criteria included patients with CNF who were treated with other dressing materials or a combination of dressing materials.

The departmental clinic registers, surgical day books and theatre records were reviewed, and the records of all cases of CNF were retrieved. Data extracted included age and gender of the patient, size of the defect (<5 cm, 5 - 10 cm, >10 cm), duration of hospital stay (days), material used for wound dressing (honey or povidone-iodine), presence/absence of comorbidities, occurrence of complications, results of microbiology, culture & sensitivity testing (MCS), presence of overlying skin discolouration, and the final outcome (dead or alive). Cases were then categorized into two groups, based on the solution used for wound dressing. Group 1 consisted of cases in which wound dressing was done using honey, while Group 2 comprised cases in which wound dressing was done using povidone iodine. Allocation to treatment groups was carried out randomly by the nursing officer on duty at the time of admission. All patients underwent haemodynamic support, serial daily surgical debridement, followed by application of a layer of dressing material (povidone-iodine or honey) to the wound. The frequency of debridement and dressing was subsequently reduced as clinical improvement occurred. For the honey group, locally sourced, non-sterilized honey was applied directly to the wound bed, which was then covered with sterile gauze. For the povidone-iodine group, gauze soaked in 10% povidone-iodine solution (Betadine®) was applied. Following control of the infection, two patients had skin grafting, while one had repair with a local flap. For the remaining cases, the wounds were allowed to heal by secondary intention. All patients received empirical antibiotics following collection of samples for microscopy, culture and sensitivity. Antibiotic therapy involved a combination of agents to cover both aerobic and anaerobic organisms. The most common combination was Intravenous Ceftriaxone, Metronidazole and/or Clindamycin. De-escalation of antibiotic regimen following culture results was performed in all cases.

The primary outcome variable was defined as the duration of hospital stay (in days), while the secondary outcome variable was defined in terms of the final outcome (dead or alive). The major independent variable of interest was defined as

the wound dressing agent, while the other variables were considered as possible confounders.

Data were entered into a spreadsheet and subsequently exported to SPSS version 26 for data analysis. Descriptive statistics were computed for all variables. Normality testing for continuous variables was performed using the Shapiro-Wilk test, and such data were expressed as means ± standard deviation (for normally distributed data) and median (interquartile range) for non-normally distributed data. Categorical data were expressed as frequencies and percentages. The duration of hospital stay between the two groups was compared using the Mann-Whitney U test, and multiple linear regression analysis. A hierarchical modelling approach was used to control for potential confounding variables. In Model 1, age, comorbidity and size of defect were entered, while in Model 2, the wound dressing material was added to determine whether it independently predicted the duration of hospital stay beyond clinical confounders. The final outcome was analyzed using multivariable binary logistic regression. Due to the limited number of mortality outcomes, only the occurrence of complications and wound dressing agents were used as the predictors. to assess the independent association with mortality outcomes. Statistical significance was set at $p < 0.05$. Ethical approval for this study was obtained from the Ethics Review Committee of the University of Port Harcourt Teaching Hospital.

3. Results

Over the duration of the study, a total of 37 patients were managed for cervicofacial necrotising fasciitis. Among these, four were managed using dressing materials other than honey or povidone iodine, while three were managed using a combination of wound dressing agents. As such, they were excluded from the study, leaving 30 patients who met the inclusion criteria. Eighteen patients (60.0%) received honey dressings, while twelve patients (40.0%) were managed with povidone-iodine dressings. The overall mean age of the patients was 61.4 ± 17.9 years, with a range from 10 to 92 years. The majority (66.7%) of patients were aged 60 years and above. Patients treated with honey dressings were older compared to those treated with povidone-iodine. The study population comprised 17 (56.7%) males and 13 (43.3%) females. The distribution of age, gender, size of defect, comorbidities, complications, skin discolouration, and final outcome distribution for subjects treated with povidone iodine and those treated with honey are shown in **Table 1**.

