Original Article

Relationship between Characteristics of the Wound and Healing Duration among Patients Treated during Home-Visits

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ABSTRACT

In humans, wound healing is a vital but complex process governed by chronological yet overlapping stages, such as hemostasis, inflammation, proliferation, and remodeling. Because of the complexities of wound healing, it is prone to pausing at multiple levels. Wound healing can potentially be influenced by factors that affect cellular functions and physiologic responses. This research aimed to investigate the relationship between wound healing duration and demographic properties and characteristics of wounds among patients treated during home visits in Erbil, Iraq. To this end, a longitudinal correlational quantitative design was employed in the current study. A random sample of about 101 chronic wounds was found in 77 patients of both genders selected from all ages during home visits for around four years in Erbil. The professional nurse applied nursing management according to the nursing plan during home visits until the wound recovered. The total duration of wound healing was calculated and documented for each wound. Seventy-seven patients participated in the current study, with their mean±SD age being 58.02±16.29 years, ranging from 19 to 89. The median age was 60. More than half of the sample (54.5%) were ≥60 years, and 62.3% were males. Less than one-third of patients (31.2%) were of normal weight, 93.5% were married, 37.7% were housewives, and 35.1% were illiterate. Regarding the duration of wound healing, in more than one quarter (26.7%), it was delayed (took more than three months for healing). The longest mean healing time (20.06 weeks) was for pressure ulcers (P<0.001), which was significantly higher than all the mean healing times of other types of wounds. The study showed a significant (P=0.011) association between the mean healing time and the anatomic location of wounds, revealing that the highest mean healing time was for wounds located in the trochanteric area (21.10 weeks) or the sacrum (18.25 weeks). A significant association (P=0.002) was also detected between the mean healing time and the edge of the wound, with the highest mean healing time (18.64 weeks) found in wounds with undermined edges. Furthermore, the mean healing time was significantly higher among those with infected wounds (14.59 weeks) than the mean (6.50 weeks) among those with no infection (P<0.001). In conclusion, wound healing progression is an important but complicated process that healthcare providers use for patients during home visits. It is divided into phases, including hemostasis, inflammation, proliferation, and remodeling. The current study revealed that the healing time was affected by the anatomical site of the wound and took longer in pressure ulcers, undermined edge wounds, and infected wounds.

Keywords: Chronic wound, Healing, Healing duration, Home visits, Wound

1. Introduction

In humans, wound healing is a vital but complex process governed by chronological yet overlapping stages, such as hemostasis, inflammation, proliferation, and remodeling (1). Because wound healing is so complicated, it often stops at more than one level. Wound healing can potentially be influenced by factors that affect cellular functions and physiologic responses (2). Wound healing is impaired by many causes, such as diabetes mellitus (DM). Many contributing factors may affect the healing of wounds, unlike other causes of tissue repair alteration. Depending on the number of diabetic patients, the impact of healing changes can be enormous. Chronic wounds are often aggravated by minor wounds and non-healing sores that are susceptible to infection. Infection commonly leads to gangrene and, eventually, the need for amputation (3).

Over the last 65 years, the elderly population has grown dramatically, increasing the risk of age-related pathologies, such as chronic ulcers, and the associated socioeconomic and clinical burdens (4). Many local factors in the sore itself may delay the healing process, such as infection or the presence of abnormal bacteria, desiccation, swelling, maceration, pressure, trauma, and necrosis (5). Radiotherapy is unavoidable and will affect some normal tissues. The long-term effects of such radiation may cause radiation damage that may persist for decades after radiotherapy. Wound healing issues are frequently underestimated in these patients (6).

Obesity affects one-third of the adult population in the United States (7). The primary concern with obesity is the increased heart workload required to supply oxygenated blood to body tissues. Ischemia may occur when the tissues are not perfused by the heart and thus contribute to tissue necrosis and wound healing impairment (8). Despite the beneficial action of steroids, such as dexamethasone, as immunosuppressive glucocorticoids, and anti-inflammatory drugs in autoimmune disorders or asthma, they may affect the wound healing process and thus delay healing (9, 10).

Organ transplant recipients are at risk because they are given antirejection drugs, such as CellCept and prednisolone, after surgery. The negative effect on wound healing comes from the tendency of steroid drugs to inhibit wound contraction and reduce tensile strength (8). Wound healing needs adequate nutrition. Many skin biological processes require nutrients for maintenance and proliferation. Competency in the mechanism of cellular requirements is required for wound healing (1, 11). Adequate quantities of nutrients are required for the production of proteins, nucleic acids, and other factors involved in functional tissue differentiation and maturation.

