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## INTRODUCTION

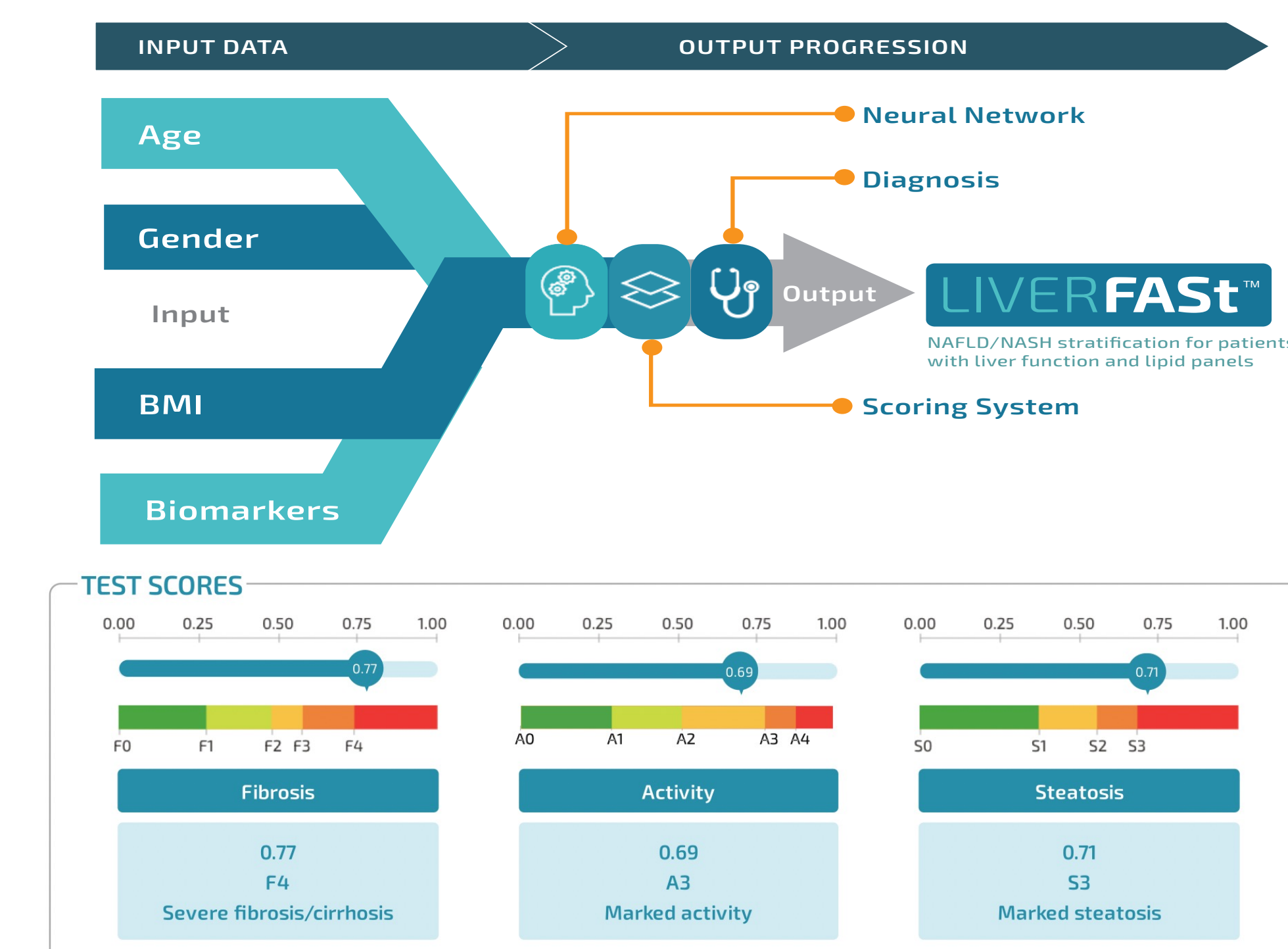
Psoriasis is a chronic, inflammatory skin disease often associated with steatotic liver disease. Non-invasive diagnostic tests may assist in detecting liver disease without a liver biopsy, especially in psoriasis patients who require systemic treatment. LIVERFAST (Fibronostics, Florida, US) is an artificial intelligence (AI) technology that uses surrogate blood-serum biomarkers to assess steatosis, fibrosis and activity scores.