Microbiological culture results were available in 20 (66.7) of the 30 cases, and in the remainder of cases, culture was either not done or the results could not be retrieved. Among the available cases, MCS did not yield any growth in 35% of cases, and the commonest microorganisms associated with CNF were *Staphylococcus aureus*, Klebsiella species and *Escherichia coli* (**Figure 1**).

Seventy percent of the study subjects had one or more comorbid condition(s), most frequently Diabetes Mellitus (**Figure 2**). Over the duration of hospitalization, about one-third (36.7%) of the study subjects developed complications, with the most frequent complication being systemic sepsis (26.7%).

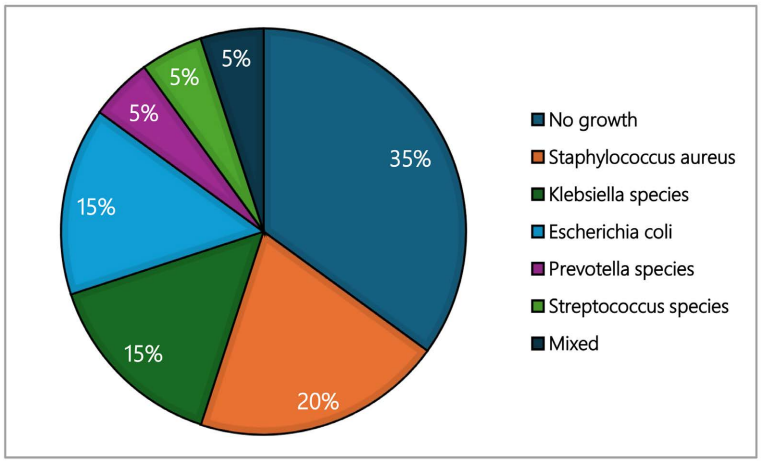

Figure 1. Microbiological profile of organisms frequently isolated from subjects with cervicofacial necrotizing fasciitis.

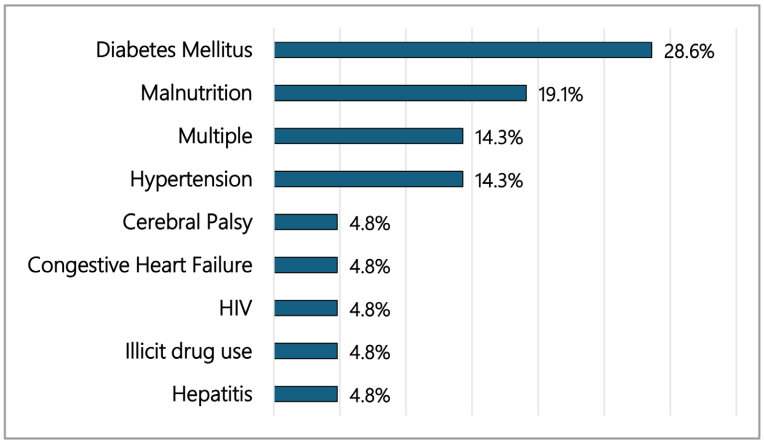

Figure 2. Comorbid conditions frequently encountered in subjects with cervicofacial necrotizing fasciitis.

Table 1. Comparison of patient characteristics, clinical features and outcomes between study participants according to the wound dressing material.

Variable	Honey dressing	Povidone iodine dressing	Total
Age (years)			
Range	23 - 92	10 - 77	10 - 92
Mean	65.7 ± 17.7	55.1 ± 17.0	61.4 ± 17.9
Gender			
Male	12 (66.7)	5 (41.7)	17 (56.7)
Female	6 (33.3)	7 (58.3)	13 (43.3)
Size of Defect			
<5 cm	8 (44.4)	7 (58.3)	15 (50.0)
5 - 10 cm	4 (22.2)	3 (25.0)	7 (23.3)
>10 cm	6 (33.3)	2 (16.7)	8 (26.7)
Median duration of hospital stay (days)	8.0 (6.75 - 13.25)	13 (3.75 - 16.75)	9 (6.75 - 14.25)