This research aimed to investigate the relationship between wound healing duration and demographic properties and characteristics of wounds among patients treated during home visits in Erbil, Iraq.

2. Materials and Methods

2.1. Study Design

A longitudinal, correlational, quantitative design was employed in the current study to investigate the relationship between the wound healing duration and demographic properties and characteristics of wounds among patients treated during home visits in Erbil, Iraq. A random sample of about 101 chronic wounds was found in 77 patients of both genders selected from all ages during home visits for around four years in Erbil city.

The information gathered from the patients was in three parts: the patient's characteristics, the wound's characteristics, and the relationship between the wound healing duration and the wound's characteristics.

Patients with chronic wounds went to a professional nurse to get help with their health. During home visits, the professional nurse looked at the wound to see what kind of care it needed. Accordingly, the nurse began treating the wounds.

During home visits, the professional nurse used the nursing plan to treat the wound until it was completely healed.

For each wound, the total amount of time it took to heal was calculated and documented.

2.2. General Objective

This study aimed to find out the relationship between wound healing time and the wounds' demographic properties and characteristics among patients who were treated during home visits in Erbil, Iraq.

2.3. Specific Objective

The specific objectives of the current research were to illustrate the frequencies of the sample and investigate the association between the duration of wound healing and the medical history of the sample, the site of the wound, the grade of the wound, the edge of the wound, the tissue type of the wound, and the risk factors for wound healing.

2.4. Statistical Analysis

The Statistical Package for Social Sciences (SPSS) was used to calculate the frequencies and percentiles of the characteristics of patients and wounds. ANOVA tests were used to find out the relationship between the mean healing time and some patient characteristics (age, BMI (kg/m^2), occupation, and educational level) and wound characteristics. T-tests were used to determine the relationship between the mean healing time and patients' characteristics.

Fisher's exact test was used to determine the relationship between variables for those less than 5 in the cells for the schedules.

The *P*-value was used to determine the relationships between the variables as follows:

A *P*-value of ≤0.05 was assumed to show a significant relationship.

A *P*-value of >0.05 was assumed to show a non-significant relationship.

A *P*-value of ≤0.01 was assumed to show a highly significant relationship.

3. Results and Discussion

The total number of patients was 77. Their mean±SD age was 58.02±16.29 years, ranging from 19 to 89. The median age was 60. More than half of the sample (54.5%) were ≥60 years, as presented in table 1, and 62.3% were males. Only less than one-third of the patients (31.2%) were of normal weight. The table shows that 37.7% of the patients were housewives, 93.5% were married, and 35.1% were illiterate.

Table 1. Basic characteristics of patients

	No.	**(%)**
Age (years)		
< 50	22	(28.6)
50-59	13	(16.9)
≥ 60	42	(54.5)
Gender		
Male	48	(62.3)
Female	29	(37.7)
BMI (Kg/m^2)		
Normal (< 25)	24	(31.2)
Overweight (25-29)	27	(35.1)
Obese (≥ 30)	26	(33.8)
Occupation		
Self-employed	22	(28.6)
Worker	11	(14.3)
Retired	15	(19.5)
Housewife	29	(37.7)
Marital status		
Married	72	(93.5)
Single	5	(6.5)
Education		
Illiterate	27	(35.1)
Read and write	11	(14.3)
Primary School	22	(28.6)
Secondary School	7	(9.1)
University Level	10	(13.0)
Total	77	(100.0)

Around one-third (31.7%) of the wounds were caused by pressure ulcers, and 24.8% were surgical wounds, as presented in table 2, which also shows other types of wounds.

As shown in table 1, as more than half of the patients were under the age of 60, the researchers' choice of patients who already had complicated wounds and were bedridden had an impact on the current findings.