## AIMS

**This study aims to explore the association between psoriasis severity and steatosis by utilising a non-invasive test, LIVERFAST.**

## METHODS

- A cross-sectional study was conducted on patients  $\geq 18$  years old with chronic plaque psoriasis in the Dermatology Clinic, Universiti Teknologi MARA (UiTM) Medical Specialist Centre, Sungai Buloh, Malaysia.
- We assessed psoriasis severity measured by psoriasis area and severity index (PASI) scores  $< 10$  (mild) and  $\geq 10$  (moderate-to-severe) after excluding other liver diseases.
- We evaluated the relationship of PASI scores with presumed steatosis, fibrosis, and activity scores measured by LIVERFAST.
- Serum biomarkers performed, including alpha-2 macroglobulin, haptoglobin, apolipoprotein A1, total bilirubin, GGT, ALT, AST, fasting glucose, total cholesterol, triglycerides, age, sex, height, and weight were entered into LIVERFAST algorithms to analyse the scores.



## RESULTS

A total of 50 patients with chronic plaque psoriasis had a mean PASI of  $8.7 \pm 6.3$ , and body surface area (BSA) was  $7.0$  [interquartile range (IQR)  $9$ ]% with disease duration of  $5.5$  years (IQR  $11.38$ ).

Based on the PASI score, the proportions of mild and moderate-to-severe subjects were  $28$  ( $56.0\%$ ) and  $22$  ( $44.0\%$ ), respectively.

Steatosis scores were higher among patients with moderate-to-severe psoriasis group vs mild group [ $0.30$  (IQR  $0.48$ ) vs ( $0.23$  (IQR  $0.42$ ))],  $p = 0.145$ .

Mild and moderate-to-severe psoriasis patients differed significantly in the duration of disease ( $p = 0.033$ ) and age ( $p = 0.040$ ).

Psoriatic patients with steatosis were older, with a median of  $47.0$  (IQR  $25$ ) years and had a longer disease duration, with a median of  $9$  years (IQR  $20.25$ ).

Comparison of LIVERFAST™ Scores and Demographics according to the Psoriasis Severity

Variables	Mild PASI (IQR), n=28	Moderate to Severe PASI (IQR), n=22	p-value
<b>LIVERFAST™</b>			
Steatosis Score	0.23 (0.42)	0.30 (0.48)	0.145
Fibrosis Score	0.11 (0.10)	0.14 (0.16)	0.338
Activity Score	0.07 (0.13)	0.09 (0.14)	0.563
<b>Demographics</b>			
Age (years)	34.00 (17.00)	41.00 (38.00)	<b>0.040</b>
Duration of Disease (years)	3.50 (9.00)	9.50 (11.50)	<b>0.033</b>
BMI <sup>1</sup> (kg/m <sup>2</sup> )	24.04 (7.46)	25.49 (8.81)	0.328

Figures are in median (interquartile range). All p values are from the Mann-Whitney test  
BMI<sup>1</sup> = body mass index

Comparison of Demographics & Anthropometric and Clinical Features according to the Psoriasis Severity

Variables	Mild PASI (n=28)	Moderate-to-Severe PASI (n=22)	p-value*
<b>Duration of Disease (years)</b>			
0-5	18 (64.3%)	7 (31.8%)	0.045
$\geq 6$	10 (35.7%)	15 (68.2%)	
<b>Age (years)</b>			
18-54	25 (89.3%)	13 (59.1%)	0.020
$\geq 55$	3 (10.7%)	9 (40.9%)	
<b>Gender</b>			
Male	6 (21.4%)	12 (54.5%)	0.016
Female	22 (78.6%)	10 (45.5%)	
<b>BMI<sup>1</sup> (kg/m<sup>2</sup>)</b>			
$< 30$	22 (78.6%)	15 (68.2%)	0.520
$\geq 30$	6 (21.4%)	7 (31.8%)	
<b>Central Obesity (cm)</b>			
M $< 90$ ; F $< 80$	17 (60.7%)	10 (45.5%)	0.393
M $\geq 90$ ; F $\geq 80$	11 (39.3%)	12 (54.5%)	
<b>Diabetes Mellitus</b>			
Yes	3 (10.7%)	7 (31.8%)	0.084
No	25 (89.3%)	15 (68.2%)	
<b>Hypertension</b>			
Yes	4 (14.3%)	7 (31.8%)	0.178
No	24 (85.7%)	15 (68.2%)	
<b>Dyslipidaemia</b>			
Yes	9 (32.1%)	10 (45.5%)	0.389
No	19 (67.9%)	12 (54.5%)	