Continued

Comorbidities			
Present	10 (55.6)	11 (91.7)	21 (70.0)
Absent	8 (44.4)	1 (8.3)	9 (30.0)
Complications			
Present	6 (33.3)	5 (41.7)	11 (36.7)
Absent	12 (66.7)	7 (58.3)	19 (63.3)
Skin discolouration			
Present	13 (72.2)	7 (58.3)	20 (66.7)
Absent	5 (27.8)	5 (41.7)	10 (33.3)
Final Outcome			
Alive	14 (77.8)	8 (66.7)	22 (73.3)
Dead	4 (22.2)	4 (33.3)	8 (26.7)

Duration of hospital stay

When all cases were included, the median duration of hospital stay was 8.0 (6.75 - 13.25) days for patients treated with honey and 13 (3.75 - 16.75) days for those treated with povidone-iodine, (Figure 3) and there was no statistically significant difference in duration of hospital stay between the two groups (U = 85.0, Z = −0.976, p = 0.329). However, following exclusion of patients who died (n = 8), a Mann-Whitney U test demonstrated a statistically significant difference in the duration of hospital stay between the groups (U = 24.5, p = 0.031), with shorter duration observed in the honey group [8.5 (7.75 - 14.0) days vs 15.5 (12.5 - 17.75) days].

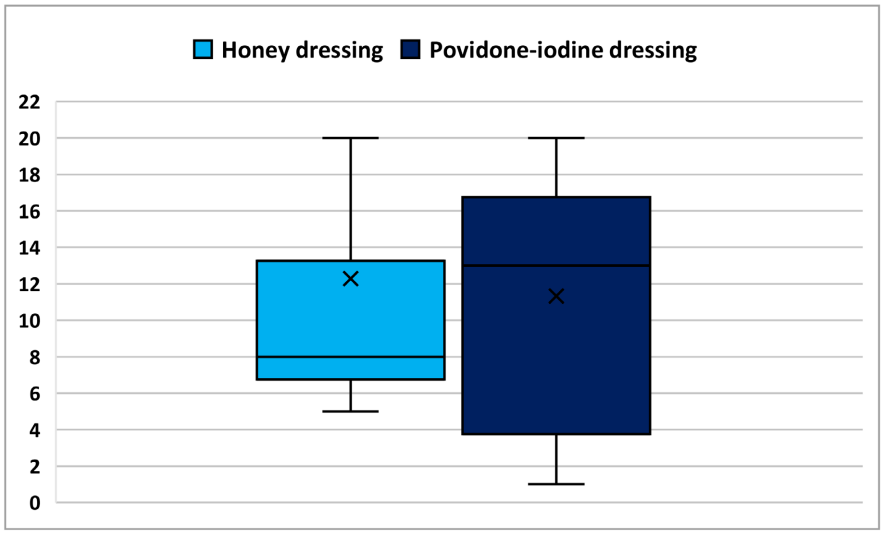

Figure 3. Comparison of the duration of hospital stay of the study participants between honey and povidone-iodine dressing groups. (Note: outlier (62 days) in the honey group not shown).

The results of the hierarchical multiple linear regression showed that in Model 1, the confounding variables (age, comorbidity and size of defect) explained 16.2% of the variation in the duration of the hospital stay; however, the model was not statistically significant ($F(4,25) = 1.210$, $p = 0.331$). In Model 2, following the addition of the type of wound dressing agent, there was a marginal increase, and the model was able to explain 17.7% of the variation in the duration of the hospital stay. The R^2 change of 1.4% was not statistically significant ($p = 0.523$). The wound dressing material was not an independent predictor of the duration of hospital stay ($B = -2.921$, $p = 0.523$), and none of the evaluated confounding variables independently predicted duration of hospital stay. Overall, the model was not statistically significant ($F(5,24) = 1.030$, $p = 0.422$) (Table 2). A survivor-only multiple linear regression analysis also showed that age, comorbidity, and dressing material were not significant predictors of length of hospital stay ($F = 0.721$, $p = 0.552$) with the model explaining only 10.7% of the variance in length of stay ($R^2 = 0.107$; Adjusted $R^2 = -0.041$).

