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ORIGINAL ARTICLE

Self-esteem following maxillofacial and orthopedic injuries: preliminary observations in sub-Saharan Africans

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Abstract

Background The face is a vital component of one's personality and body image while extremities are important in function (mobility, routine daily activities). Recovery and rehabilitation from acquired maxillofacial and orthopedic traumas are psychological in nature.

Methods This was a prospective study of recruited subjects in a Nigerian University teaching hospital. A total of 160 participants (80 with maxillofacial injuries and 80 with orthopedic injuries) had repeated review assessments within 1 week of arrival in the hospital (time 1), 4–8 weeks after initial contact (time 2), and 10–12 weeks thereafter (time 3), using Rosenberg's Self-Esteem Questionnaire.

Results Thirty-three (41.3%) participants in the maxillofacial injured and 12 (15.0%) in the orthopedic injured subjects scored between 0 and 14 at time 1. At time 2, 39 (51.3%) subjects in the maxillofacial fracture group and 20 (29.0%) in the orthopedic injured group scored between 0 and 14, while at time 3, 7 (9.2%) in the maxillofacial fracture group and 1 (1.5%) in the orthopedic injured group scored between 0 and 14. There was a statistical significant difference between the two groups when compared at times 1, 2, and 3 with $p < 0.001$, $p = 0.006$, and $p = 0.041$ respectively. Subjects with maxillofacial fracture consistently had lower self-esteem compared to subjects with orthopedic injured for times 1, 2, and 3.

Conclusions Self-esteem may be reduced following maxillofacial injuries; therefore, measures should be taken by surgeons to minimize the risk of facial scarring by careful handling of tissues. Also, management of these injuries should integrate multidisciplinary care that will address psychological needs of patients.

Trial registration Not applicable.

Keywords Fracture · Maxillofacial · Orthopedic · Psychological · Self-esteem

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Background

The face is important to one's personality makeup and body image. During recovery and rehabilitation from acquired facial trauma, the psychological functioning of victims is equally important [1, 2]. Living with a change in the appearance of one's face because of injury or disease is always a challenging task because the face is often the seat of identification for a human being [2]. Facial disfigurement is one of the important physical consequences of maxillofacial trauma, with victims experiencing agony and bitterness, and consequently may be emotionally disabled [3, 4].

Self-esteem is a term used in psychology to reflect a person's overall emotional evaluation of his or her own worth. Self-esteem is the degree, to which one respects, prices, approves, admires, and likes oneself. In the mid-1960s, Morris Rosenberg, a social learning theorist, defined self-esteem as a personal worth or worthiness [5]. The importance of self-

esteem lies in the fact that it concerns one's self, the way we are and the sense of our personal value. Thus, self-esteem affects the way we are, the way we act in the world, and the way we relate to everybody else. Also, the way individuals think, feel, decides, and act is influenced by self-esteem. Low self-esteem is having a generally negative overall opinion of oneself, judging or evaluating oneself negatively, and placing a general negative value on oneself as a person. Low self-esteem can also have an impact on many aspects of a person's life. It can affect a person's performance at work or at school. People with low self-esteem might not engage in many leisure or recreational activities, as they might believe that they do not deserve any pleasure or fun [6]. Personal self-care might also be affected. People who do not value themselves might drink excessive amounts of alcohol or abuse drugs [6]. Following trauma, there may be physical dysfunction especially from orthopedic injuries and facial disfigurement in facial injury, which may adversely affect the patients' ability to undertake daily activities and lower their mood and self-esteem [7]. Experiencing other psychological problems such as panic attacks, depression, anxiety, chronic worrying, or social phobia can also chip away at a person's self-esteem.

Research from sub-Saharan Africa on whether the self-esteem of victims of maxillofacial trauma is compromised when burdened with facial injuries is rare. This study was an investigation to fill in the gaps created by this dearth of information. The aim of the study was to compare levels of self-esteem in two groups of trauma subjects with injuries (maxillofacial vs orthopedic). The study sought to reject the hypothesis that when self-esteem levels of maxillofacial injury subjects are compared with those of orthopedic injuries, no differences would be found.

