

Original Research Article

Ingrown toe nail as seen in Bayelsa state Nigeria

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ABSTRACT

Background: Ingrown toenails are common conditions of the foot causing pain, disability, and absence from work. It has been associated with use of tight foot wears, congenital anomalies of nail folds, nail plates, and medial rotation of the great toes; other predisposing factors include diabetes, obesity and cardiac disorders. It can be diagnosed clinically, and treatments include use of antibiotics analgesia and surgery. When untreated it may be complicated by sepsis, ulceration of nail fold and excessive granulation tissue formation osteomyelitis, gangrene of the leg.

Methods: We observed an increase in the number of patients visiting our clinic with ingrown toe nails, and with no known work done on this subject in our environment we therefore conducted a questionnaire based prospective study between the periods January 2014 to June 2016 to determine the pattern of presentation, predisposing factors and treatment outcome. The data collected was analyzed using SPSS Version 20 for windows.

Results: Twenty-eight (28) patients with age range 9 to 65 years, and mean age of 32, and male: female ratio of 2.1:1 were reviewed. The highest incidence was seen between the ages of 11 to 40 year old, and among students 8 (28.57%). Prevalence of 28.57% (n=8) was highest in those who wore tight/short shoes. The commonest presenting complains were pain, swelling (edema) and suppuration, with most patients 10 (35.71%) being seen in the clinic between 5-6 months of development symptoms. Ingrown toenails occurred statistically significantly more in the right big toe 13 (46.43%) [χ^2 (p-value) = 19.43 (0.001)]. Amongst those whose anatomical site was at the right big toe, the Lateral aspect was 9 (69.23%).

Conclusions: Most patients received Analgesics and Antibiotics and twenty one, 21(75%) of the patients had wedge resection and surgical destruction of the nail matrix.

Keywords: Big toe, Ingrown toe nail, Predisposing factors, Swelling, Suppuration, Surgical matricectomy

INTRODUCTION

Ingrown toenails are common surgical conditions of the foot causing pains, disability, and absence from work, and are of worldwide in distribution. It occurs most often in teenagers and young adult males between the ages of 15 to 40 years; with a male to female ratio of 3:1.¹⁻³ Although the etiology is unknown, some associated factors like tight foot wears, poor foot hygiene, hyperhidrosis, may be etiological factors. Congenital

abnormally shaped nail folds associated with fleshy folds, and thin nail plate with medial rotation of the great toes have also been implicated as a predisposing factor.^{1,4,5}

Murray et al had noted that 73% of ingrown toe nails occur in young adults between the ages of 12-30 years, those who wear tight shoes and particularly among physical trainers, sports and military men.³ Scher RK et al also noted that diabetes, obesity and patients with cardiac disorders are more predisposed to developing ingrown toe nails. They also noted that those who have thyroid or

renal disorders that have increased lower extremity edema are more likely to develop the disease.⁶ Repetitive (e.g. running, kicking) or inadvertent trauma (stubbing the toe) may also precipitating factors in the development of ingrown toe nails.^{5,7}

Clinically, ingrown toe nails may presents as a nail fold swelling, erythema, edema, pain, suppuration with discharge of pus, ulceration of nail fold, granulation tissue and lateral nail fold hypertrophy.^{1,5} The diagnosis of ingrown toenail is purely clinical and in untreated cases may be complicated by sepsis, ulceration of nail fold and excessive granulation tissue formation.²

In diabetics and patients with peripheral vascular diseases, infection of the lateral nail fold due to ingrown toe nail may spread to the entire limb, and without adequate treatment may lead to osteomyelitis and gangrene.⁸

Study recently noticed an increase in the number of patients presenting in our clinic with this condition, and with dearth of literature on the subject we designed this study to determine the pattern of presentation, predisposing factors and treatment outcome, with a view to suggesting preventive measures.