Table 2. Wounds characteristics

Wound characteristics	No.	(%)
Etiology		
Surgical	25	(24.8)
Arterial	18	(17.8)
Pressure ulcer	32	(31.7)
Trauma	7	(6.9)
Neuropathic / DM Ulcer	19	(18.8)
Anatomic location		
Chest & Abdomen	9	(8.9)
Sacrum	20	(19.8)
Legs	16	(15.8)
Trochanter	10	(9.9)
Feet	46	(45.5)
Duration of wound healing		
1 week - Three months (12 weeks)	74	(73.3)
more than three months	27	(26.7)
Edge		
Attached	14	(13.9)
Not-attached	54	(53.5)
Undermined	33	(32.7)
Shape		
Oval	17	(16.8)
Round	30	(29.7)
Irregular	37	(36.6)
Other	17	(16.8)
Tissue type		
Necrotic	33	(32.7)
Sloughy	36	(35.6)
Granulating	14	(13.9)
Epithelialization	18	(17.8)
Total	101	(100.0)

The highest proportion of wounds (45.5%) was in the foot region, which may be related to the main causes of foot ulcers: pressure ulcers in the heel region and neuropathic/DM ulcers. Regarding the duration of wound healing, in more than one quarter (26.7%), it was delayed (took more than three months for healing). This may be related to the nature and medical status of the sample, with more than half of the sample (54.5%) aged ≥60 years, and also to the level of education of the sample, which affects personal hygiene and skin care. The edges of more than half of the wounds (53.5%) were not attached. The table shows that the shape of 36.6% of the wounds was irregular. The tissue type was sloughy in 35.6% and necrotic in 32.7% of the wounds (Table 2). Table 3 shows no significant association between the mean healing time and age (P=0.569), BMI (P=0.842), occupation (P=0.222), or educational level (P=0.490).

It is evident in table 4 that the pressure ulcer had the longest mean healing time of 20.06 weeks (P<0.001), which was significantly higher than the entire mean healing times of other types of wounds, showing the effect of blood circulation on the healing process. No significant differences were detected between the mean healing times of other types of wounds (according to the LSD test). The table shows a significant (P=0.011) relationship between the mean healing time and the anatomic location, with the highest mean healing time found in wounds located in the trochanteric area (21.10 weeks) or the sacrum (18.25 weeks). This may be due to lower oxygen and blood supply in those areas due to pressure on the tissues. A significant association (P=0.002) was detected between the mean healing time and the edge of the wound, showing that the highest mean healing time (18.64 weeks) was when the edge was undermined. No significant association was also detected between the healing time and the shape of the wound (P=0.805). Table 4 shows that the highest mean healing time was detected when the tissue was sloughy (16.17 weeks) or necrotic (14.09 weeks), and the differences were significant (P=0.023). This result can be supported by what has been stated in research done in the UK, indicating that healing can be inhibited by the amassing of slough or necrotic tissue, a feature of chronic wounds (10).

It is evident in table 5 that there was no significant association between the mean healing time and the following variables: gender (P=0.909), marital status (P=0.201), smoking (P=0.445), stress (P=0.821), hypertension (P=0.234), diseases (P=0.850), medications (P=0.571), malnutrition (P=0.126), advanced age (P=0.450), and alcoholism (P=0.979). The mean healing time among those with infected wounds (14.59 weeks) was significantly higher than the mean (6.50 weeks) among those with no infection (P<0.001). This is in agreement with previously published works (10) and (11) that mentioned that if the inflammation of a wound is excessive, the process of wound healing may be prolonged. Finally, a significant (P=0.002) association was detected between

immobility and the healing time, where it is evident that healing time is longer among immobile patients and that poor mobility can impede the healing process (10).

The incidence of delayed healing happened in 26.7% of patients, as presented in table 6, which shows there is no significant association between delayed healing time and age (*P*=0.514), gender (*P*=0.510), or the educational level of patients (*P*=0.859). Wound healing is impaired with advancing age (10). Regarding the tissue type, the highest incidence of delayed healing was when the tissue was necrotic or sloughy (36.4% and 33.3%, respectively), and none of the wounds with epithelialization developed delayed healing (*P*=0.011). The accumulation of necrotic tissue or slough in a chronic wound promotes bacterial colonization and prevents complete repair of the wound (10).

The highest incidence of delayed healing (59.4%) was found in pressure ulcers, while all neuropathic ulcers healed within the first three months of the treatment (*P*<0.001). Continuous pressure on the area of the wound prevents blood nutrients and oxygen from reaching the attacked tissues and prevents the healing process. The incidence of delayed healing was also high (60%) when the wound was in the sacrum or trochanter, and the least (8.7%) was found in the feet (*P*<0.001). This is related to the status of the sample, as they were almost bedridden patients; therefore, there was more pressure on the trochanter and sacrum parts and less pressure on the feet. A significant association was detected with the edge of the wound (*P*=0.003) as the highest incidence existed when the edge of the wound was undermined. On the other hand, no significant association was detected between the shape of the wound and the healing time (*P*=0.248), as presented in table 7.

