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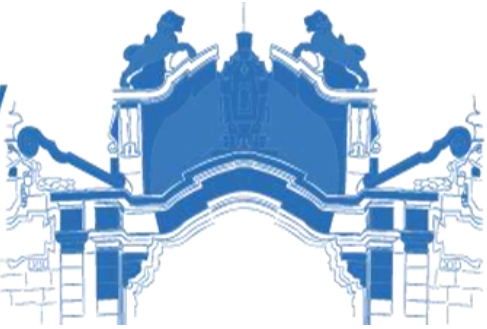

Addis Ababa University

College of Health Sciences

School of Medicine

Department of Dermatology and Venereology

Clinical Patterns and Quality of Life Among patients with Ingrown Nail: A prospective cross-sectional study at ALERT Comprehensive Specialized Hospital, Addis Ababa, Ethiopia,2024

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A Thesis to be submitted to Addis Ababa University, College of health Sciences, School of Medicine, Department of Dermatology and Venereology as the fulfillment of partial requirements for specialty certificate in Dermatology and Venereology.

Addis Ababa, Ethiopia

December , 2024

ADVISOR APPROVAL SHEET

This is to certify that the research thesis entitled " Clinical patterns and Quality of life among patients with Ingrown nail, at ALERT Comprehensive Specialized Hospital, Addis Ababa, Ethiopia" is submitted in partial fulfillment of the requirements for the certificate of specialty in Dermatovenereology" to the Graduate Program of the College of health sciences of Addis Ababa University and is carried out by Dr Azeb Abebe. Therefore, I recommend that the student has fulfilled the requirements and hence hereby can submit the thesis paper to the department.

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DECLARATION FORM OF PRINCIPAL INVESTIGATOR

I, the under Signed, hereby declare that this thesis is my original work and has not been presented for a degree in any other university and all sources of material used for this thesis have been duly acknowledged.

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Place: Addis Ababa University College of Health Sciences, Tikur Anbesa Specialized Hospital, Department of Dermatovenereology

Date of submission: _____

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ACRONYMS/ABBREVIATIONS

AAU : Addis Ababa University

ALERT: All African Leprosy Rehabilitation and Training Center

DLQI: Dermatology Life Quality Index

SPSS Statistical Package for Social science

G.C. – Gregorian calendar

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ACKNOWLEDGEMENT

First and foremost, I would like to thank Almighty God for the strength he has given me to bear all burdens and be diligent in completing this thesis.

I would like to thank Addis Ababa University, Department of Dermatovenereology for giving me this opportunity of undergoing such a research experience.

I would like to convey my heartfelt gratitude and appreciation to my advisors, Dr Yosef Legesse, Dr Tizita Yosef and Dr Bezawit Lakew for their invaluable assistance and time spent guiding me through the process of rectifying this thesis.

I want to thank Dermatovenerology department fellow residents and nurses (Sister Tihitina and Saron) who contributed much during data collection.

I would like to thank my husband ,Dr Liyew Birhanu , for his unwavering support to my research on data processing & analysis and also for his patience and undererstanding during Challenging moments.

Finally, I would like to extend my deepest gratitude to my Mom,Dad and Brothers for their unwavering moral support and constant prayers throughout my academic Journey.

ABSTRACT

Background

Ingrown nails are pathologic conditions of nail appparatus. They may present in 4 different clinical patterns. These are proximal, distal, distolateral, and lateral ingrown nails. This condition may have a significant impact on patients' quality of life.

Objective

The objective of this study is to determine clinical patterns and quality of life among patients with Ingrown nail at at ALERT Comprehensive Specialized Hospital.

Methodology

An institution-based cross-sectional prospective study was conducted at ALERT HOSPITAL on all patients who visited dermatology clinic from February 2024 to October 2024 .Quality of life of patients was assessed with the validated Amharic version of DLQI.

Result

Seventy-three patients with age range 9 to 67 years met criteria with Male-to-Female ratio of 2.3:1 and highest incidence of age range of 20 to 30. The great toe was found to be the most affected toe. Distolateral ingrown nail was the most common clinical pattern, and Heifetz Stage 3 was the most common clinical stage identified. Hyperhidrosis, wearing tight shoes, poor nail trimming habit and engaging in sports were common risk factors identified. Ingrown nail affects quality of life with moderate to severe effect with mean DLQI score of 11.75. Multivariate analysis revealed that clinical pattern, Heifetz staging, and BMI are factors associated with quality of life.

Conclusion and Recommendation

Ingrown nail has significant impact on quality of life primarily among working age patients.

Further Research on factors influencing quality of life and disease severity with larger sample size.

1. INTRODUCTION

1.1 Background of the study

Onychocryptosis (from the Greek onyx, meaning nail, and kryptos, meaning hidden) is a pathologic condition of the nail apparatus caused by the impingement of the nail plate into the soft tissue surrounding it, most commonly the lateral nail fold [1,2]. The hallux is the most often afflicted toe, and in 80% of instances, the condition is unilateral [3]. The most frequent nail problem is an ingrown nail, which primarily affects teenagers and young adults, especially those between the ages of 14 and 30. Males are more likely to experience it [2, 3]. The prevalence and incidence of ingrown nails are poorly characterized [4].

The most frequent cause of ingrown nails appears to be improper nail trimming, which can result in a nail spike that traumatises nearby soft tissue [5, 6]. Tight-fitting shoes, poor foot cleanliness, hyperhidrosis, trauma, and the use of some drugs, particularly epidermal growth factor receptor inhibitors (gefitinib, cetuximab), are additional risk factors for ingrown nails [7].

There has been much discussion over the potential contribution of intrinsic risk factors, such as aberrant nail growth and anatomical anomalies, to the aetiology of ingrown nails. Large nail plates, congenitally misaligned toenails, pincer-nail deformity, and thickening of the nail plate are all potential risk factors for ingrown toenails[6,8]. Ingrown nails may be caused by bone defects thatincrease internal pressure in the ankle, foot, or toe [9, 10]. Not all studies, however, corroborate a distinction between controls and patients with ingrown nails based on anatomical abnormalities [11].

Many hypotheses have been explored to explain how ingrown nails first appear. One theory holds that the underlying cause is extra skin present around the nail. Wide lateral tissue that tends to bulge up around the nail, causing pressure and necrosis, explains the condition [14]. The most widely recognized explanation, however, states that an ingrown nail develops when the edge of the nail plate grows into the overlapping lateral nail fold, resulting in painful inflammation and the growth

of granulation tissue [14, 13]. This penetration is made possible by reactive ground forces brought on by a combination of physical activity, obesity, and restrictive footwear [5].

