ORIGINAL ARTICLE

Establishment of Reference Intervals for SII, NLR, PLR, and LMR in Healthy Adults in Jiangsu Region in Eastern China

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SUMMARY

Background: We preliminarily established the reference intervals for the systemic immune-inflammation index (SII), neutrophil to lymphocyte ratio (NLR), platelet to lymphocyte ratio (PLR), and lymphocyte to monocyte ratio (LMR) in healthy adults in Jiangsu region in Eastern China to guide the interpretation and application of these indicators in clinical practice.

Methods: In total, 29,947 ostensibly healthy subjects from December 2020 to March 2021 were included in this study. The distributions of the SII, NLR, PLR, and LMR were analyzed using the Kolmogorov-Smirnov test. According to the C28-A3 guidelines, the 2.5th and 97.5th percentiles ($P_{2.5}$ to $P_{97.5}$) of the SII, NLR, PLR, and LMR were used to establish the reference intervals based on nonparametric methods.

Results: All SII, NLR, PLR, and LMR data were non-normally distributed. The levels of the SII, NLR, PLR, and LMR in healthy adults were significantly different between males and females (all $p < 0.05$). However, there were no significant differences in the SII, NLR, PLR or LMR among the different age groups, regardless of gender (all $p > 0.05$). Therefore, the reference intervals for the SII, NLR, PLR, and LMR were established based on the Sysmex testing platform for males (162×10^9/L - 811×10^9/L; 0.89 - 3.26; 63.15 - 191.34; 3.18 - 9.61) and females (165×10^9/L - 792×10^9/L; 0.87 - 3.16; 69.04 - 205.62; 3.46 - 10.96).

Conclusions: We have established the reference intervals for SII, NLR, PLR, and LMR in healthy adults based on the Sysmex detection platform and large sample size, which may provide important guidance for its clinical application.

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Supplementary Data

Table S1. Distribution of all subjects in different centers, ages, and genders (n).

Param-eters	Center A		Center B		Center C		Center D		Center E	
	Male (n = 3,100)	Female (n = 2,896)	Male (n = 3,005)	Female (n = 2,980)	Male (n = 3,052)	Female (n = 2,948)	Male (n = 2,978)	Female (n = 3,001)	Male (n = 3,002)	Female (n = 2,985)
20 - 29 years	550	518	521	511	482	478	469	523	508	490
30 - 39 years	525	530	500	498	495	496	486	488	519	521
40 - 49 years	517	502	524	521	534	534	521	523	526	532
50 - 59 years	537	489	518	505	548	522	508	519	521	487
60 - 69 years	496	448	470	494	512	471	524	508	496	480
70 - 79 years	475	409	472	451	481	447	470	440	432	475

Table 2. General characteristics and hematologica indicators of all subjects.

Parameters	Total (n = 29,947)	Male (n = 15,137)	Female (n = 14,810)
Age (years)	49 (34 - 64)	49 (35 - 64)	49 (33 - 64)
BMI (kg/m²)	21.8 (20.7 - 22.6)	21.9 (20.9 - 22.7)	21.7 (20.5 - 22.6)
SBP (mm Hg)	122 (118 - 125)	123 (119 - 126)	121 (117 - 124)
DBP (mm Hg)	80 (77 - 83)	80 (78 - 83)	79 (76 - 82)
RBC count ($\times 10^{12}$/L)	4.41 (4.15 - 4.74)	4.70 (4.47 - 4.95)	4.18 (4.02 - 4.36)
Hb (g/L)	136 (126 - 146)	146 (141 - 151)	127 (122 - 131)
WBC count ($\times 10^9$/L)	5.20 (4.60 - 6.10)	5.40 (4.80 - 6.40)	5.00 (4.40 - 5.80)
Neutrophil count ($\times 10^9$/L)	2.87 (2.41 - 3.48)	3.00 (2.51 - 3.68)	2.74 (2.32 - 3.29)
Lymphocyte count ($\times 10^9$/L)	1.86 (1.56 - 2.21)	1.90 (1.59 - 2.27)	1.82 (1.54 - 2.14)
Monocyte count ($\times 10^9$/L)	0.31 (0.25 - 0.37)	0.33 (0.28 - 0.41)	0.28 (0.24 - 0.34)
Platelet count ($\times 10^9$/L)	222 (192 - 255)	215 (187 - 247)	229 (197 - 262)

BMI - body mass index, SBP - systolic blood pressure, DBP - diastolic blood pressure, RBC - red blood cell, Hb – hemoglobin, WBC - white blood cell.