Table 8 shows a significant association between delayed healing and the following factors: no smoking (*P*=0.042), infection (*P*=0.014), and lack of mobility (*P*<0.001). No significant association was detected with stress (*P*=0.548), hypertension (*P*=0.142), accompanying diseases (*P*=0.964), medications (*P*=0.171), malnutrition (*P*=0.325), surgery (*P*=0.940), and alcoholism (*P*=0.438).

Table 3. Mean healing time by patients' characteristics (ANOVA test output)

	N	Mean healing time*	(SD)	p (ANOVA)	LSD groups	p (LSD)	LSD groups	p (LSD)
Age								
A) < 50	30	11.20	(8.5)	0.569	A X B	0.345		
B) 50-59	13	14.92	(18.2)		A X C	0.393		
C) ≥ 60	58	13.48	(11.5)		B X C	0.692		
BMI (Kg/m^2)								
A) < 25	32	12.09	(10.2)	0.842	A X B	0.757		
B) 25-29	34	13.00	(14.3)		A X C	0.558		
C) ≥ 30	35	13.80	(10.5)		B X C	0.780		
Occupation								
A) Self-employed	25	12.28	(9.0)	0.222	A X B	0.490	B X D	0.472
B) Worker	16	9.69	(6.4)		A X C	0.154	C X D	0.118
C) Retired	24	17.08	(15.8)		A X D	0.985		
D) Housewife	36	12.22	(11.8)		B X C	0.053		
Educational level								
A) Illiterate	41	13.78	(11.8)	0.490	A X B	0.237	B X D	0.294
B) Read and write	12	9.17	(6.1)		A X C	0.363	B X E	0.125
C) Primary school	25	11.04	(9.0)		A X D	0.839	C X D	0.431
D) Secondary school	9	14.67	(16.1)		A X E	0.483	C X E	0.181
E) College	14	16.36	(16.0)		B X C	0.652	D X E	0.738

*in weeks

Table 4. Mean healing time by wound characteristics (ANOVA test output)

	N	Mean healing time*	(SD)	p (ANOVA)	LSD (groups)	p (LSD)	LSD (groups)	p (LSD)
Etiology								
A) Surgical	25	11.92	(15.5)	< 0.001	A X B	0.708	B X D	0.642
B) Arterial	18	10.67	(2.4)		A X C	0.006	B X E	0.229
C) Pressure ulcer	32	20.06	(12.4)		A X D	0.451	C X D	0.011
D) Trauma	7	8.43	(5.6)		A X E	0.094	C X E	<0.001
E) Neuropathic / DM Ulcer	19	6.37	(3.5)		B X C	0.004	D X E	0.667
Anatomic location								
A) Chest & Abdomen	9	12.22	(16.8)	0.011	A X B	0.185	B X D	0.514
B) Sacrum	20	18.25	(11.2)		A X C	0.536	B X E	0.010
C) Legs	16	9.31	(4.5)		A X D	0.089	C X D	0.011
D) Trochanter	10	21.10	(15.7)		A X E	0.652	C X E	0.747
E) Feet	46	10.37	(10.4)		B X C	0.020	D X E	0.007
Edge								
A) Attached	14	7.29	(4.4)	0.002	A X B	0.266		
B) Non-Attached	54	11.02	(10.7)		A X C	0.002		
C) Undermined	33	18.64	(13.4)		B X C	0.003		
Shape								
A) Oval	17	11.12	(9.7)	0.805	A X B	0.676	B X D	0.964
B) Round	30	12.63	(10.9)		A X C	0.352	C X D	0.585
C) Irregular	37	14.38	(13.4)		A X D	0.741		
D) Other	17	12.47	(11.7)		B X C	0.552		
Tissue type								
A) Necrotic	33	14.09	(13.5)	0.023	A X B	0.451	B X D	0.003
B) Sloughy	36	16.17	(13.0)		A X C	0.386	C X D	0.249
C) Granulating	14	10.93	(6.7)		A X D	0.020		
D) Epithelialization	18	6.22	(3.2)		B X C	0.147		