Based on anatomic location, there are four clinical patterns of ingrown nails: proximal, distal, lateral, and distolateral. There are also three severity levels for each type. Pain and difficulties in walking are incapacitating problems brought on by an ingrown nail. As it hinders participation in sports, academics, or the workplace, it is linked to considerable morbidity and lower quality of life [14]. An ingrown nail may typically be diagnosed based only on clinical signs and symptoms without the need for any laboratory or radiological examinations. X-ray may be required to rule out subungual exostosis if physical examination is indicative of subungual bony proliferation [15]. The current standard of care emphasises conservative treatment in the early stages, such as the gutter splint technique. For cases unresponsive to medical treatments or recurrences, surgical correction is the preferred course of action. The literature describes a variety of surgical procedures. Although there isn't a perfect method, lateral nail plate avulsion with lateral matricectomy by phenol is frequently utilised and has been shown to be more successful in preventing recurrences [14].

1.2 Statement of the problem

The prevalence of ingrown nails have been estimated to be 2.5 – 5.0 percent of the overall population. Ingrown nails accounts 20 % of foot problems seen at primary care in USA.[3] Among 396 UK podiatrists ,72 % of them treated 5 or more ingrown toenails per month and 17.5% conducted over 21 surgical procedures for ingrown toe nails per month [33]. Ingrown nails hurt, swell, get infected, restrict daily activities, and result in absenteeism from work and school. In Brazilian study ,the mean DLQI score found to be (8.3) which was higher than that for major chronic diseases in Brazil, such as atopic dermatitis (7.9), alopecia areata(4.6), and contact dermatitis (6.5).Ingrown nails have a negative impact on patient quality of life and places a strain on society and the healthcare system [3]. A chronic course is common for ingrown nails [16]. Additionally, an ingrown nail can progress to a diabetic foot ulcer and cause chronic osteomyelitis

of the affected leg in patients with diabetes mellitus [3, 17]. Treatment of such advanced lesions require surgical management.

1.3 Significance of the study

There has been no research conducted on ingrown nails in Ethiopia, despite the fact that this condition has been reported to be the most frequent nail complaint among studies conducted worldwide. The results of this study can be used as a starting point for further research in Ethiopia on the clinical pattern and quality of life among patients with ingrown nail patterns, as well as evidence for changing treatment plans as preventive insights for modifiable risk factors.

2. LITERATURE REVIEW

2.1. Prevalence & patterns of ingrown nail

Young adults' great toes are typically affected by the prevalent problem of ingrowing nails. Rarely are fingernails impacted. Nail ingrowth can occur in four different ways: distal-lateral ingrowing (onychocryptosis) being the most common, lateral ingrowing, proximal ingrowing (retronychia), and distal ingrowing. The actual prevalence is unknown. It has been calculated to be between 2.5 and 5% in the overall population. According to a study conducted in Washington, 20% of people who visit their general practitioner with foot problems also have ingrown nail. In a Dutch study, the prevalence of ingrown nails was noted to be 54/10,000 registered cases each year [1], while in the UK, there were more than 10,000 new cases noted per year [2].

In the third and fourth decades of life, males are more likely to have the condition than females (the male-to-female ratio is roughly 2:1). Although it can affect toddlers and older individuals, retronychia (proximal nail ingrowing) is a rather uncommon disorder typically observed in young adult females [18]. In a study on the sociodemographic and clinical characteristics of patients with ingrown nails, 718 ingrown toenails on the feet and 11 on the fingers were among 729 lesions that were examined. The study involved 206 patients with ages ranging from 18 to 77 (mean age, 39

years; female to male ratio, 1.45). In total, 7.6% of participants had a family history of ingrown nails. Additionally, 26.7% of the 206 patients that had ingrown nails reported previous surgical treatment and recurrence. Finally, 81.3% of patients reported ingrown toenails in the hallux and 52% on the lateral border [19].

A study on ingrown toenails in Nigeria's Bayelsa state included 28 patients, ranging in age from 9 to 65, with a mean age of 32 and a male to female ratio of 2.1:1. The frequency was highest among students in grades 8 (28.57%) and those between the ages of 11 and 40. The proportion of people who wore tight or short shoes was 28.57% (n=8). Most patients (35.71%) were seen in the clinic between 5 and 6 months after the onset of symptoms, with the most frequent presenting complaints being pain, swelling (edoema), and suppuration. Right big toe had statistically more ingrown toenails than left big toe. The lateral aspect was indicated in 9 (69.23%)cases among individuals whose anatomical placement was at the right big toe [20]. Study participants in Nigeria ranged in age from 10 to 71 and comprised 46 females (M/F ratio of 1.2:1) with the average age being 32. Each lesion exclusively affected the great toe. A total of 78 individuals had lesions on only one great toe. The majority attributed the cause to wearing tight shoes (51%) or poor trimming of nails (46%) [21].

2.2. Severity indexes (stages)

Heifetz, Frost, Mozena, Martinez, and Kline are just a few of the severity indices that have been published. Heifetz index is the preferred index since it aids in selecting the most appropriate course of action: stage 1 conservative, stage 2 definite nail narrowing, and stage 3 debulking of the hypertrophic soft tissues [22]. The rationale behind a straightforward classification is mostly based on how severe and obvious the early clinical findings are. This may help the clinician determine the most effective treatment option. An algorithm for the treatment of ingrowing toenails could result from this as well. There have been five different severity indices reported so far. The same primary

criteria governs them all: erythema, infection, swelling, seeping and hypertrophy of the lateral fold, granulation tissue and pain [23, 24]—except one, which accounts for shape of the nail plate [25].