Methods

The aim of the study was to compare levels of self-esteem in two groups of trauma subjects with injuries (maxillofacial vs orthopedic). This is a repeated measure study where subjects are consecutive attendees at the accident and emergency unit and oral/maxillofacial surgery unit of the Obafemi Awolowo University Teaching Hospital, Ile-Ife, Nigeria. They were recruited over a period of 12 months from February 2012 to January 2013.

The index group comprised patients with facial trauma (soft tissue injuries or fractured bones or both) who gave informed consent for the study. The comparison group comprised trauma patients with long bone fractures.

The enrolment criteria included age 18 years and over and Glasgow Coma Scale on admission of 12 or more. Subjects with a combination of maxillofacial and long bone fractures were excluded from the study. Outcomes were assessed at baseline (time 1), usually within a week of arrival at the accident and emergency unit, and at 6 to 8 weeks (time 2) and 10 to 12 weeks after injury. For the patients with maxillofacial fractures, the timing of the interviews, viz., time 1 and time 2, was in line with the review protocol of the maxillofacial surgery unit of the hospital.

Instruments

Socio-demographic and clinical data

We prepared a data schedule and recorded age, gender, educational status, employment, and marital status. The clinical information included cause of injury; site and type of injury were also documented.

Measurement of self-esteem

This was done using the Rosenberg Self-Esteem Scale developed by Morris Rosenberg in 1965 [5]. This scale is similar to other social survey questionnaires and comprises of 10 items, scored on a 4-point Likert scale. It is a measure of global self-esteem consisting of 10 statements related to overall feelings of self-worth or self-acceptance. Total scores range from 0 to 30, and scores of 15–25 indicate normal levels of self-esteem whereas scores below 15 indicate low levels of self-esteem. The Rosenberg Self-Esteem Scale has been used in previous studies in Nigeria [8]. The items of the questionnaire had previously been translated into Yoruba, the language of the indigenes of Osun State, Nigeria, where the study took place.

The questionnaire was pretested among patients attending the unit who did not participate in the study. The subjects completed the screening instruments in English or Yoruba. One of us or a trained research assistant read out the questions and marked the responses of those subjects who needed help in completing the questionnaire.

Statistical analysis The Statistical Package for the Social Sciences (SPSS) for Windows, version 16.0, was used to store and analyze data. Results were calculated as frequencies (%), means, and standard deviations (SD) for normally distributed variables. Between-group differences were compared using independent samples *t* test. Categorical variables were analyzed using the chi-square statistic. Repeated measures ANOVA was used to analyze the change in levels of self-esteem over time. Predictors of self-esteem levels were analyzed using multiple regression analysis with injury group membership (maxillofacial vs orthopedic), admission status (out vs inpatient), and age

as independent variables. Probabilities of less than 0.05 were accepted as significant. All tests were two-tailed.

Results

Characteristics of the sample

Of the 160 trauma subjects seen within the 12-month study period (80 maxillofacial and 80 orthopedic), 122 (76.3%) were males and 38 (23.7%) were females. The mean age of the sample was 33.2 ± 12.5, range 18 to 70 years. However, the group with facial injuries comprised significantly younger in age than those with fracture of the long bones: 30.9 ± 11.3 compared with 37.6 ± 12.8 years ($p < .001$). Most of the injuries in the two groups of subjects, 68 (85%) in the maxillofacial and 73 (91.3%) in the orthopedic, resulted from road traffic accidents.

At baseline, there were more long bone fracture patients on admission as inpatients 71 (88.8%) compared to maxillofacial injury patients 59 (83.1%).

The sociodemographic and some clinical characteristics of the study population are shown in Table 1. The distributions of injuries for the two groups of subjects are shown in Table 2.

