

الاية

بسم الله الرحمن الرحيم

قال تعالى : (وعلّم آدم الاسماء كلها ثم عرضهم على  
الملائكة فقال أنبئوني بأسماء هؤلاء إن كنتم صادقين)

صدق الله العظيم  
سورة البقرة اية رقم (31)

Dedication

*To my father ...  
The candle light that  
Shows me the road  
..... to my mother...  
The warmest asylum  
That I resort to for  
Support  
To my sisters and brothers  
My eyes through which  
....I vise the world ...  
To my husband and daughters  
The sweetest garden of being  
...To them all...  
I dedicate this humble  
Work*

## Acknowledgement

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Who gave the strength and power to complete this effort.

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lend a hand to make this work possible

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### **Abstract**

This research was conducted as a trial to get acquainted with the Sudanese foot shape and anatomy as it is necessary in the field of foot wear

industry. Besides, the research aims at proposing shoes size and fitting system for Sudanese dwelling in Khartoum state and studying the factors affecting the shape of Sudanese foot.

The study was conducted into two parts. The first part was questionnaire investigating a sample of 480 individuals from medical cadres operating in the medical and health institutions in Khartoum state about the most effective factors on the shape of Sudanese feet from Sudanese land vastness, land topography, work, diet and genetic factors.

In the second part, foot survey through manual measurement was conducted for sample of 327 individuals as 172 males and 155 females. The sample was distributed into 6 groups to be three for each sex according to their age and their foot length, width, joint, waist, instep , long heel , short heel and ankle girths were measured for each one.

The obtained results from the first part were subjected to analysis using The Statistical Package for Social Science application program (SPSS) which showed that the type of work is the most effective factor on the shape of Sudanese feet when it is compared with diet and land topography factors. The topography factor is more effective than diet factor. Whereas the genetic factor is the most effective factor on the shape of Sudanese feet when it is compared with land topography, diet and work factors. Generally, it was found that the genetic and work factors are more effective than the other factors on determination of the Sudanese foot shape.

Also, the obtained results from the second part were subjected to analysis using The Statistical Package for Social Science application program (SPSS) determining the common foot measurements for the group 1 of females with age ranging from 6 to 15 years old to be foot length (221.97mm) , width (87.478mm) , joint (204mm) , waist (197.72mm) , instep (207.28mm) , long heel (305.03mm) , short heel (279.03mm) and

ankle (228.39mm) girths. And for the group 2 of females with age ranging from 16 to 25 years old to be foot length (242.92mm) , width (85.00mm) , joint (208.99mm) , waist (219.71mm) , instep (207.28mm) , long heel (302.96mm) , short heel (276.30mm) and ankle (246.01mm) girths. And for the group 3 of females with age ranging from 26 to 54 years old to be foot length (256.45mm) , width (97.55mm) , joint (236.29mm) , waist (229.24mm) , instep (241.95mm) , long heel (352.90mm) , short heel (332.26mm) and ankle (268.00mm) girths.

For males groups , the analysis determined the common foot measurements for the group 4 of males with age ranging from 5 to 15 years old to be foot length (226.45mm) , width (91.47mm) , joint (212.52 mm) , waist (206.95mm) , instep (218.23mm) , long heel (313.10 mm) , short heel (287.42mm) and ankle (235.57mm) girths. And for the group 5 of males with age ranging from 16 to 25 years old to be foot length (267.66 mm) , width (103.78mm) , joint (242.26mm) , waist (239.19mm) , instep (257.92mm) , long heel (343.88mm) , short heel (318.15mm) and ankle (263mm) girths. And for the group 6 of males with age ranging from 26 to 60 years old to be foot length (270.26mm) , width (107.26mm) , joint (249.42mm) , waist (246.23mm) , instep (255.61mm) , long heel (366.77mm) , short heel (349.29mm) and ankle (272.90mm) girths. These results will surely be the base on which the suitable shoe size and fitting system for the six groups to be made. In addition to the above, comparative analysis was conducted for the six groups between the foot length and girths which determine the common measurements for their feet and gave a clear picture for variations of foot sizes and shapes according to sex and age groups.

#### مستخلص الدراسة

اجري هذا البحث كمحاولة للتعرف على الشكل و التركيب التشريحي للقدم السودانية فيما يتعلق بمجال صناعة الاحذية ومحاولة الوصول لمقترح بنظام للقياس وضبط للاحذية داخل ولاية الخرطوم. بالاضافة الى دراسة تشريح القدم وبكل ما يتعلق بالقدم من مؤثرات تؤثر على شكل القدم السودانية.

في القسم الاول من الدراسة و عبر استبيان عينة من المختصين بلغت 480 فرد يعملون في المؤسسات الصحية وذلك للاجابة عن بعض الاسئلة التي تدور حول اكثر العوامل تأثيراً على شكل القدم السودانية و تم تحديد عوامل اتساع مساحة السودان و طبيعة الارض و طبيعة العمل و طبيعة الغذاء و العامل الوراثي.