HEIFETZ severity scoring Stages

I: Slight erythema and swelling of the nail grooves in the nail bed

II: Presence of an acute infection and suppuration

III: Chronic infection, formation of granulation tissue in the nail grooves and hypertrophy of the surrounding tissues

FROST severity scoring Stages

I: Nails have spurs formation in the lateral nail fold

II: The nail are concave

III: Soft tissue hypertrophy

MOZENA severity scoring Stages

I Inflammatory stage : Erythema, mild edema and pain on pressure. The nail is normal

II a Infectious stage : Increased pain, oozing and infection, swelling of the lateral fold that extend on the lateral nail <3 mm

II b ditto IIa with swelling of the lateral fold that extend on the lateral >3 mm

III Hypertrophic stage : Granulation tissue and lateral fold extend widely over the lateral nail plat

MARTINEZ-NOVA severity scoring Stages

I Infl ammatory stage : Erythema, mild edema and pain on pressure. The nail is normal

II a Infectious stage : Increased pain, oozing and infection, swelling of the lateral fold that extend on the lateral nail <3 mm IIb ditto IIa with swelling of the lateral fold that extend on the lateral >3 mm

III Hypertrophic stage : Granulation tissue and lateral fold extend widely over the lateral nail plate

IV Serious hypertrophic stage with chronic deformity of the toenail involving the two lateral and distal folds covering a wide part of the plate.

KLINE severity index Stages

I Local irritation stage: Local irritation of the nail fold without gross infection or granulation tissue, with or without history of onychocryptosis

II Infectious stage: Infection of the nail border with pus and/or granulation tissue, without history of onychocryptosis

III Infection of the nail border with the history of more than one episode of onychocryptosis to the affected nail border

IV Infective onychocryptosis with partial onycholysis of a single nail border

V Infective onychocryptosis with partial or complete onycholysis of the nail plate and/or nail border involving both nail borders

2.3. Quality of Life Among patients with Ingrown Nail

Patients' quality of life may suffer as a result of ingrown tonails. According to one study [26], older patients who had nail surgery for ingrown toenails indicated an improvement in their quality of life. Another study [27] examined patients with various nail disorders and found that these conditions can affect different aspects of quality of life, such as symptoms, emotions, and social functioning. Furthermore, yet another study [28] emphasized that nail disorders can significantly decrease health-related quality of life and have an impact on social functioning and work ability. However, a different study [3] did not indicate conclusive findings related to quality of life among patients with ingrown toenails. Ninety patients with ingrown toenails were enrolled in a Brazilian cross-sectional study between August 2015 and March 2016. All patients qualified for surgical care. Working age adults with a DLQI total score of "moderate" or "severe" deterioration of quality of life were the primary particpants. Related symptoms, regular actions in public spaces, and social and recreational

activities were most commonly impacted. Female sex, younger age, and severe clinical categorization are linked to higher DLQI scores, according to multivariate analysis [3]. Another study was conducted using the modified Howard-Dubois technique to treat an ingrown toenail. Here, 31 patients had one foot implicated among forty cases, while nine patients had both feet involved. Average time of presentation from the start of the symptoms was 17.5 months. Twenty-three instances were stage IIb according to the Mozena classification system, while 17 cases were stage III. According to the European Quality of Index questionnaire, mobility issues accounted for 50% of all problems, as did difficulties caring for oneself (15% of tasks), experiencing pain or discomfort (35% of daily activities), and feeling anxious, depressed, or dissatisfied (60%). In a study on the improvement of quality of life in elderly individuals following toenail surgery, 52 patients had baseline scores of 69.73 on the Manchester-Oxford Foot Questionnaire and 8.69 on the BORG CR-10.

2.4 Conceptual frame work

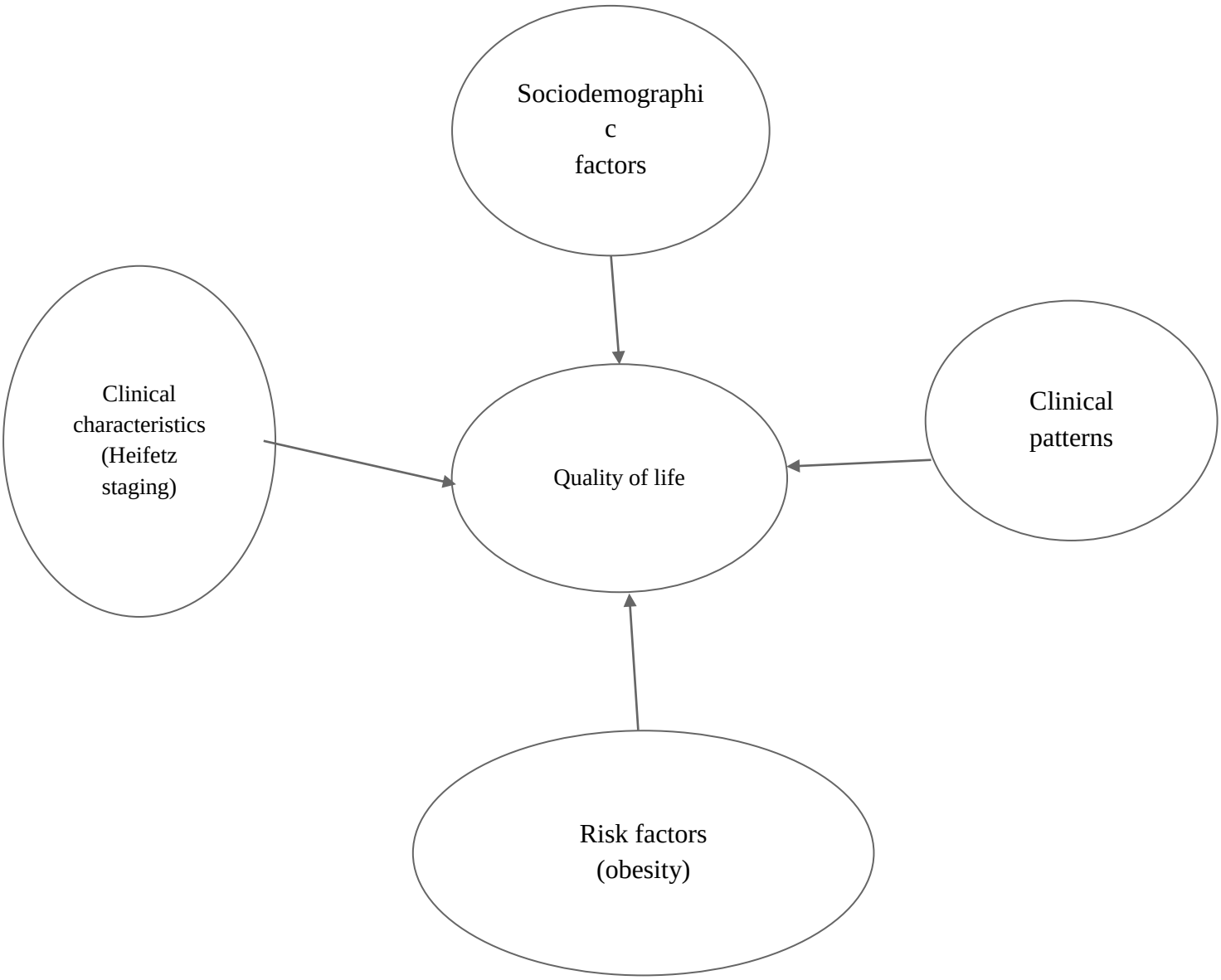

Figure 1 . Developed conceptual frame work after reviewing different literatures

3. OBJECTIVES

3.1 General objective

- To determine clinical pattern & quality of life among patients with ingrown nail at ALERT Hospital Department of dermatovenerology.