METHODS

This is a prospective study of patients who presented with ingrown toenails with data drawn from the Divine Grace Medical Center, Okolobiri, in Bayelsa State Nigeria between the periods January 2014 to June 2016. The patients were duly counseled and consent obtained before administering a well-structured questionnaire. The questionnaire included patient's socio-demographic information like age, sex, occupation, family history, and clinical characteristics like clinical presentation, etiology, duration of symptoms before presenting, and the likely predisposing factors. The anatomic site of disease, treatment received, complications and out-come of

treatment were also documented. Patients who presented early with pain, erythema, were treated conservatively with analgesic, antibiotics, antiseptic solution, and advised appropriately. Those who presented late with suppuration, ulceration and hypertrophic nail fold,–were treated by wedge resection and surgical matricectomy under local anesthesia. Those who had severe infection and ulceration had simple nail avulsion. The patients were followed up at six months and one year post treatment. The data collected were analyzed using SPSS Version 20 for windows (IBM, USA).

Ethical approval for the study was obtained from the Research and Ethical Review Committee of the institution

RESULTS

Age and sex distribution

A total of 35 cases with in-grown toe nails were seen within the period of the study, but only 28 cases were included in the study. Seven patients were lost to follow up, thus were excluded. There were nineteen (19) males and nine (9) females with age range 9 to 65 years, mean age of 32 year and male to female ratio of 2:1 (Table 1).

The highest incidence was between the ages of 11 and 40 years.

Students had the highest incidence 8 (28.57%) of ingrown toe nails, but this was not significantly [χ^2 (p-value) = 3.73 (0.712)], followed by farmers 5 (17.86%).

Wearing of Tight/short shoes was the highest predisposing factor causing ingrown toe nails among the study population with a prevalence of 28.57% (n=8). This is followed by trauma, 6 (21.43%) to the toe and hyperhidrosis 5 (17.86%). Inadequate nail cutting and Systemic diseases (like diabetes and renal failures) accounted for 3 (10.71%) of cases each (Table 3).

Table 1: Age-sex distribution

Characteristics	Sex		Total	Chi-square (χ^2) (p-value)
	Male F (%)	Female F (%)		
0-5	0 (0.0)	0 (0.0)	0 (0.0)	2.0, (0.920) *
6-10.	1 (5.26)	0 (0.0)	1 (3.57)	
11-20	2 (10.53)	2 (22.22)	5 (17.86)	
21-30	7 (36.84)	2 (22.22)	9 (32.14)	
31-40	4 (21.05)	2 (22.22)	6 (21.43)	
41-50	2 (10.53)	1 (11.11)	3 (10.71)	
51-60	1 (5.26)	1 (11.11)	2 (7.14)	
>60	1 (5.26)	1 (11.11)	2 (7.14)	
Total	19	9	28 (100.0)	

*Not statistically significant (p>0.05)

Table 2: Occupation.

Characteristics	Sex		Total	Chi-square (χ^2) (p-value)
	Male	Female		
Occupation				
Students.	5	3	8 (28.57)	3.73, (0.712)
Farmers.	4	1	5 (17.86)	
Civil servants.	2	1	3 (10.71)	
Athletes.	1	0	1 (3.5)	
Military	2	0	2 (7.14)	
Unemployed.	2	3	5 (17.86)	
Fishing	3	1	4 (14.29)	
Total	19	9	28 (100.0)	

*Not statistically significant ($p > 0.05$).

Table 3: Predisposing factors.

Characteristics	F	(%)	Chi-square (χ^2) (p-value)
Predisposing factors			
Tight/ short shoe	8	28.57	10.50 (0.105)
Trauma	6	21.43	
Hyperhidrosis	5	17.86	
Systemic disease	3	10.71	
Nail cutting (manicure)	3	10.71	
Familial history (genetic)	2	7.14	
Poor foot hygiene	1	3.57	
Total	28	100	

*Not statistically significant ($p > 0.05$).

