

Immunophenotypic Profiles and Association with Survival and Clinical Stage in Newly Diagnosed Multiple Myeloma: A Retrospective Study in Resource-constrained Settings

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BACKGROUND

Multiple myeloma (MM) is a plasma cell malignancy that require risk stratification for prognostication and care, particularly for high-risk MM patients. In Indonesia, cytogenetic examinations for risk assessment faces challenges due to cost and limited availability. Therefore, research on alternative prognostic markers is required. Flow cytometry-based immunophenotyping is beneficial for diagnosis, prognosis and is accessible in Indonesia. However, it is underutilized for diagnosing MM with insufficient data on their association with patient survival in Indonesia.

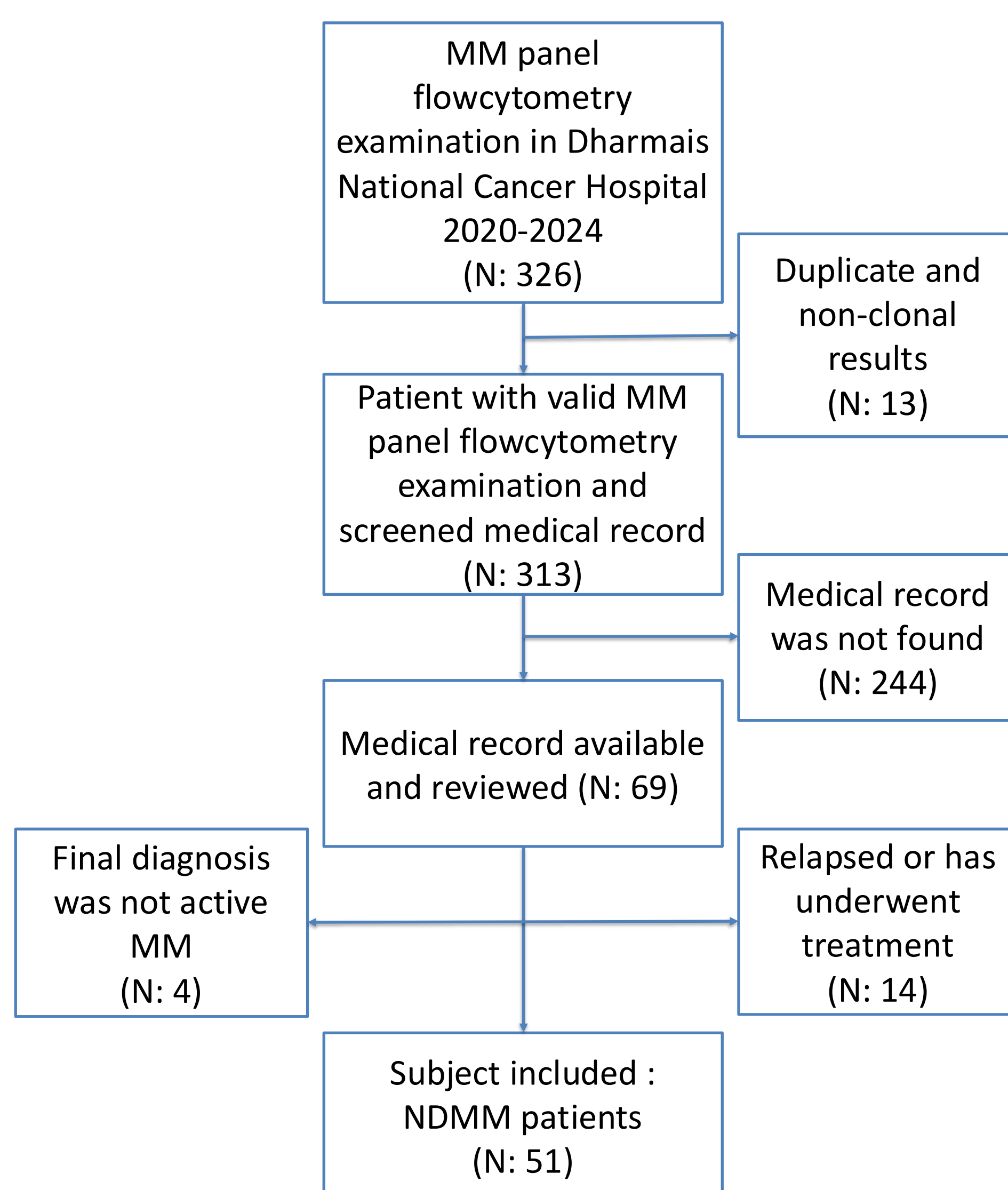
PURPOSE

To determine the correlation between immunophenotypic profiles, survival and risk stratification in newly diagnosed MM (NDMM) patients

METHODS

This retrospective cohort study included NDMM patients who underwent immunophenotyping at Dharmais National Cancer Hospital (2020-2024). Associations between immunophenotypes, clinical parameters, and International Staging System (ISS) stage were analyzed using Chi-square/ Fischer's exact test, and multivariate logistic regression. Overall survival (OS) was evaluated using Kaplan-Meier analysis, log-rank tests, and multivariate cox regression.