3.2 Specific objectives

- To determine clinical pattern of Ingrown nail
- To assess the quality of life in patients with Ingrown nail
- To determine the severity of ingrown nail among patients
- To determine risk factors associated with Ingrown nail

4. METHODS

4.1 Study area

The study was conducted at ALERT Comprehensive Specialized Hospital that located in Addis Ababa city.

4.2 Study period

The study was conducted from February 2024 – October 2024.

4.3 Study design

Institution based cross sectional prospective study design was applied.

4.4 Population

4.4.1 Source population

All patients with dermatologic problems that visited department of Dermatovenerology at ALERT Hospital during study period.

4.4.2 Study population

All patients with Ingrown nail that visited department of Dermatovenerology at ALERT Hospital during study period

4.5 Inclusion and Exclusion criteria

4.5.1 Inclusion criteria

All patients with Ingrown nail who visited department of Dermatovenerology at ALERT Hospital for the first time .

4.5.2 Exclusion criteria

Patients and guardians not able to communicate, psychiatric patients,

4.6 Sample size determination and sampling technique

Convenience sampling technique was implemented. All patients diagnosed with ingrown nail in the study period was included.

4.7 Study variables

Dependent variables: Quality of life of Patients with Ingrown nail,

Independent variables:

- Socio-demographic variables(Age ,Sex,Occupation)
- Clinical characteristics
- Clinical pattern of patients with ingrown nail (proximal,distal,distolateral, lateral)
- HEIFETZ Ingrown nail staging
- Risk factors for development of ingrown nail

4.8 Operational definition

Proximal Ingrown nail (Retronychia): describes ingrowth of the proximal nail plate into the proximal nail fold,

Distal ingrown nail: The nail plate growth is blocked by the hyponychium, which forms a distal rim

Lateral Ingrown nail: ingro**wth of nail plate into lateral nail fold**

Distolateral ingrown nail: ingrowth of nail plate into both hyponychium and lateral nail fold

Heifetz staging

Stage 1: follows the initial embedding of the nail spicule into the nail fold and is characterized by slight erythema and swelling of the lateral nail folds. Patients experience pain when touching the area or wearing tight shoes.

Stage 2: characterized by severe inflammation with redness, swelling, tenderness, oozing, and seropurulent discharge. Secondary infections can occur. Pain can be severe and alters the patient's daily activities.

Stage 3: Stage 3 is characterized by formation of granulation tissue that, with time, will undergo epithelization with hypertrophy of the lateral nail fold that covers the embedded nail plate

Dermatology Life Quality index -The total score of the DLQI was computed from the sum of the 10 evaluated dimensions of quality of life.

No effect : (0-1)

Mild effect : (2–5)

Moderate effect: (6 -10)

Severe effect : (11-20)

very severe effect : (21-30)

4.9 Data collection and Analysis

Data was collected using structured questionnaire by face to face interview with the patient with Ingrown nail. The Questionnaire incudes 4 sections ; Sociodemographic , clinical characteristics,possible risk factors and the validated Amharic version of DLQI .

4.10 Data quality

The quality of the data was maintained by recording complete data of patients on daily basis by trained Dermatologist,Dermatology residents and nurses.

4.11 Data Processing and Analysis

Descriptive statistics (percentages and frequencies, mean and standard deviation) were used to to analyze the data on socio-demographic and clinical characteristics of patients with ingrown nails, as well as risk factors for their development, using SPSS version 25. The data cleaning process involved key steps to ensure the integrity of the dataset. Missing values were addressed by either imputation, using the mean for continuous variables and the mode for categorical ones. Duplicate records were identified through unique identifiers (e.g., patient ID). Multiple linear regression analysis was performed using R software version 4.3.2 to identify factors associated with the quality of life (QoL) of patients with ingrown nails. This method was chosen as it effectively evaluates the relationship between a continuous dependent variable (QoL) and multiple independent variables (socio-demographic characteristics ,clinical characteristics and Risk factors) . A p-value less than 0.25 in bivariate linear regression was used to run multivariate linear regression. The normality of distribution of all outcome variables was verified using the Kolmogorov–Smirnov test. A p-value of < 0.05 was declared as statistically significant.

5. RESULTS

5.1. Socio-demographic characteristics of patients with ingrown nail

Seventy-three patients with ingrown nails were interviewed. Males are predominantly affected with Male:Female ratio of 2.3:1. The 20-30 age group (50.68%) had the highest number of participants while age groups <20 and 31-60 constituted comparable levels (24.66% and 23.29%, respectively) respectively. The age group >60 accounted for the rest (Table 1). Among participants, 47.9% were professionally employed, followed by students who accounted for 31.5%. Additionally, 13.7 % and 6.8 % identified as housewives and merchants respectively.

Table 1: Socio-demographic characteristics of patients with ingrown nail patients attending Dermatology clinic at ALERT Hospital , Addis Ababa, Ethiopia (N = 73).

Variables	**Categories**	**Frequency**	**Percentage**	Minimum	Maximum	**Mean ± SD**
Age (years)	<20	18	24.66	9	67	27.11±11.17
	20-30	37	50.68			
	31-60	17	23.29			
	>60	1	1.37			
Sex	Male	51	69.9			
	Female	22	30.1			
Occupation	Merchant	5	6.8			
	Student	23	31.5			
	Housewife	10	13.7			
	Employee	28	38.3			
	Driver	7	9.5			

5.2. Clinical characteristics of patients with Ingrown nail

Nearly half of the participants (54.8%) had a lesion for less than 6 months.