*in weeks

Table 5. Mean healing time by patients' characteristics (t-test output)

	N	Mean healing time week	(SD)	p
Gender				
Male	62	13.10	(11.82)	0.909
Female	39	12.82	(11.85)	
Marital status				
Married	96	13.33	(11.96)	0.201
Single	5	6.40	(3.58)	
Smoking				
Yes	26	11.46	(12.07)	0.445
No	75	13.52	(11.71)	
Stress				
Yes	85	13.11	(12.02)	0.821
No	16	12.38	(10.69)	
Hypertension				
Yes	57	11.68	(9.02)	0.234
No	44	14.68	(14.53)	
Elevated cholesterol				
Yes	43	9.9070	(4.24160)	0.011
No	58	15.2759	(14.74912)	

	N	Mean healing time week	(SD)	p
Disease (DM, fibrosis…				
Yes	82	13.10	(11.02)	0.850
No	19	12.53	(14.96)	
Medications (corticosteroids, anticoagulants				
Yes	56	13.59	(10.80)	0.571
No	45	12.24	(12.97)	
Malnutrition				
Yes	37	15.35	(13.26)	0.126
No	64	11.63	(10.70)	
Advanced age				
No	12	15.42	(14.62)	0.450
Yes	89	12.66	(11.40)	
Alcoholism				
Yes	9	12.89	(13.63)	0.979
No	92	13.00	(11.66)	
Infection				
Yes	81	14.59	(12.51)	< 0.001
No	20	6.50	(3.91)	
Lack of general mobility				
Yes	39	17.62	(11.83)	0.002
No	62	10.08	(10.86)	

Table 6. Incidence of delayed healing by age, gender, and educational level

	Healing within 3 months		Delayed healing (> 3 months)				
	No.	**(%)**	**No.**	**(%)**	**No.**	**(%)**	**p**
Age (years)							
< 50	24	(80.0)	6	(20.0)	30	(100.0)	
50-59	10	(76.9)	3	(23.1)	13	(100.0)	
≥ 60	40	(69.0)	18	(31.0)	58	(100.0)	0.514
Gender							
Male	44	(71.0)	18	(29.0)	62	(100.0)	
Female	30	(76.9)	9	(23.1)	39	(100.0)	0.510
Level of education							
Illiterate	29	(70.7)	12	(29.3)	41	(100.0)	
Able to read and write	10	(83.3)	2	(16.7)	12	(100.0)	
Primary school	19	(76.0)	6	(24.0)	25	(100.0)	
Secondary school	7	(77.8)	2	(22.2)	9	(100.0)	
University	9	(64.3)	5	(35.7)	14	(100.0)	0.859
Total	74	(73.3)	27	(26.7)	101	(100.0)	

Table 7. Incidence of delayed healing by wound characteristics

	Healing within ≤ 3 months		Delayed healing (> 3 months)				
	No.	**(%)**	**No.**	**(%)**	**No.**	**(%)**	**p**
Wound etiology							
Surgical	20	(80.0)	5	(20.0)	25	(100.0)	
Arterial	17	(94.4)	1	(5.6)	18	(100.0)	
Pressure ulcer	13	(40.6)	19	(59.4)	32	(100.0)	
Trauma	5	(71.4)	2	(28.6)	7	(100.0)	
Neuropathic (DM ulcer)	19	(100.0)	0	(0.0)	19	(100.0)	< 0.001
Anatomic location of the wound							
Chest and abdomen	7	(77.8)	2	(22.2)	9	(100.0)	
Sacrum	8	(40.0)	12	(60.0)	20	(100.0)	
Legs	13	(81.3)	3	(18.8)	16	(100.0)	
Trochanter	4	(40.0)	6	(60.0)	10	(100.0)	
Feet	42	(91.3)	4	(8.7)	46	(100.0)	< 0.001*
Edge of wound							
Attached	12	(85.7)	2	(14.3)	14	(100.0)	
Non-attached	45	(83.3)	9	(16.7)	54	(100.0)	
Undermined	17	(51.5)	16	(48.5)	33	(100.0)	0.003
Shape of wound							
Oval	14	(82.4)	3	(17.6)	17	(100.0)	
Round	25	(83.3)	5	(16.7)	30	(100.0)	
Irregular	24	(64.9)	13	(35.1)	37	(100.0)	
Other	11	(64.7)	6	(35.3)	17	(100.0)	0.248*
Tissue type							
Necrotic	21	(63.6)	12	(36.4)	33	(100.0)	
Sloughy	24	(66.7)	12	(33.3)	36	(100.0)	
Granulating	11	(78.6)	3	(21.4)	14	(100.0)	
Epithelialization	18	(100.0)	0	(0.0)	18	(100.0)	0.011
Total	74	(73.3)	27	(26.7)	101	(100.0)	

