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ALTERATIONS IN HEPATIC ENZYMES AND LIPID PROFILE IN A CROSS SECTION OF UNDERGRADUATE FEMALE STUDENTS IN NIGER DELTA UNIVERSITY HAVING STRIAE DISTENSAE

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ABSTRACT

Worrisome statistics have suggested that striae distensae (stretch mark) is high amongst young adult female in Nigeria, although undeniably, dearth of information regarding its exact relationship with biochemical indices such as lipid profile and organ functions is a gap particularly in the south southern region. Therefore this investigation sought to reduce this gap. A total of 50 young adult female aged between 18 and 25 years was divided into 2 groups of 25 each. Group 1 (test) had stretch mark and the other, group 2 (control) did not. Specified standard assay method was implored to generate relevant data which was subjected to statistical analysis with SPSS version 21. The results show significantly (p=0.025) that group 1 had higher (10.19± 2.89 mg/dl) serum total bilirubin than control (8.87± 2.40 mg/dl). Similarly, total cholesterol (14.3± 0.63 mg/dl) in serum was higher for test group than control (3.75± 0.59 mg/dl), significant at (p=0.03). Also, serum alanine aminotransferase (ALT) was higher (10.48± 2.85 mg/dl) in test group significantly (p=0.028) than control (8.88± 2.97 mg/dl). It is conceivable that these elevated levels of serum total bilirubin, ALT and total cholesterol may partly contribute in the development of this skin disorder.

KEYWORDS: stretch mark, liver, skin, serum, bilirubin, cholesterol, ALT.

INTRODUCTION

Striae distensae, commonly known as stretch mark is a skin disorder that has social and psychological impact among female sex; affecting about 90% of women emotionally, cognitively and behaviourally (Barbara & Reif, 2008). Nada et al (2009) reported more susceptibility to stretch mark in African women than their Caucasian counterpart. In Nigeria, stretch mark prevalence among women ranges from 43% to 88% for expectant women, 86% for adolescents and 43% for obese women (Nada et al., 2009).

Striae distensae represents a major dermatological condition though not considered a medical emergency but impacting negatively on the quality of life of affected women folks (Weber, 2019). It is caused by marked stretching on the skin leading to dermal damage and epidermal thinning that presents clinically as linear atrophic scars (Ikaraoha & Azubuike, 2022). Two forms of this disorder recognized are striae rubrae which is the acute stage and characterized by red, flat lesions perpendicular to skin tension direction as initial effects, while the striae albae is chronic stage classified when stretch mark has faded with atrophic hypopigmented and wrinkled appearance (Weber, 2019).

It is believed that stretch mark develops as a result of tissue stretching during growth in adolescence and rapid increase in size of some portions of the body, most commonly – the buttocks, breasts, thigh and abdomen. In a vast majority of cases reportedly, pregnant women and adolescents have bore the brunt of this skin disorder; which is also associated with cushing syndrome and chronic steroid use (Cho et al., 2006). It is not fully understood, the mechanisms and factors that contribute to development of striae distensae (SD), as views are divergent; ranging from SD developing due to stressful rupture in the framework of connective tissue, to a view of effortless development due to presence of raised amount of rigid cross-linked collagen on skin and the

view of raised cortical stimulations and secretions as seen in Cushing syndrome (Cho et al., 2006).

Ikaraoha and Azubuike (2022) had asserted that electrolytes (which are low molecular mass charged molecules present in plasma and cytosol may be linked with a variety of medical disorders when they are in abnormal concentrations particularly sodium and potassium ions. Sodium is considered the major cation of the extracellular fluid where it is higher in quantity than in intracellular fluid; and this asymmetric distribution is essential for human life (Banks, 2010). Similarly, abnormal concentrations of lipids may be the cause of or consequence of variety of medical disorders (Nigam, 2011).

It is well established knowledge that the liver has a central and critical biochemical role in metabolism - digestion, detoxification and elimination of substances from the body (Kaltra et al., 2021). And all blood from the intestinal tract initially passes through it, where products derived from digestion of food are processed, transformed and sometimes stored (Moriles & Azer, 2022). Also the liver health may be assessed and response to treatment monitored by the various liver enzymes including Alanine phosphatase (ALP), Alanine aminotransferase (ALT), and Aspartate aminotransferase (AST).

However, in respect of elucidating the exact link between some biochemical parameters such as lipid profile, liver health biomarkers and striae distensae sufferers worldwide (with south southern Nigeria in focus), there seem to be scarcity of understanding (Nada et al., 2009). Therefore, this study sought to examine lipid profile and liver enzymes in young female adults from a university community in south southern Nigeria.