The most afflicted toe is the great toe nail in 98.6 % of patients .only One male patient who is a machine operator had finger nail involvement after having trauma . Additionally, 67.1% of respondents located lesions on the unilateral foot (one big toe) followed by 31.5% on the bilateral foot (two big toes).T The majority of participants reported one nail fold affected (68.5%), while 28.8% indicated two nail folds involved. The most common pattern of ingrown nails was the distolateral type (52.1%), followed by the lateral type (34.3%), distal type (10.9%), and proximal type (2.7%). Of the total participants, 39 (53.4%) were diagnosed with stage 3, 21 (28.8%) with stage 2, and the remaining 13 (17.8%) with stage 1 (See Table 2).

Table 2: Clinical characteristics of with ingrown nail patients attending Dermatology clinic of ALERT Center, Addis Ababa, Ethiopia (N = 73)

Variables	**Categories**	**Frequency**	**Percentage**	Minimum	Maximum	**Mean ± SD**
Duration of lesion	0-6 months	40	54.8	0.5	84	13.48±19.27
	7-12 months	19	26.0			
	13-24 months	5	6.8			
	>24 months	9	12.3			
Location of lesion	Unilateral hand	1	1.4			
	Unilateral foot	49	67.1			
	Bilateral foot	23	31.5			
Number of nail fold affected per patient	One	50	68.5			
	Two	21	28.8			
	Three	1	1.4			
	Four	1	1.4			
Which nail affected	Great toe nail	72	98.6			
	Finger nail	1	1.4			
Pattern of ingrown nail	Distolateral	38	52.1			
	Lateral	25	34.3			
	Distal	8	10.9			
	Proximal	2	2.7			
Heifetz stage	Stage one	13	17.8			
	Stage two	21	28.8			
	Stage three	39	53.4			

5.3. Possible risk factors for the development of ingrown nails

Table 3 presents possible risk factors for the development of ingrown nails. According to the respondents, key risk factors include a history of nail hyperhidrosis (75.3%), and poor trimming of nails (58.9%), wearing tight shoes(45.2) and taking part in sports.Less reported risk factors include history of onychomycosis,misalignment of the nail and diabetes.

Table 3. Possible risk factors for the development of ingrown nail of patients attending dermatology clinic of ALERT Center, Addis Ababa, Ethiopia (N= 73).

Variables	Categories	Frequency	Percentage
Poor trimming of nails	Yes	43	58.9
Wearing tight shoes	Yes	33	45.2
History of trauma to the site	Yes	18	24.7
Family history of Ingrown nail	Yes	16	21.9
Play Sports	Yes	33	45.2
Hyperhidrosis	Yes	55	75.3
History of onychomycosis	Yes	4	5.5
History of misalignment of nail	Yes	6	8.2
History of Diabetes	Yes	9	12.3
Previous history of ingrown nail	Yes	17	23.3
Previous history of treatment for ingrown nail	Yes	21	28.7
Obesity---Body Mass Index (BMI)30 and above		7	9.6%

5.4. Quality of Life with Ingrown nails

The mean Dermatologic Life Quality Index score in the study was 11.75 with maximum and minimum quality life of score 28.00 and 2.00, respectively (Figure 2). According to DLQI

categories, patients were most likely to report severe effect (45.2%) followed by moderate effect (35.6 %) while 11% and 8.2% reported mild and very serious effect respectively (Figure 3).

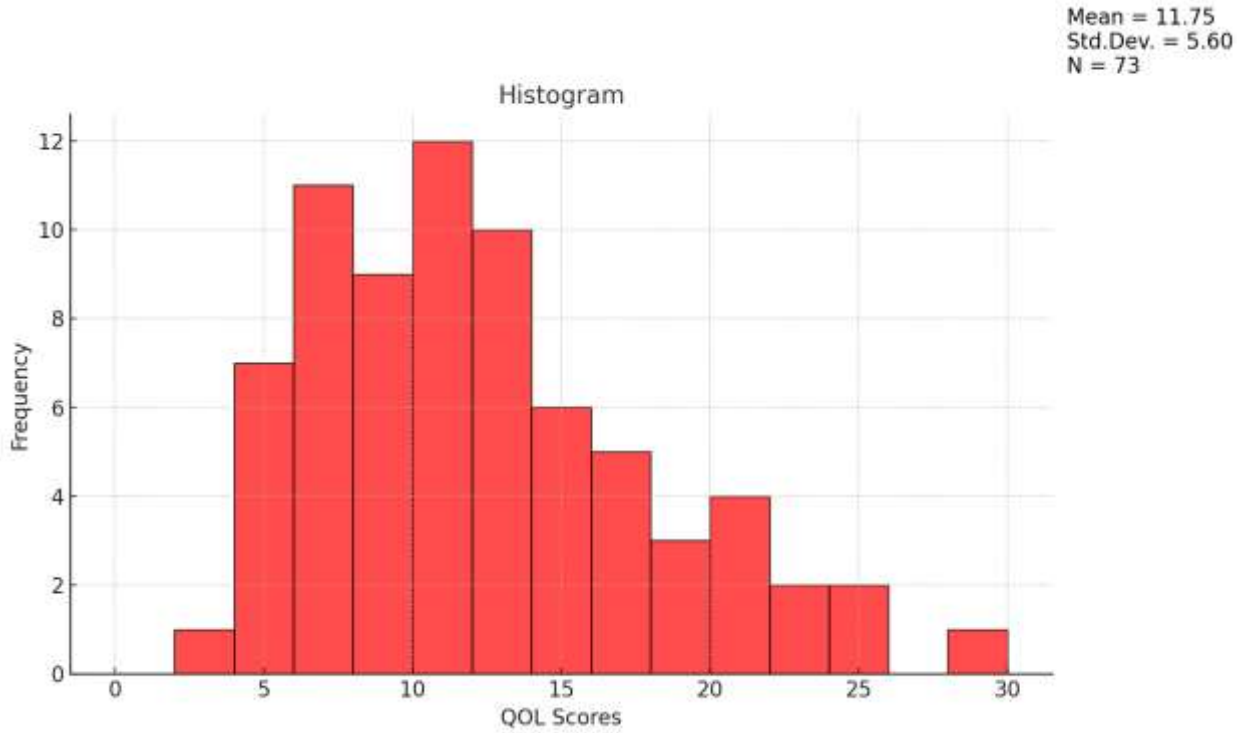

Figure 2. Quality of life scores of ingrown nail patients attending Dermatology clinic of ALERT Center, Addis Ababa, Ethiopia (N= 73).