Evaluation of self-esteem in the study sample

The proportion of participants whose self-esteem scores fell within the low range, normal, or high levels within the 12-week review period are shown in Fig. 1 and Table 3. Thirty-three subjects (41.3%) in the maxillofacial injury group and only 12 (15.0%) in the orthopedic injury group experienced low levels of self-esteem (scores of 0–14) at time 1. At time 2, 39 facial trauma subjects (51.3%) and 20 long bone fracture patients (29.0%) experienced low levels of self-esteem. However, at time 3, only 7 (9.2%) in the maxillofacial injury group and only 1 subject (1.5%) in the orthopedic injury group had scores that were indicative of low levels of self-esteem. There were statistically significant differences between the two groups when self-esteem scores were compared at time 1 and time 2 ($p < 0.001$ and $p < 0.004$ respectively), but not at time 3 ($p = 0.118$). Mean scores on the Rosenberg Self-Esteem Scale (RSES) declined between time 1 and time 2 in the two

Table 1 Sociodemographic and clinical characteristics of participants

	Maxillofacial injury	Orthopedic injury	Total	*p* value
Sex				
Male	64 (80.0%)	58 (72.5%)	122 (76.3%)	0.265
Female	16 (20.0%)	22 (27.5%)	38 (23.7%)	
Age				
Young adult (18–35)	60 (75.0%)	44 (55.0%)	104 (65.0%)	0.028
Middle age (36–44)	10 (12.5%)	16 (20.0%)	26 (16.3%)	
Elderly (45–70)	10 (12.5%)	20 (25.0%)	30 (18.7%)	
Cause of injury				
Assault	6 (7.5%)	0 (0.0%)	6 (3.8%)	0.044
Road traffic accident	68 (85.0%)	73 (91.5%)	141 (88.1%)	
Others (fall and occupational injury)	6 (7.5%)	7 (8.7%)	13 (8.1%)	
Type of RTA				
Motorcycle	52 (76.6%)	40 (54.1%)	92 (64.8%)	0.113
Car	9 (13.2%)	19 (25.7%)	28 (19.7%)	
Truck	1 (1.4%)	3 (4.1%)	4 (2.8%)	
Bus	6 (8.8%)	10 (13.5%)	16 (11.3%)	
Combined	0 (0.0%)	2 (2.6%)	2 (1.4%)	
Admission				
Yes	21 (26.3%)	71 (88.8%)	92 (57.5%)	0.000
No	59 (73.7%)	9 (11.2%)	68 (42.5%)	
Mean (SD) RSES scores				
Time 1	16.1 (4.0)	17.4 (2.8)	t (158) = 2.25	0.020
Time 2	15.1 (4.4)	16.1 (2.7)	t (143) = 1.69	0.092
Time 3	22.3 (4.6)	23.2 (2.7)	t (143) = 1.15	1.150

RSES, Rosenberg Self-Esteem Scale scores

Table 2 Distribution of maxillofacial and orthopedic injuries

Type	Right (%)	Left (%)	# Combined (%)	Total (%)
Maxillofacial				
Mandible	12 (26.1)	16 (34.8)	18 (39.1)	46 (100)
Maxilla	4 (36.4)	1 (9.1)	6 (54.5)	11 (100)
Zygomatic bone	7 (100)	0	0	7 (100)
Mandible + maxilla	3 (21.4)	3 (21.4)	8 (57.2)	14 (100)
Maxilla + zygomatic	0	0	2 (100)	2 (100)
Total				80 (100)
Orthopedic				
Humerous	1 (14.3)	6 (85.7)	0	7 (100)
Radius	2 (66.7)	1 (33.3)	0	3 (100)
Femur	11 (50)	10 (45.5)	1 (4.5)	22 (100)
Tibia	5 (55.6)	4 (44.4)	0	9 (100)
Fibular	0	1 (100)	0	1 (100)
Tibia-fibular	11 (47.8)	11 (47.8)	1 (4.4)	23 (100)
Ulna-radius	0	1 (100)	0	1 (100)
Radius-femur	0	1 (100)	0	1 (100)
Femur-tibia	2 (40)	3 (60)	0	5 (100)
Ulna-tibia	0	1 (100)	0	1 (100)
Humerous-femur	2 (33.3)	3 (50)	1 (16.7)	6 (100)
Femur-fibula	0	1 (100)	0	1 (100)
Total				80 (100)

Combined (both right and left)

groups of subjects, but it was only at time 1 (baseline) that significant differences were found when group mean scores were compared. Self-esteem mean scores were lower in the facial injury group than those in the long bone fracture group (t (158) = 2.25, p = .025; Table 1).