METHODS

The study which was approved by the Faculty of Basic Medical sciences ethical committee on research with humans and animal specimens, involved random selection of 50 consented apparently healthy females between 18 and 25 years from the Niger Delta University, among whom 25 had striae distensae (SD)subjects and 25 did not have it (NSD) subjects. On the exclusion list were those with other skin diseases such as eczema, these having chronic diseases, and those who did not give informed consent. Oral informed consent was obtained from all volunteers who were made to know the reasons why their blood specimens were needed for the research.

Venous blood was collected (4mls) from subjects by venipuncture using sterile needle and syringes and dispensed into lithium heparin bottle containers appropriately labeled before commencement of analytical procedure. Storage was by refrigeration at 2 - 8 ^{0}C until analyzed within 5 hours.

All reagents were commercially purchased, as manufactured by Randox Laboratories limited, 55 Diamond Road, Crumlin County, Antrim, BT294QY United Kingdom, and the manufacturers' standard operational procedures were strictly adhered to; in measurement / estimation of total protein (TP), total cholesterol (T.CHOL), High density lipoprotein (HDL), triglyceride (TG), low density lipoprotein (LDL), very low density lipoprotein (VLDL), total bilirubin (TB), direct bilirubin (DB) and liver enzymes in line with previous protocols of researchers (Yang et al., 2009; Kimmich et al., 2002; Thiriet, 2018).

RESULT ANALYSIS

Table 1: Mean value of biochemical parameters for liver health evaluation in test and control groups.

Parameters	Striae Distensae	Non-Striae Distensae	P-value	Remark
TB	10.19± 2.89	8.87±2.40	0.025	S
DB	4.06±1.09	3.95±1.25	0.700	NS
ALT	10.48±2.85	8.88±2.97	0.028	S
AST	6.32±2.11	6.28±1.67	0.921	NS
ALP	34.18±4.74	34.80±5.51	0.650	NS
Total protein	72.78±5.51	72.78±5.51	0.922	NS
From the above table, there were significantly (p=0.025) higher total bilirubin (10.19±2.28) and ALT (10.48±2.85) in serum of SD subjects than NSD subjects; but for direct bilirubin (4.06±1.09), AST (6.32±2.11), ALP (34.18±4.74) in SD subjects, these were all non-significantly different from their NSD counterparts at (p=3.95±1.25, 6.28±1.67, 34.80±5.51) in that order.				

Table 2: Mean values of biochemical parameters for lipid profile in test and control groups.

Parameters	Striae Distensae	Non-Striae Distensae	P-value	Remark
T. CHOL	14.3± 0.63	3.75±0.59	0.03	S
TG	1.38±0.57	1.18±0.40	0.168	NS
HDL	0.88±0.20	0.85±0.18	0.59	NS
VLDL	0.27±0.11	0.23±0.82	1.90	NS

ALP	34.18±4.74	34.80±5.51	0.650	NS
LDL	2.37±0.84	2.35±0.36	0.92	NS
The table shows significant increase of serum T.CHOL in test group than control (p=0.03), and non-significant difference of the other lipids.				

DISCUSSION AND CONCLUSION

Although striae distensae is a skin disorder without critical clinical problem of concern, it remains a condition of significant psychosocial distress to affected individuals, thus this research gave attention to it. Test and control groups of 25 young adult females each were used for this research; those with visibly established stretch mark as test group, and those without stretch mark represented control group. The blood samples collected, and analyzed for relevant biochemical parameters showed the followings.

Total bilirubin in serum was significantly higher in individuals with striae distensae than control counterparts. The serum level of ALT and T. CHOL were also higher significantly in test group than those without striae distensae.

It was observed that direct bilirubin level, as well as AST in serum was higher amongst the individuals that have stretch mark than their counterparts without the skin disorder; although this was not significant statistically. Meanwhile, the estimation of total protein was not different between test and control groups.

It is still not very fully elucidated, the mechanisms associated with striae distensae development; particularly regarding biochemical parameters such as serum bilirubin, total protein and liver health assessed through liver enzymes as biomarkers. But in the current investigation, it may be conceivable that the increased levels of total bilirubin and increased ALT amongst striae distensae subjects than non-striae individuals could have contributed to development of the skin disorder.

This inference perhaps is corroborated since bilirubin and ALT are closely associated biomarkers of liver health; and their high concentration in blood serum is a pointer to liver dysfunction or injury; and bilirubin is associated with jaundice which typically in neonates presents with pigment on skin that gives it abnormal coloration (Henok et al., 2020; Ellison et al., 2016; Mauro et al., 2006).

Again, when cholesterol levels are high and circulates in blood stream, this could collect in fatty deposits under the skin and cause rash, yellowish bumps filled with fat, or block skin capillaries changing colour of skin surface; thereby possibly predisposing it to stretch mark.

In conclusion, it is probable that these altered concentrations of biomarkers may have contributed to other more specific parameters not yet elucidated, to bring about this disorder seen in the test group of female subjects; and further research is recommended to fully appreciate the exact link between this development of striae distensae and these parameters.

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