Table 2. Multiple linear regression analysis of factors predicting the duration of hospital stay in CNF.

Variable	Model 1 B (SE)	p-value	Model 2 B (SE)	p-value
Age (years)	−0.109 (0.124)	0.389	−0.119 (0.127)	0.358
Comorbidity	3.539 (4.805)	0.468	4.626 (5.142)	0.377
Defect size (5 - 10 cm)	−1.954 (4.922)	0.695	−1.866 (4.982)	0.711
Defect size (>10 cm)	5.998 (4.699)	0.214	5.393 (4.846)	0.277
Dressing material	-	-	−2.921 (4.504)	0.523
Constant	14.961 (9.916)	0.144	16.121 (10.191)	0.127
Model statistics	R^2	Adjusted R^2	F	p-value
Model 1	0.162	0.028	1.210	0.331
Model 2	0.177	0.005	1.030	0.422

Reference categories: honey dressings, defect size < 5 cm, comorbidity absent. SE = Standard Error.

Final outcome (Survival/Mortality)

There was a higher proportion of mortality cases recorded among those whose wounds were dressed using povidone-iodine (33.3%) compared to those in which honey was the wound dressing agent (22.2%). Additionally, those who received honey dressings had 1.75 times higher odds of survival compared to the povidone-iodine group (OR = 1.75, 95% CI: 0.341 - 8.982). These differences were however, not statistically significant ($p = 0.678$).

Test of association using Chi square test showed that there were no significant associations between mortality outcomes and age ($p = 0.386$), gender ($p = 0.698$), size of defect ($p = 0.249$), skin discolouration ($p = 0.210$), comorbidity ($p = 0.666$), as well as the type of dressing agent use ($p = 0.678$). However, a statistically significant association was observed between mortality outcomes and the occurrence of complications ($p = 0.028$).

On multivariable binary logistic regression analysis, the presence of complications was significant in predicting mortality outcomes. Patients who developed complications had significantly higher odds of death (OR = 10.03; 95% CI: 1.51 - 66.68; p = 0.017). Wound dressing material was not a significant predictor of mortality (Table 3). Although patients treated with povidone-iodine had higher odds of death compared to those treated with honey (OR = 1.63; 95% CI: 0.25 - 10.49), this association was not statistically significant (p = 0.610).

Table 3. Logistic regression analysis for factors predicting mortality in CNF.

Variable	Model 1 (Unadjusted) OR (95% CI)	p-value	Model 2 (Adjusted) OR (95% CI))	p-value
Complications (present)	10.03 (1.51 - 66.68)	0.017*	10.03 (1.51 - 66.68)	0.017*
Dressing material (Povidone-iodine vs Honey)	-	-	1.63 (0.25 - 10.49)	0.610
Constant	0.36	0.014	0.10	0.007
Model performance	−2 Log likelihood	Nagelkerke R^2	Model p-value	Classification accuracy
Model 1	27.945	0.297	0.009	76.7%
Model 2	27.684	0.307	0.029	76.7%

Reference categories: Outcome variable: Mortality (0 = Alive, 1 = Dead); Complications: No; Dressing material: Honey. *Statistically significant at p < 0.05; OR: Odds Ratio; CI: Confidence Interval.

4. Discussion

Cervicofacial Necrotizing Fasciitis requires prompt and aggressive surgical debridement and systemic antibiotics; however, wound management following debridement is often underemphasized despite its influence on clinical outcome. This study sought to compare the effect of honey and povidone-iodine wound dressings on the duration of hospital stay and mortality outcomes in patients with cervicofacial necrotising fasciitis. Our results showed that patients managed with honey dressings demonstrated a shorter median hospital stay; however, dressing material did not independently influence the duration of hospitalization or mortality outcomes after adjustment for clinical factors.