Table 8. Incidence of delayed healing by patients' characteristics

	Healing within ≤ 3 months		Delayed healing (> 3 months)				
	No.	**(%)**	**No.**	**(%)**	**No.**	**(%)**	**p**
Smoking							
Yes	23	(88.5)	3	(11.5)	26	(100.0)	
No	51	(68.0)	24	(32.0)	75	(100.0)	0.042
Stress							
Yes	61	(71.8)	24	(28.2)	85	(100.0)	
No	13	(81.3)	3	(18.8)	16	(100.0)	0.548*
Hypertension							
Yes	45	(78.9)	12	(21.1)	57	(100.0)	
No	29	(65.9)	15	(34.1)	44	(100.0)	0.142
Diseases (DM….)							
Yes	60	(73.2)	22	(26.8)	82	(100.0)	
No	14	(73.7)	5	(26.3)	19	(100.0)	0.964
Medications							
Yes	38	(67.9)	18	(32.1)	56	(100.0)	
No	36	(80.0)	9	(20.0)	45	(100.0)	0.171

	Healing within ≤ 3 months		Delayed healing (> 3 months)				
	No.	**(%)**	**No.**	**(%)**	**No.**	**(%)**	**p**
Malnutrition							
Yes	25	(67.6)	12	(32.4)	37	(100.0)	
No	49	(76.6)	15	(23.4)	64	(100.0)	0.325
Surgery							
Yes	35	(72.9)	13	(27.1)	48	(100.0)	
No	39	(73.6)	14	(26.4)	53	(100.0)	0.940
Alcoholism							
Yes	8	(88.9)	1	(11.1)	9	(100.0)	
No	66	(71.7)	26	(28.3)	92	(100.0)	0.438
Infection							
Yes	55	(67.9)	26	(32.1)	81	(100.0)	
No	19	(95.0)	1	(5.0)	20	(100.0)	0.014
Lack of mobility							
Yes	19	(48.7)	20	(51.3)	39	(100.0)	
No	55	(88.7)	7	(11.3)	62	(100.0)	< 0.001
Total	74	(73.3)	27	(26.7)	101	(100.0)	

For patients, healthcare providers, and researchers worldwide, the relationship between wound healing duration and wound characteristics for treated patients during home visits is a serious matter. Wound healing in humans is a vigorous but complex process, encompassing a multidimensional process administered by sequential but comprehensive phases comprising hemostasis, inflammation, proliferation, and remodeling. Wound healing is affected by many contributing factors, such as weight gain, DM, age of the patient, type of the wound, site of the wound, and infection, which commonly leads to gangrene and then finally the need for amputation. Around 70% of the participants were overweight or obese, and infected wounds took longer to heal (14.59 weeks) than non-infected ones (6.50 weeks) (P=0.001). The current results clarify that the healing process can be impeded by poor mobility (P=0.002).

Because of the complexities of the wound healing process, additional research is recommended to address the entire set of contributing agents in the wound healing procedure.

Based on the above results, the researchers recommended the following items:

1. Further research on wound healing time is recommended, as there are limited references on this topic.
2. Nutritional-based research is recommended to detect the effect of nutrient substances on wound healing.
3. Microbial-based research is recommended to find the effect of different types of microorganisms on the process of wound healing.
4. Further research on the wound healing process using nanotechnology and nanomedicine is also recommended.

Authors' Contribution

Study concept and design: D. T. M.
Acquisition of data: D. T. M.
Analysis and interpretation of data: M. M. H.
Drafting of the manuscript: H. K. Q.
Critical revision of the manuscript for important intellectual content: H. K. Q.
Statistical analysis: M. M. H.
Administrative, technical, and material support: H. K. Q.

Ethics

Ethical approval and consent from the patients were required for them to take part in this study.

Conflict of Interest

The authors declare that they have no conflict of interest.

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