A one-way repeated measures ANOVA was done for both groups of subjects to find out whether there was a significant time effect on self-esteem scores. The two groups of subjects (maxillofacial and orthopedic injury) showed highly significant improvements in levels of self-esteem with time (Wilks = 0.52, $F(2,74) = 33.75$, $p = 0.001$ and Wilks = 0.225, $F(2,67) = 115.5$, $p = 0.001$), with 62 (81.6%) in the maxillofacial group and 60 (87%) in the orthopedic group having self-esteem levels in the normal range at time 3 (Table 3). The regression equation with group membership, age, and admission as predictors was significantly related to self-esteem scores only at time 1 ($R^2 = .10$, adjusted $R^2 = .083$, $F(3,156) = 5.79$, $p = .001$), but not at time 2 ($R^2 = .047$, adjusted $R^2 = .026$, $F(3,141) = 2.29$, $p = .081$) and time 3 ($R^2 = .035$, adjusted $R^2 = .015$, $F(3,141) = 1.73$, $p = .16$) R^2.

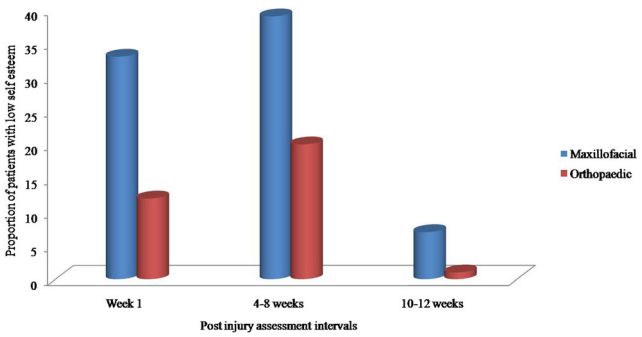

Fig. 1 Bar chart showing proportions of patients with low self-esteem

Discussion

This study investigated levels of self-esteem in two groups of subjects after traumatic injuries (maxillofacial vs. orthopedic) with a view to finding out whether self-esteem levels were compromised during the recovery period following injury. The strongest deficits in self-esteem were seen in the first week after injury and again from 6 to 8 weeks during recovery for the two groups. Even though mean scores were consistently lower in the facial injury group compared to those in the long bone fracture group throughout the study period, it was only at time 1(week one) that the difference was statistically significant. The important finding of this study is that subjects who sustain facial or orthopedic injuries as a direct consequence of trauma are more likely to experience a deficit in their self-esteem. There is also a greater likelihood for

Table 3 Cross-tabulation of change in self-esteem scores with time in both groups of subjects

Rosenberg scores	Maxillofacial injury	Orthopedic injury	Total	*p* value
Week 1	(*n* = 80)	(*n* = 80)		
0–14	33 (41.2%)	12 (15.0%)	45 (28.1%)	0.001
15–25	47 (57.5%)	67 (83.8%)	113 (70.6%)	
26–30	1 (1.2%)	1 (1.2%)	2 (1.2)	
4–8 weeks	(*n* = 76)	(*n* = 69)		
0–14	39 (51.3%)	20 (29.0%)	59 (40.7%)	0.004
15–25	35 (46.1%)	49 (71.0%)	84 (57.9%)	
26–30	2 (2.6%)	0 (0.0%)	2 (1.4%)	
10–12 weeks	(*n* = 76)	(*n* = 69)		
0–14	7 (9.2%)	1 (1.4%)	8 (5.5%)	0.118
15–25	62 (81.6%)	60 (87%)	122 (84.1%)	
26–30	7 (9.2%)	8 (11.6%)	15 (10.3%)	