The commonest form of presentation was pain, swelling (edema) and Suppuration, and this was in all the patients, 28 (100.0). Discharge of pus, 19 (67.86%), granulation, 12 (42.86%), Lateral fold hypertrophy 11 (39.29%) (Table 4).

Table 4: Clinical presentation.

Presentation	f (%)
Pain	28 (100)
Swelling (edema)	28 (100)
Suppuration	28 (100)
Discharge (pus/fluid)	19 (67.86)
Granulation	12 (42.86)
Lateral fold hypertrophy	11 (39.29)
Erythema	9 (32.14)
Ulceration.	8 (28.57)
Gangrene of toes.	3 (10.71)

Ingrown toenails occurred statistically significantly more in the right big toe, 13 (46.43%) [χ^2 (p-value) = 19.43 (0.001)], followed by the left big toe, 11 (39.29%) and both big toes, 2 (7.14%).

Most of the patients 10 (35.71%) presented to the clinic between 5-6 months of development symptoms (Table 5).

Amongst those whose anatomical site was at the right big toe, the Lateral aspect was 9 (69.23%) and the Medial aspect, 4 (30.77%). Also for those whose anatomical site was the Left big toe, the Lateral aspect was 7 (63.67%) and the Medial aspect, 4 (36.36%). For patients whose anatomical site was in both big toes, the Lateral and the Medial was equal, 1 (50.0%) (Table 6).

Table 5: Duration of symptoms before presentation.

Time (months)	F (%)	Chi-square (χ^2) (p-value)
<1 months	0 (0)	17.23 (0.001) *
1-2 months	2 (7.14)	
3-4 months	9 (32.14)	
5-6 months	10 (35.71)	
>6 months	7 (25.00)	
Total	28 (100)	

*Statistically significant ($p < 0.05$).

Analgesics and Antibiotics were administered to all the patients (100%). Twenty-one, 21 (75%) of the patients had wedge resection and surgical destruction of the nail matrix, while 7 (32%) patients in addition to antibiotics and analgesics had avulsion of the nails only (Table 7).

Morbidity and morbidity

Three diabetic patients had gangrene of the limb following in-grown toe nails, while 4 had deformed toe. Two of the patients had severe septicemia which was

controlled with systemic antibiotics, insulin and amputation of the limbs. Only one had ulceration, and 13 (46.43%) had excessive granulation tissues. Seven, 7 (25%) patients who had conservative treatment and avulsion of the nail had recurrence of in-grown toe nail.

Table 6: Anatomic site of disease.

Anatomic site	F (%)	Chi-square (χ^2) (p-value)
Right big toe (total number)	13 (46.43)	
Medial aspect	4 (30.77)	3.85 (0.05) *
Lateral aspect	9 (69.23)	
Left big toe (total number)	11 (39.29)	
Medial aspect	4 (36.36)	1.64 (0.20)
Lateral aspect	7 (63.67)	
Both big toes	2 (7.14)	
Medial	1 (50.0)	1.00 (0.317)
Lateral	1 (50.0)	
Other toes	2 (7.14)	
Medial	0 (0.0)	1.00 (0.317)
Lateral	2 (100.0)	
Chi-square (χ^2) (p-value)		19.43 (0.001) *

*Statistically significant (p<0.05).

Table 7: Treatment.

Treatment	F (%)
Antibiotics	28 (100)
Analgesics	28 (100)
Antiseptic/soapy (warm)	7 (32)
Steroid cream	5 (17.86)
Wedge resection/surgical matricectomy	21 (75.0)
Phenol/wedge resection	0 (0.00)
Nail avulsion nail	7 (25)