و في القسم الثاني من الدراسة اجري مسح ميداني لعينة تتألف من الذكور و الاناث بمختلف فئاتهم العمرية بولاية الخرطوم بلغت عدد 172 فرد من الذكور قسموا الى ثلاثة مجموعات عمرية و عدد 155 فرد من الاناث قسموا الى ثلاثة مجموعات عمرية حيث تم قياس ابعاد طول القدم و عرضها مع محيطات مفصل القدم و وسط القدم و مشط القدم و الكعب الطويل للقدم و الكعب القصير و كاحل القدم.

اخضعت النتائج المتحصل عليها من القسم الاول من البحث للتحليل عبر برنامج الحزم الاحصائية للعلوم الاجتماعية SPSS و التي اظهر التحليل ان عامل طبيعة العمل اكثر تأثيراً على شكل القدم من طبيعة الغذاء و طبيعة الارض عند المقارنة بينهم. و كذلك وجد ان عامل طبيعة العمل اكثر تأثيراً من عامل طبيعة الغذاء عند المقارنة بينهما. كما وجد ان العامل الوراثي اكثر تأثيراً على شكل القدم من عوامل طبيعة العمل و طبيعة الارض و طبيعة الغذاء عند المقارنة بينهم. و مما سبق توصل الى ان كل من العامل الوراثي و طبيعة العمل لهما اكبر اثر على شكل القدم السودانية من عوامل طبيعة الارض و الغذاء.

وكذلك اخضعت نتائج القسم الثاني من البحث للتحليل عبر برنامج الحزم الاحصائية للعلوم الاجتماعية SPSS و قد توصل الى ان متوسطات ابعاد القدم للمجموعة الاولى و التي تتألف من الاناث ذو الاعمار بين 6 الى 15 سنة هي طول القدم (221.97 ملم) و عرضها (87.478 ملم) مع محيطات مفصل القدم (204 ملم) و وسط القدم (197.72 ملم) و مشط القدم ( 207.28ملم) و الكعب الطويل للقدم ( 305.03 ملم) و الكعب القصير (279.03 ملم) و كاحل القدم (228.39ملم) و متوسطات ابعاد القدم للمجموعة الثانية و التي تتألف من الاناث ذو

الاعمار بين 16 الى 25 سنة هي طول القدم (242.92 ملم) و عرضها (85.00 ملم) مع محيطات مفصل القدم (208.99 ملم) و وسط القدم (219.71 ملم) و مشط القدم (207.28 ملم) و الكعب الطويل للقدم ( 302.96 ملم) و الكعب القصير ( 276.30 ملم) و كاحل القدم (246.01ملم). و متوسطات ابعاد القدم للمجموعة الثالثة و التي تتألف من الاناث ذو الاعمار بين 26 الى 54 سنة هي طول القدم (256.45 ملم) و عرضها (97.55 ملم) مع محيطات مفصل القدم (236.29 ملم) و وسط القدم (229.24 ملم) و مشط القدم ( 241.95 ملم) و الكعب الطويل للقدم ( 352.90 ملم) و الكعب القصير (332.26 ملم) و كاحل القدم ( 268.00 ملم). بالنسبة للذكور قد توصل الى ان متوسطات ابعاد القدم للمجموعة الرابعة و التي تتألف من الذكور ذو الاعمار بين 5 الى 15 سنة هي طول القدم (226.45 ملم) و عرضها (91.47 ملم) مع محيطات مفصل القدم (212.52 ملم) و وسط القدم (206.95 ملم) و مشط القدم (218.23 ملم) و الكعب الطويل للقدم ( 313.10 ملم) و الكعب القصير (287.42 ملم) و كاحل القدم (235.57ملم) و متوسطات ابعاد القدم للمجموعة الخامسة و التي تتألف من الذكور ذو الاعمار بين 16 الى 25 سنة هي طول القدم (267.66 ملم) و عرضها (103.78 ملم) مع محيطات مفصل القدم (242.26 ملم) و وسط القدم (239.19 ملم) و مشط القدم ( 257.92 ملم) و الكعب الطويل للقدم ( 343.88 ملم) و الكعب القصير ( 318.15 ملم) و كاحل القدم ( 263 ملم). و متوسطات ابعاد القدم للمجموعة السادسة و التي تتألف من الاناث ذو الاعمار بين 26 الى 60 سنة هي طول القدم (270.26 ملم) و عرضها ( 107.26 ملم) مع محيطات مفصل القدم (249.42 ملم) و وسط القدم (246.23 ملم) و مشط القدم ( 255.61 ملم) و الكعب الطويل للقدم ( 366.77 ملم) و الكعب القصير ( 349.29 ملم) و كاحل القدم ( 272.90ملم). و شكلت المعلومات السابقة مقاسات الحذاء الانسب للباس المجموعات الستة. بالاضافة لما ذكر اجريت مقارنة بين اطوال الاقدام و المحيطات بالنسبة للمجموعات الستة حددت الاطوال الشائعة و اعطت صور متعدد لاحجام الاقدام وفق النوع و الفئة العمرية