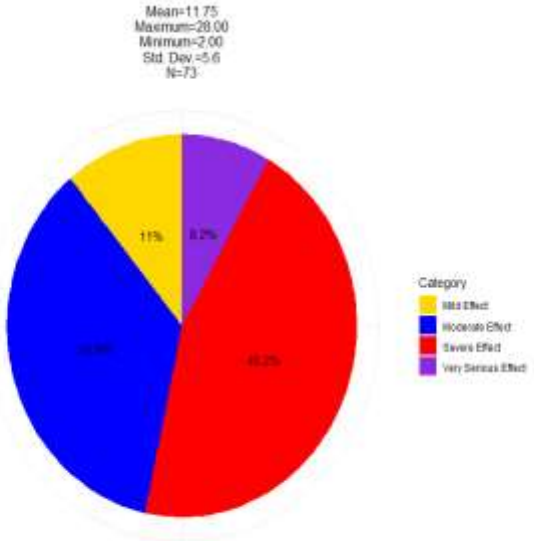

Figure 3. Effect on Quality of life by total DLQI score

The most affected parameters of DLQI components include on Symptoms , Embarassment,public places,dressings and social /leisure activities (Table 4).

Table 4: Dermatologic Life quality index Parameters

Parameter	**Percentage of patients reported impairment**
Symptoms	60.27
Embarrassment	67.57
Public places	45.2
Dressings	66.21
Social/leisure	42
Sports	40.63
Work/school	17.8
Relationships	16.89
Sexual life	4.56
Treatment	26.48

5.5. Factors associated with QOL in Ingrown nail patients

Multiple linear regression ($p < 0.05$) revealed that the pattern of the ingrown nail, BMI, and Heifetz stage were stastically significant factors affecting the quality of life for patients with ingrown nails. Heifetz stages (Stage 2 and Stage 3) ($\beta = -5.46$, CI: -8.34 to -2.57, $p = 0.003$ and $\beta = -11.42$, CI: -14.32 to -8.52, $p = 0.002$) this showed that patients in stage 2 have an average DLQI score lower by 5.46 compared to stage 1 and patients in Stage 3 have an average DLQI score lower by 11.42 compared to stage 1 .In this case patients with stage 2 and stage 3 have better quality of life compared to stage 1.BMI categories (30–34.9 and ≥35) with ($\beta = 7.74$, CI: 1.99–13.49, $p = 0.009$ and $\beta = 17.47$,CI: 2.77–32.18, $p = 0.021$) showed negative impact on the quaity of ife of patients. These findings suggest higher BMI scores are associated with poorer quality of

life.Furthermore, distal and lateral patterns of ingrown nails are associated with poorer quality of life with the distal pattern having a severe effect (β = 16.16, CI: 4.22–28.11, p = 0.009) (Table 5).

Table 5 Multivariate analysis result of factors associated with ingrown nail in atients attending dermatology clinic of ALERT Center, Addis Ababa, Ethiopia (N= 73).

Predictors				95% CI	
	β Coefficients	Std. Error	p-value	Lower	Upper
Intercept	2.70863	5.31710	0.61236	-7.931	13.348
Gender (Female=ref)					
male	-2.75983	1.66575	0.10287	-6.093	0.573
BMI (<18.5=ref)					
18.5-24.9	3.58524	1.74838	0.04476 *	0.087	7.084
25-29.9	3.53290	1.93806	0.07339	-0.345	7.411
30-34.9	7.74218	2.87116	0.00912 **	1.997	13.487
≥ 35	17.47480	7.34923	0.02068 *	2.769	32.181
Which nail is affected?	0.67597	6.78508	0.92098	-12.901	14.253
Duration	0.03814	0.03481	0.27764	-0.032	0.108
Trauma to site (yes=ref)					
No	0.08492	1.41706	0.95242	-2.751	2.920
Heifetz stage (stage one=ref)					
Stage two	-5.46444	1.45345	0.0033**	-8.343	-2.572
Stage three	-11.4231	1.46442	0.0021**	14.321	-8.523
History of onychomycosis (yes=ref)					
No	-4.65245	2.89794	0.11374	-10.451	1.146
Pattern of ingrown nail(distolateral=ref)					
Lateral	10.36025	4.11766	0.01461 *	2.121	18.600
Distal	16.16458	5.97132	0.00887 **	4.216	28.113
Proximal					
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 Multiple R-squared: 0.7523, Adjusted R-squared: 0.7418 , F-stasistic:62.3132 on 3 ,69 df,p-value 2.14e-18 Residual standard error: 9.5289 on 69 df					

6. DISCUSSION

6.1 Socio-demographic characteristics of patients with ingrown nail

The literature indicates that ingrown toenails primarily affect teenagers and young adults. This is in line with our sample. Teenagers and young adults who participated in sports and physical training were more likely to have ingrown toenails, according to one study by Murray et al [19]. Reduced incidence later in life may be associated with obtaining good skin and nail care, nail folds experiencing age-related shrinkage, and nail thickness growing with age[19]. Males are predominantly affected in this study with M:F ratio of 2.3:1 which is in line with studies conducted in Nigeria (2017) with 2.1 :1 and North India (2018)[14,16].

The preference for males may be attributed to the fact that men are more likely to be active in sports and to encounter minor foot trauma. The majority of patients identified as employees. There may be a disproproportionate number of males involved in occupations that necessitate extended standing, such as desk job officers, medical professionals, police, military personnel, or other groups [19].

6.2 Clinical characteristics of patients with ingrown nail

Most patients that presented to the clinic in this study were found to be present with in 6 months following the development of symptoms, which was again consistent with a Nigerian study(2017) accounted 75 % of cases. [20]. In contrast to other skin disease including skin cancer, the discomfort brought on by ingrown nails may have led patients to seek care sooner. The majority of our cases (67.1%) affected one foot, which is consistent with North India study (2018) with 60% of cases. [16,20]. We poist that this may be due to having one dominant foot with asymmetrical tension on the toes, a result of normal variation in foot anatomy and the resulting unequal dispersion of weight during ambulation. Other factors include different nail trimming habits for each foot, localized trauma to specific toe and medical conditions, such as diabetes or peripheral vascular disease that may affect one limb disproportionately.