DISCUSSION

More males were affected than females in our study, in a ratio of 2.1:1, although with no statistically significant difference shown [χ^2 (p-value) = 2.0 (0.920)]. This figure is similar to previous works by Burssens et al and Pearson et al in 1987, but slightly lower than the 3:1 reported by Ariela et al.^{1,10,11} Males are more active and are prone to subtle trauma which may be precipitating factor in causing in-grown toe nails, and this may explain the higher incidence. Previous reports by Murray et al have also stated that in-grown toe nails occurred more in teenagers and young adults involved in sports and physical training.³ In their series, Ariel et al had noted that it occurred most often between the ages of 15 to 40 years.¹ In another study, Murray et al had noted that in-grown toe nails occurred more often in young male adults between ages of 12 to 30 years.³ Our findings agree with

these reports for the majority 20 (71.43%) of our patients were teenagers and young adults between the ages of 11 to 40 years who are normally involved with sport and other physical activities. Again, our study showed that subtle trauma, use of tight shoes and defective cutting of the nails may be etiologic agents. Although, wearing of Tight/short shoe was the highest predisposing factor causing in-grown toe nails among the study population with a prevalence of 28.57% (n=8) this was not statistically significant difference when compared to other predisposing factors [χ^2 (p-value) = 10.50 (0.105)].

Previous work by Muhammudsajj had noted that most patients with in-grown toe nails had surgery because they presented late with advanced disease to the clinic when conservative treatment may not be effective.² This view was also supported by Pearson et al who noted that the average time for patients with in-grown toe nail to present in the clinic is between 5 to 6 months.¹¹ Our findings is similar and agree with this, with majority 10 (35.71%) of the patients presenting to the clinic between 5-6 months after developing symptoms, and this was statistically significant [χ^2 (p-value) = 17.23 (0.001)]. As a result, 21 (75%) of them had wedge resection and surgical matricectomy. Toybenoshole et al and Ariel et al in their articles had also noted that most patients with in-growing toe nail presents late to the clinic.^{1,8}

The etiology of in-grown toe nails is uncertain, but a genetic predisposition, short tight shoes, hyperhidrosis, and poor foot hygiene have all been implicated in

predisposing patients to developing in-grown toe nails.^{4,5} Although our finding is similar to this, short tight shoes (28.57%) and trauma (21.43%) played a leading role as a predisposing factor among patients in our study group. Our study showed that five patients (17.86%) had a history suggestive of hyperhidrosis. This is surprising because, ours is a hot humid environment with increased sweating. Therefore, hyperhidrosis may not be a contributory factor in predisposing patients to developing in-grown toenails.

Some experts suggest that those with wider nail folds and thinner, flatter nails has a higher risk of in-grown nails.⁴ However, a case control study by Pearson et al analyzing 46 patients, found no difference in the anatomic shape of toe nails in patients with or without in-grown toe nails, but in our study we found that ingrown toenails occurred statistically significantly more in the right big toe, 13 (46.43%) [χ^2 (p-value) = 19.43 (0.001)].¹¹ Amongst those whose anatomical site was at the right big toe, the lateral aspect 9 (69.23%) was more affected than the Medial aspect, 4(30.77%). Our findings therefore, agree with those of Langford et al who believe in anatomic differences in the shape of the nails being responsible as a causative agent in patients with ingrown toe nails, but in contrasts with the work of pearson et al who find no anatomic variation in the shape of the toes among those who had ingrown toe nails.^{4,11}

As stated by Scher RK, systemic diseases like diabetics, cardiac, renal and thyroid disease may predispose patients to developing in-growing toe nails.⁶ These diseases cause lower extremity edema which may predispose patients to developing in-grown toe nail. Our finding seems to agree with their report although our figure 3 (10.71%) is low; patients who had systemic disease had in-grown toe nails. This figure may be significant in patients who are diabetics and those with peripheral vascular disease. If the condition is not treated early, the patient may progress to developing gangrene as has been noted earlier by other workers.⁸