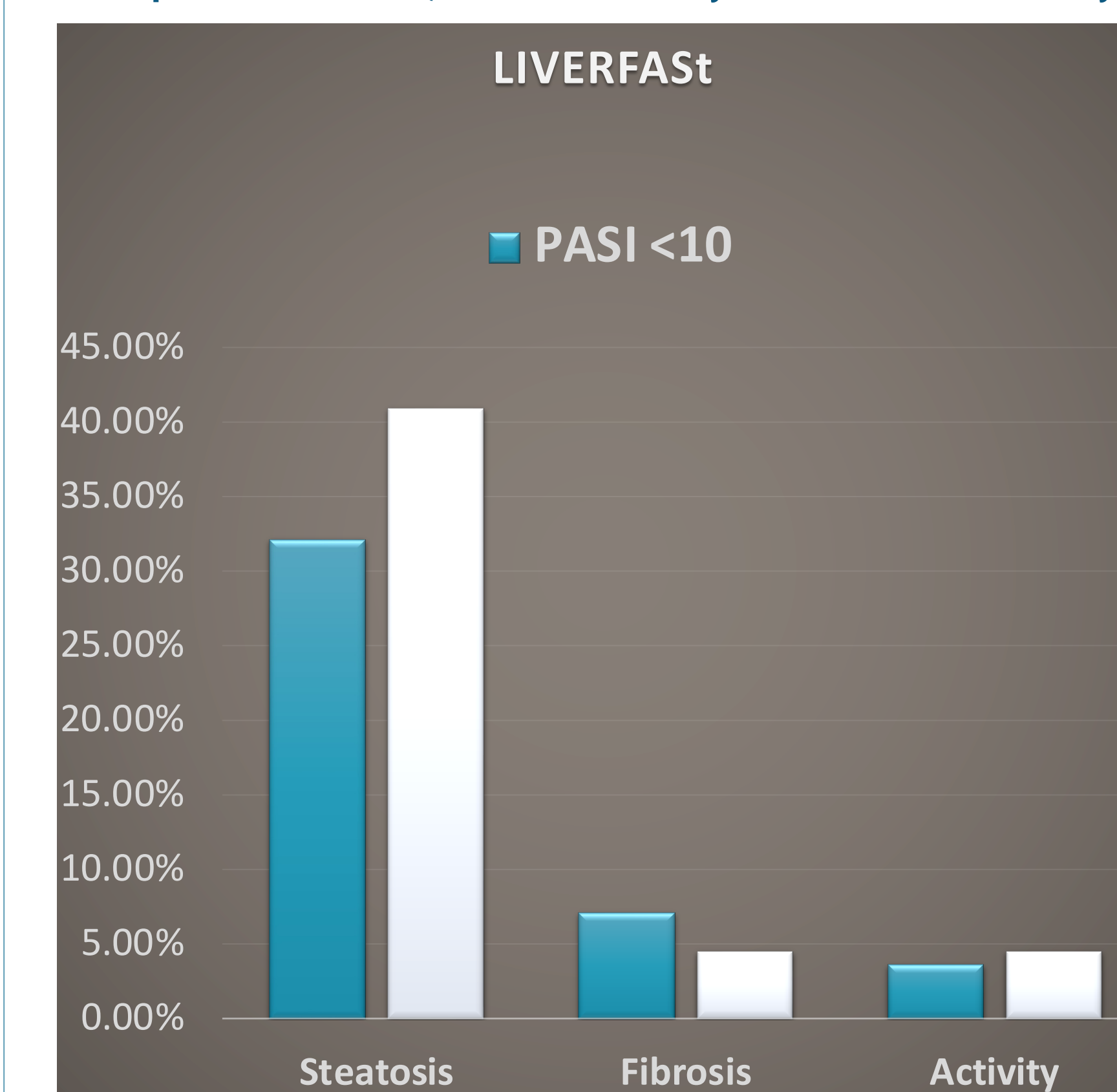
\*All p values are from Fisher's exact test; <sup>1</sup> BMI = body mass index

**Steatosis prevalence in the overall cohort was 36%; and was higher in the moderate-to-severe (PASI  $\geq 10$ ) vs mild group, 40.9% vs 32.1%, respectively, with no significant difference,  $p = 0.565$ .**

**Fibrosis and activity rate of 4.5% was observed in moderate-to-severe psoriasis population. However, higher fibrosis rates was detected (16.7%) in psoriatic patients with steatosis.**

**Waist circumferences were significantly correlated with the PASI score ( $r = 0.285$ ,  $p = 0.045$ ).**

Proportion of Steatosis, Fibrosis and Activity based on Psoriasis Severity.



Correlation between PASI Scores with LIVERFAST™ and Anthropometrics

Variables	r	P
<b>LIVERFAST</b>		
Steatosis score	0.254	0.075
Fibrosis Score	0.188	0.192
Activity Score	0.190	0.186
<b>Waist Circumference</b>	0.285	<b>0.045</b>
<b>BMI<sup>1</sup></b>	0.107	0.458

All p values are from Spearman's Correlation test,  $p < 0.05$ ,  $r$  = Correlation Coefficient  
<sup>1</sup> BMI = body mass index

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## CONTACT INFORMATION

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## CONCLUSIONS

- Patients with higher and moderate-to-severe psoriasis had higher LIVERFAST steatosis scores and prevalence of steatosis.
- LIVERFAST, an AI-based blood algorithm, is convenient for screening steatosis, particularly in psoriasis patients.
- Early detection of fibrosis is also recommended.