A majority of our participants had one- or two-nail fold involvement (97.2%), which is consistent with a Turkish study (2019) accounting for 91.7% of patients [29]. In the present study, ingrown nail over great toe is the most common (98.1%) and Involvement of the fingers was observed in only one patient, which also coincided with the aforementioned Turkish study (81.3%) [29]. The toes appear to be more prone to stress than fingers, including the stress of weight-bearing. Additionally, the matrix beneath toenails curves over the terminal phalanx to create a hemisphere.; particularly, the lateral nail fold covers a larger area of the nail plate than it does in the finger because of mediolateral convexity [30,5,31,32].

The prevalence of stage 3 ingrown toenails was significant in this study (53.4%), which is compatible with a Brazilian study(2017) (43%) and a Polish study (53.7%). This indicates a potential lack of awareness about prevention and early treatment for ingrown toenails among the general population.

Consistent with the literature, distolateral ingrown nail was the common subtype reported in this study. This could be due to weight-bearing activities that place extra pressure on the distal portion of the nail, especially at the lateral margins. Furthermore, when toenails grow close to the distal end, their growth pattern can lead the lateral edges to become pronounced or curved. Some footwear have a smaller toe box, which may exert pressure on the lateral and distal edges of the toenails and compress the toes. Furthermore, trauma most frequently impacts the distal nail.

6.3 Possible risk factors for the development of ingrown nails

As stated by numerous studies, the key drivers of ingrown toenails are poor nail care practices, wearing tight shoes, hyperhidrosis, trauma, and participating in sports [8,9,14,16].]. In the present study, 58.9% of patients reported poor nail trimming habits, as compared to the 75% in the Turkish study, 22% in the North Indian study, and 10.71% in the Nigerian study [16,19,20].

Tight shoes were worn frequently (45.2%) as compared to 46.2% in the Turkish study, 34% in the North Indian study in 34 %, and 28.% in the Nigerian study[16,19,20]. Wearing tight shoes or

socks may be another component contributing to the progressive compression of embedded lateral soft tissue, resulting in inflammation and foreign-body responses .

Hyperhidrosis was encountered in 75.3 % of the present patients with ingrown nail, compared to 8% in North Indian study, 16.8% in the Turkish study, and 17.8% in the Nigerian study. Hyperhidrosis compromises pedal hygiene and enhances the chance of foot infections, which in turn produces edema that may facilitate ingrown nail [16,19,20].

A history of trauma was ascertained in 24.7% of the patients in the present study. This result is in line with the Turkish study (24.3%) and Nigerian study (21.43%)[19,20]. A total of 9.6% of patients with ingrown nail in this study were found to be obese, compared to 34.1% in the Turkish study. Obesity increases pressure on the toes and may thereby promotes the development of ingrown nails [19]. Taking part in sports was characteristic of 45.2% of cases in our study, compared to 20.5% in the Turkish study [19]. A family history was present in 21.9% of participants as compared to 7.6% in the Turkish study, 7.14% in the Nigerian study and 10% in the North Indian study. A familial history reflects familial nail toe pattern characterized by medial rotation of the toe and a thickened nail fold [16,19,20].

Diabetes mellitus was reported in 12.3 % of cases in this study, compared to 7.5% in the Turkish study, 10.71% in the Nigerian study, and 12% in the North Indian study. These patients may be at greater risk for bacterial or fungal infections. Likewise, vasculopathy in diabetic patients has been shown to cause blood flow impairment, which is a known contributor to nail plate thickening [16,19,20] .

In this study, patients with previous history of ingrown nail account 23.3 % of cases and those with previous history of treatment for ingrown nail account 28.7 % of cases. In North Indian study,12% of patients presented with recurrent disease and had history of partial or complete nail avulsion in the past. 52% of patients were managed previously by conservative modalities of treatment.[16]. Although the treatment modality is not determined in this study, the factors leading

to recurrence after surgical treatment include incomplete matrix removal, improper nail growth post-surgery due to natural nail contour or foot structure and poor post-operative care, resulting in infection or improper wound healing. Other risk factors that predispose to ingrown nail may also result in recurrence.

6.4 Quality of Life with Ingrown nails

In this study, ingrown toenails were shown to have an impact on quality of life ranging from moderate to severe. The mean DLQI score in this study was 11.75, where as in a Brazilian study (2017) it was reported as 8.3. In this study, respondents were most likely to report severe effect (45.2%) followed by a moderate effect (35.6 %) where as in the Brazilian study, 30% reported moderate effect and 27% severe effect [3]. This variation could be due to more prevalent Stage 3 disease in this Study (53.4% vs 43%). The most affected life dimensions according to DLQI were symptoms, embarassment, daily activities, dressings, and social/leisure activities, similar to the Brazilian study [3].

In this study, multiple linear regression revealed that the pattern of the ingrown nail, BMI, and Heifetz stage were significant factors affecting the quality of life for patients with ingrown nails. In the Brazilian study, women, young subjects and more severe clinical cases reported higher DLQI scores[3]. In this study, distal ingrown nail and Higher BMI are associated with High DLQI score meaning with poor quality of life of patients. However Patients in stage 2 and 3 have better quality of life compared to stage 1 disease .This paradox may be due to personal variation in expression of discomfort in DLQI parameters or adaptation of symptoms in higher stages of the disease.

7 Strength and Limitation

7.1 Strength of the study

This is the first study on ingrown nail patients at ALERT Hospital and in Ethiopia at large.

7.2 Limitation of the study

The lack of pertinent literature for discussing key variables, particularly those in relation to ingrown nail sufferers' quality of life. It is a hospital-based study and the Small sample size which might make extrapolating the results to a community level difficult.

8. Conclusion and Recomendations

8.1 Conclusions

In conclusion, ingrown nail has significant impact on quality of life of working age patients and most of the patients presented to our clinic at advanced stages of the disease.

8.2 Recomendation

Health professionals: Considering that Ingrown nail is Common condition and disrupts the quality of life, informing the public about risk factors will decrease the frequency of ingrown nail , and modifying risk factors in patients will enable rapid control of the disease and reduce recurrences.

ALERT Center : better to open Dermatology OPD deicated for nail disorders.

Researchers: Future research should look into factors Influencing quality of life as well as the severity of their disease ;with an emphasis on extended data collection time to ensure a large enough sample size.