Bursens et al in their study noted that the lateral aspect of the big toe is more commonly affected by in-growing toenails.¹⁰ Another study by Pearson et al, also stated that the lateral aspect of the toes is more commonly involved in the diseases.¹¹ Our study is similar to these finding as majority 13 (46.43%) of the Right big toe lesion were in the lateral aspect of the big toes 9 (69.23%) and this finding was statistically significant [χ^2 (p-value) = 3.85 (0.05)]. Again, pressure from the side of the short tight shoe to the nails may affect the lateral aspect of the toes, this may explain the high incidence of in-grown toe nails at the lateral aspect of the toes. Joel at al, in their study also confirmed these findings in their series.⁵

In-grown toe nails may result in considerable morbidity in diabetics, immunocompromised and patients with peripheral vascular disease.² As was noted in previous works by Muhammad Sajj et al and Toybleoshele et al, in

diabetics with peripheral vascular diseases and immunocompromised patients, the infection following in-grown toenails may progress to involve the proximal limb leading to gangrene.^{2,8} Our study agrees with these findings, for the three patients who were diabetic and developed in-grown toe nails also had gangrenous toe that was amputated. Greige JD et al in their study, had noted that the result of in-grown toe nail treatment was extremely variable.¹² In his study, Joel et al had noted that surgical excision of the nail without phenolization had a higher incidence of recurrence, and that partial nail avulsion combined with phenolization is more effective at preventing symptomatic recurrence of in-growing toe nails, but has a slightly increased risk of postoperative complication.⁵ In their study, Sykes et al had noted a higher incidence (86%) of recurrence of ingrown toe nail following simple avulsion of the nails.¹³ In another study, Grieg JD et al had noted a similar high incidence of recurrence (73%) rate following simple nail avulsion.¹² This reports varies widely with the low reoccurrence rates between 5% to 9% following nail edge excision followed by chemical matricectomy using phenol by GrieG et al.¹²

In another series, Cameron et al in 1988 and Murray et al in 1982 using the same method of nail wedge excision with phenolization, had a recurrent rate as low as between 3% to 25%.^{3,14} In our study, wedge resection of the nail with surgical matricectomy was done. Our recurrent rate after a year follow-up was 17.85%. Our figure is low compared with the 86% from simple nail avulsion, but higher than the 9% from nail edge excision with phenolization.

Our result was similar to those of Murray et al and Cameron.^{3,14} We therefore advocate the use of wedge resection and surgical matricectomy in the treatment of in-grown toe nails since nail wedge resection and surgical matricectomy has a low recurrent rate and compares favorably with nail edge excision and phenolization. Our finding is also in agreement with the work of Kuru et al who demonstrated that recurrence following wedge resection without matricectomy either surgical or chemically is high.¹⁵ He noted that adequate excision of the matrix is essential to avoid recurrence. Also, a conchrane systemic review by Rounding et al, found that partial nail avulsion combined with phenolization is more effective at preventing systemic recurrence than surgical excision alone without phenolization, but has a slightly increased risk of postoperative infection.

Muhammad et al in his study, had noted that In-growing toe nail may be prevented by careful cutting of the nails especially at the corners, avoidance of tight shoes with narrow forefoot, keeping the foot dry and clean.² This view was also supported by Kuru et al who also stated that careful nail cutting especially at the corners, avoiding excessive cutting and rounding at the corners, avoiding tight shoes with narrow forefoot, keeping foot dry and clean can prevent the disease.¹⁵ Although the etiology of in-grown toe nail is uncertain, but a genetic

predisposition, familial history, wearing of tight shoes and poor foot hygiene have all been implicated.^{2,5,15} Our study has shown that defective nail cutting and wearing of tight short shoes are predisposing factors in causing ingrowing toe nails. Therefore, there is need for mass public health campaign and the education of teenagers and young adults on how to cut their nails, avoid wearing tight short shoes and keep the foot clean and dry in order to prevent the development of in-grown toenail. There is also the need to educate the public especially diabetics and patients with peripheral vascular diseases to present early to the hospital if they develop symptoms suggestive of the disease.

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