This study observed a shorter hospital stay in the honey group compared to povidone-iodine group. The initial analysis including all patients did not demonstrate a significant difference in hospital stay between the groups. However, after excluding patients who died—whose hospital stay may not reflect true recovery duration—a significant reduction in hospital stay was observed in the honey group. This suggests that mortality may act as a confounding factor when evaluating duration-based outcomes. The shorter hospital stay with the honey group may reflect the biological properties of honey, which help promote wound healing [31] [32]. Honey has antimicrobial and anti-inflammatory properties, and may be a cost-effective adjunct or alternative to conventional wound dressing agents [33]

[36]. Moreover, it can be used for various wound types, like burns, diabetic foot ulcers and necrotizing fasciitis [37] [38]. Other similar reports in the literature have found that honey dressings were associated with reduced hospital stay duration, fewer debridements, and overall cost-effectiveness [39] [40].

Honey's osmotic effect, hydrogen peroxide production, and bioactive compounds contribute to its microbial inhibition and tissue regeneration properties [28] [36]. These properties complement surgical debridement and systemic antibiotics to modulate infection control and promote granulation tissue formation [39]. Comparative studies showed honey's antimicrobial efficacy comparable or superior to conventional antiseptics and dressings [39]-[41].

A number of studies have demonstrated improved patient comfort and reduced pain during dressing changes with honey wound care [42]-[44]. In a randomized control trial, Iwunze & Iwunze [32] reported that honey dressings were associated with less wound pain over the course of treatment compared to povidone iodine dressing in the treatment of Wagner 2 diabetic foot ulcers. Although pain scores were not evaluated in our study, other studies have observed less frequent need for surgical debridement and reduced odour with honey treatment [42] [45].

Our findings suggest that the clinical progression of CNF may be more influenced by systemic factors and debridement rather than topical wound dressings alone. In our regression analysis, although the addition of dressing material to the hierarchical model slightly increased the explained variance in hospital stay (R^2 change of 1.4%), this contribution was not significant. The results of the hierarchical multiple linear regression showed that in Model 1, the confounding variables (age, comorbidity and size of defect) explained 16.2% of the variation in the duration of the hospital stay; however, the model was also not statistically significant.

In this study, only one paediatric case was recorded. This contrasts with the findings of Braimah *et al.* [9], who reported 17 paediatric CNF cases within a six-month period at a tertiary hospital in Northwestern Nigeria, none of which were odontogenic in origin. Patients aged 60 years and above accounted for the majority of cases in our cohort (66.7%). However, age was not associated with outcome in this study, unlike the findings of Yan *et al.* [7] who reported that increasing age was a significant predictor of mortality. A slight male predominance was observed in this study, which is consistent with previous reports [7] [13] [14] [45].

Seventy percent of the study subjects had one or more comorbid condition(s), most frequently Diabetes Mellitus (28.6%). According to a systematic review of cervical NF by Gunaratne *et al.* [8], diabetes mellitus (18.8%) was reported to be the most common co-morbidity recorded from 1235 cases. Other studies [7] [13] [45] have also reported diabetes mellitus as the most common comorbidity encountered. Pepper *et al.*, [10] however noted that most cases of CNF occurred in individuals who had more than one comorbid condition. In our study, multiple comorbidities occurred in 14.3% of the subjects. Several prior studies [3] [5] [6] [8] [13] [14] [19] have reported that around 25% to 33% of patients with CNF

have no identifiable systemic predisposing factor, which is similar to our finding.