those with facial injuries to have more deficits in self-esteem than those with orthopedic injuries in the first 2 months after the trauma. Our findings of poor self-esteem outcomes support those of previous research [1–7]. Road traffic accidents accounted for most of the injuries in groups, 85% and 91.3% respectively. These findings are similar to those of previous reports [9–12] where 84% of injuries resulted from road traffic accidents. Road traffic accident remains the most common cause of maxillofacial injury because of inadequate vehicular maintenance, lack of traffic laws enforcement, and poor educational status of drivers [13]. In Europe, the USA, and other parts of the world, the compulsory uses of seat belts, crash helmets, traffic law enforcement, and increase in the use of vehicles with airbags have reduced the incidence of maxillofacial injuries due to road traffic accident [14, 15]. The combination of experiencing a road traffic accident and sustaining facial injuries could have adversely affected these patients' assessment of body image and subsequently low self-esteem.

Fifty-two subjects who had facial injuries (65%) had soft tissue injuries in addition to the facial bone fracture. The resultant scarring from soft tissues injuries could be a constant reminder of the traumatic event [16]. Such observations have been made in previous reports [1, 2].

Even though both groups of subjects exhibited lowering of self-esteem levels within the first 8 weeks of study recruitment, the maxillofacial group had more individuals falling into the lower self-esteem categories when compared to those with orthopedic injuries, and these were statistically significant, ($p < 0.001$ and $p = 0.004$) at time 1 and time 2 respectively.

Multiple regression analysis, however, showed that after the first week following injury, group membership (maxillofacial vs orthopedic injuries), and admission status (inpatient vs outpatient), and age of participants did not significantly predict the self-esteem levels of subjects.

The face is the main center of identity of an individual, and the presence of scar on the face may change a person's identity, which may lead to isolation and loss of self-esteem. Furthermore, when such injuries affect functions like speech and feeding, a facial injured subject may develop psychosocial complications [17–19]. Research has also documented that attractive individuals in general are more likely to have higher self-esteem, achieve higher levels of academic and occupational satisfaction, have more fulfilling sexual encounters, and will have a generally higher quality of life [20]. Therefore, it is logical to conclude that living with a facial disfigurement puts the individual at an increased risk of experiencing a significantly reduced quality of life and low self-esteem [21]. Psychological interventions are needed in the immediate aftermath of trauma in both groups of subjects, as esteem needs of victims are usually compromised. Study subjects who screened positive for low self-esteem were referred to the psychiatry unit of the hospital. The intervention outcome was not one of the aims of the present study.

Our study had the limitation of not assessing the pre-injury psychological functioning and body image status of the patients and being based on self-report. The study was, however, prospective in nature, and the validity of our findings is supported by comparison with our previous research.

These findings can serve as baseline data to highlight some mental health needs of Nigerian patients including assessment of patient self-esteem after maxillofacial trauma.

Conclusions

Self-esteem may be compromised following maxillofacial injuries, hence the need for the surgical team to minimize the risk of facial scarring by careful handling of tissues. Management of patients with facial trauma should be

multidisciplinary, and caregivers should be on the lookout for psychological needs of patients in both the short and long term.

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Authors' contributions Dr. Braimah R. O was the initiator of the concept, involved in the design, definition of intellectual content, literature search, manuscript preparation, manuscript editing, and manuscript review.

Dr. Ukpong D. I was the initiator of the concept, involved in design, definition of intellectual content, literature search, manuscript preparation, manuscript editing, and manuscript review.

Prof. Ndukwe K. C was the initiator of the concept, involved in the design, definition of intellectual content, literature search, manuscript preparation, manuscript editing, and manuscript review.

Prof Akinyoola A. L was involved in the design, definition of intellectual content, manuscript preparation, manuscript editing, and manuscript review.

Data availability Dataset presented as additional supporting files in readable spreadsheet.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent was obtained from all participants included in the study.

Approval and consent to participate in the study were gotten from the hospital's Ethics and Research Committee with protocol number ERC/2012/02/06, national number NHREC/27/02/2009a, and international number IRB/IEC/0004553.

Consent for publication Not applicable.

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