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ANNEXES

Consent Form

እኔ ዶ/ር አዜብ አበበ እባላለሁ፡፡ የመጣሁት ከአዲስ አበባ ዩኒቨርሲቲ ነው፡፡የመመረቂያ ጥናታዊ ጽሁፍ እያደረኩ እገኛለሁ፡፡ ርዕሱም “Clinical patterns and quality of life among patients with ingrown nail” **ሲሆን የሚካሄደውም በአለርት አጠቃላይ ስፔሻላይዝድ ሆስፒታል ቆዳ ክፍል ነው፡፡ የምላሽዎ ሚስጥራዊነት የተጠበቀ ነው፡፡ በዚህ ጥናታዊ ጽሁፍ መሳተፍ ካልፈለጉ በማንኛውም ሰዓት ማቋረጥ ይችላሉ፡፡ ከተስማሙ እባክዎ አዚህ ቅጽ ላይ ይፈርሙ፡፡**

Thank you!

Patient Signature _____Date_____

Questionnaire

I. sociodemographic variables

Age (yrs) ____

Sex: Male ___Female ____

Occupation:---------

II. Nail associated clinical features

1,Duration of the lesion----------

2. location of lesion

A,Unilateral Foot/hand

B, Bilateral feet/hands

3,. Number of nail fold affected per patient --------

4. Which nail is affected?

A. Great toe nail

B. Other toe nails

C. Finger nails

5. Clinical pattern of ingrown nail

A. Distolateral

B. Lateral

C. Distal

D. Proximal

6, Heifetz staging

A. Stage 1

B. Stage 2

C. Stage 3

III, Possible risk factors for development of Ingrown nail

1, Poor trimming of nails ----yes, no

2, Wearing tight shoes --- yes, no

3, History of trauma to the site yes, no

4, Family hx of Ingrown nail ….yes,no

5 , Play Sports –---yes ,no

6, Hyperhidrosis ---yes,no

7,History of Onychomycosis ---yes,no

8, History of misalignment of nail ---yes ,no

9 , History of Diabetes ---yes ,no

10 , Previous history of ingrown nail

11, Previous history of treatment for the ingrown nail

12,Body mass index-------

IV ,DLQI

የዚህ መጠይቅ ዓላማ የጥፍርዎ ሁኔታ በአጠቃላይ ህይወት ላይ በባለፈው ሳምንት ያሳደረውን ተፅዕኖ መለካት ነው። እባክዎን ለእያንዳንዱ ጥያቄ አንድ የ "√" ምልክት ያድርጉ።

1.	በባለፈው ሳምንት ጥፍርዎ ምን ያህል ቁስለት፣ ህመም እና የማቃጠል ስሜት ነበረው?	• እጅግ በጣም ☐ • በጣም ☐ • በመጠኑ ☐ • በፍፁም ☐	ግኑኝነት የለውም ☐
2.	በባለፈው ሳምንት የጥፍርዎ በሽታ ምን ያሕል አሳስቦዎት እና አስጨንቆት ነበር?	• እጅግ በጣም ☐ • በጣም ☐ • በመጠኑ ☐ • በፍፁም ☐	ግኑኝነት የለውም ☐
3.	በባለፈው ሳምንት የጥፍርዎ በሽታ ገበያ ሲሄዱ አንዳንድ ስራዎችን በቤት ውስጥ ሲያከናውኑ ምን ያህል ችግር ፈጥሮብዎታል?	• እጅግ በጣም ☐ • በጣም ☐ • በመጠኑ ☐ • በፍፁም ☐	ግኑኝነት የለውም ☐
4.	በባለፈው ሳምንት የጥፍርዎ በሽታ በሚለብሱትን ጫማ ምርጫ ምን ያህል ተፅዕኖ ፈጥሮቦታል?	• እጅግ በጣም ☐ • በጣም ☐ • በመጠኑ ☐ • በፍፁም ☐	ግኑኝነት የለውም ☐
5.	በባለፈው ሳምንት የጥፍርዎ በሽታ የሚያደርጉትን ማህበራዊ እንቅስቃሴ እና መዝናናት ሁኔታ ላይ ምን ያህል ተጽዕኖ ፈጥሮብዎታል?	• እጅግ በጣም ☐ • በጣም ☐ • በመጠኑ ☐ • በፍፁም ☐	ግኑኝነት የለውም ☐
6.	በባለፈው ሳምንት የጥፍርዎ በሽታ የስፖርት እንቅስቃሴ እንዳያደርጉ ምን ያሕል ተጽዕኖ ፈጥሮብዎታል?	• እጅግ በጣም ☐ • በጣም ☐ • በመጠኑ ☐ • በፍፁም ☐	ግኑኝነት የለውም ☐
7.	በባለፈው ሳምንት የጥፍርዎ በሽታ ከትምህርት ወይም ከስራ ምን ያህል አግዶዎታል?	• አዎ ☐ • አይደለም ☐	ግኑኝነት የለውም ☐
	አዎ ከተባለ ምን ያህል በስራዎ እና ትምህርትዎ ላይ ችግር ፈጥሮብዎታል?	• በጣም ☐ • በመጠኑ ☐ • በፍፁም ☐	
8.	በባለፈው ሳምንት የጥፍርዎ በሽታ በርሶ የቅርብ ዘመድ ወይም ጓደኞች ጋር ባለዎት ግንኙነት ላይ የፈጠረብዎት ችግር ምን ይመስላል?	• እጅግ በጣም ☐ • በጣም ☐ • በመጠኑ ☐ • በፍፁም ☐	ግኑኝነት የለውም ☐
9.	በባለፈው ሳምንት የጥፍር በሽታዎ በተቃራኒ ፆታ ግንኙነት ላይ የፈጠረብዎት ችግር ምን ይመስላል?	• እጅግ በጣም ☐ • በጣም ☐ • በመጠኑ ☐ • በፍፁም ☐	ግኑኝነት የለውም ☐
10.	በባለፈው ሳምንት የህክምናዎ ሁኔታ ያደረሰብዎት ተጽዕኖ ምን ይመስላል ለምሳሌ ቤትዎን በማመሳቀል ወይም ብዙ ጊዜ በመውሰድ ሊሆን ይችላል?	• እጅግ በጣም ☐ • በጣም ☐ • በመጠኑ ☐ • በፍፁም ☐	ግኑኝነት የለውም ☐