The microbiological profile in this study revealed polymicrobial infections, with *Staphylococcus aureus*, *Klebsiella species* and *Escherichia coli* being the most frequently isolated organisms. This aligns with the recognised polymicrobial nature of cervicofacial necrotising infections. Using cultural analyses, many authors [7] [13] [22] have observed that odontogenic cervicofacial necrotizing fasciitis, similar to odontogenic abscesses, is caused by a polymicrobial infection involving both aerobic and anaerobic bacteria. Böttger *et al.* [46], Gunaratne *et al.* [8] and Vandelaar *et al.* [17] all reported that in CNF the more common organisms include: Streptococcus, Staphylococcus, Prevotella, Peptostreptococcus, Bacteroides, Fusobacterium, Enterobacter, Klebsiella, *Escherichia coli*, Pseudomonas, and Candida. Despite the disease burden and substantial insult that usually occur with necrotizing fasciitis, a notable proportion (35%) of cultures yielded no growth. Such patients may have already been exposed to empirical antibiotic therapy prior to presentation, which can reduce bacterial load and consequently obscure or alter the results of microbiological cultures [19]. Previous reports show that standard culturing methods of odontogenic infections yield on average 2 - 8 species. When molecular methods are used, over 18 species are detected [47]. It is therefore not surprising that following a large review of 1235 cases of cervicofacial necrotizing fasciitis by Gunaratne *et al.* [8], mainly streptococci and staphylococci could be isolated, whereas the detection of anaerobes was markedly less successful, similar to our finding.

Mortality in this cohort was 26.7%, which is consistent with the high fatality rates typically associated with necrotising fasciitis of the head and neck. Although a higher proportion of deaths occurred in the povidone-iodine group (33.3%) compared with the honey group (22.2%), the difference was not statistically significant. This suggests that dressing type alone may not independently influence survival outcomes. Therefore, while a trend favouring honey was observed, firm conclusions cannot be drawn. Mortality rate from NF varies significantly from 19% to 40% [11], and figures as high as 80% have been reported in absence of early surgical or medical intervention. [12] [48]. The major cause of death in most cases is overwhelming sepsis, with multiorgan failure.

The present study identified the occurrence of complications—particularly systemic sepsis—as the only significant predictor of mortality among subjects with CNF. Patients who developed complications were approximately ten times more likely to die compared to those without complications. This finding underscores the critical importance of early detection and aggressive management to prevent systemic complications, as systemic disease progression is critical in determining survival, rather than local wound management alone. CNF is characterized by rapid fascial spread, toxin release and systemic inflammatory response; thus, once complications develop, prognosis worsens considerably regardless of dressing modality. Patients with DM, elderly, anaemic or malnourished patients, and any patient with signs of systemic toxicity are high risk for poor outcomes and for

possible mediastinal spread [49].

Limitations of the study

Certain limitations were noted in the study which should be considered when interpreting the findings. Firstly, the relatively small sample size may limit the strength of the study. Secondly, the retrospective nature of the study may have introduced potential information bias as variables such as time from infection to surgical debridement, airway compromise, and standardized severity scores (e.g., LRINEC) were not included. Additionally, the use of unprocessed non-medical grade honey could potentially affect consistency in therapeutic efficacy. Furthermore, the influence of the systemic antibiotic regimen on outcome was not accounted for. Despite these limitations, the relative rarity of CNF means that this study provides useful information and contributes to the sparse local scientific literature. Further prospective studies with larger sample sizes and standardized wound care protocols are recommended to better clarify the potential role of honey in the management of cervicofacial necrotizing fasciitis. Furthermore, combination of honey and povidone-iodine wound dressings may be a promising area for future investigation.

5. Conclusion

Overall, our findings show that honey dressings demonstrated a trend toward shorter hospital stay and lower mortality compared with povidone-iodine; however, these differences were not statistically significant. Given the accessibility of honey, its relative affordability, antimicrobial action and wound healing properties, it remains a viable wound dressing option particularly in low resource setting. Clinical outcomes in cervicofacial necrotizing fasciitis appear to be influenced primarily by the occurrence of complications rather than the choice of dressing material.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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