RESULTS



Variables	N
Sex	
Male	28 (54.9%)
Female	23 (45.1%)
Median Age	55
Hemoglobin	
<10 mg/dL	33 (64.7%)
≥10 mg/dL	15 (35.3%)
Clonal plasma cells	
<60%	39 (76.5%)
≥60%	12 (23.2%)
Creatinine levels	
≤ 2 mg/dL	35 (68.6%)
> 2 mg/dL	15 (29.4%)
No data	1 (2%)
ISS Stage	
ISS I	5 (9.8%)
ISS II	11 (21.1%)
ISS III	22 (43.1%)
No data	13 (25.5%)
Therapy	
Yes	31 (60.8%)
No	20 (39.2%)

Table 1. Baseline Characteristics

Among 51 patients, 54.9% were male with 43.1% in ISS stage III, and 60.8% received treatments

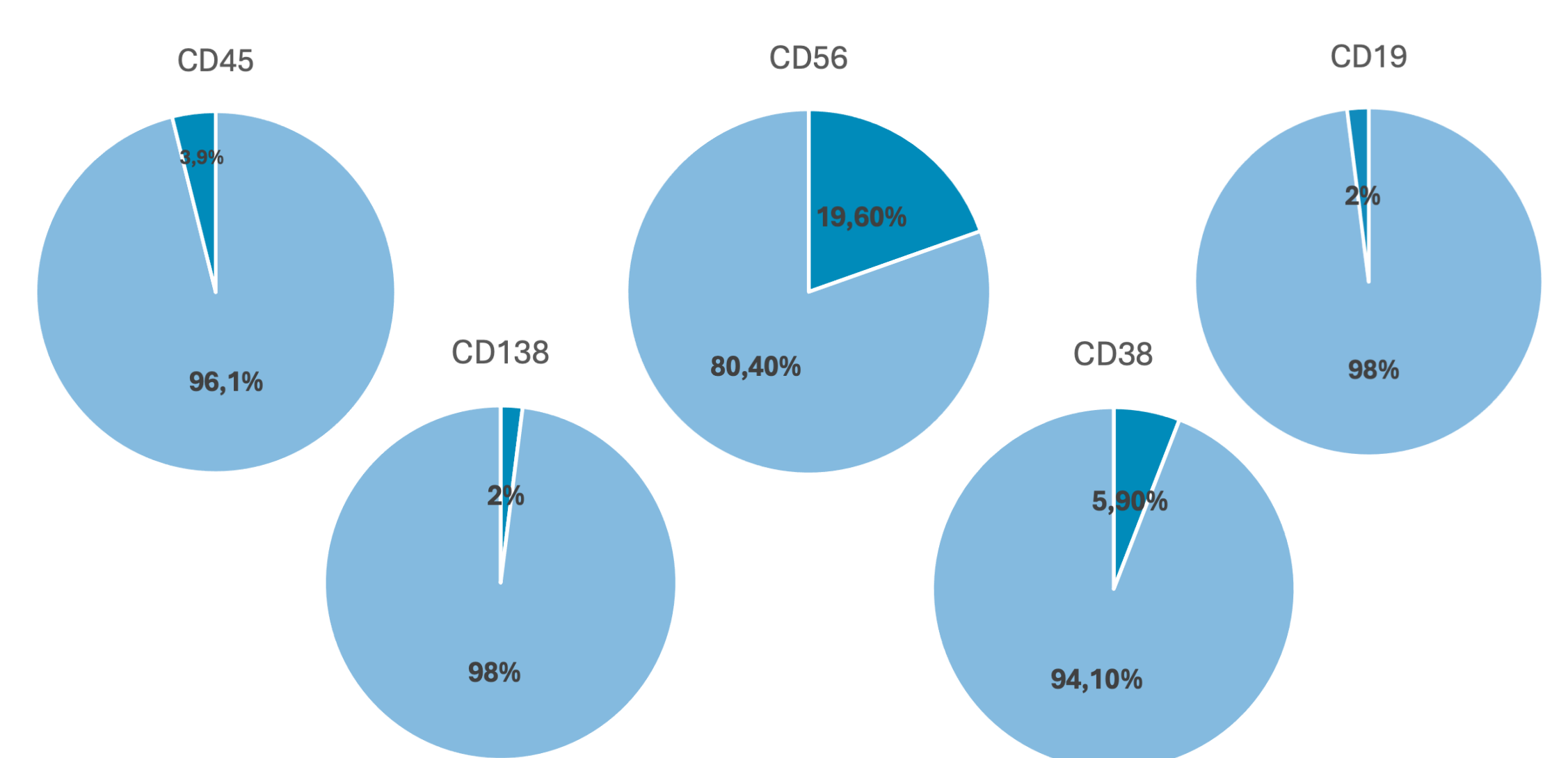


Figure 2. Immunophenotypic profiles of MM patients in Dharmais National Cancer Hospital

The predominance of CD45^{neg} and CD19^{neg} in this study shows that neoplastic plasma cells exhibit immunophenotypic features distinct from normal plasma cells.^{1,2} The high prevalence of CD56 positivity is also consistent with previous reports, which seen in 70–80% of multiple myeloma cases.³

Figure 1. Flowchart of patient selection in the study

Out of 313 MM patients, 51 NDMM patients with available medical record were included

- Low hemoglobin levels and high creatinine levels association to advanced disease were seen in other studies.^{4,5,6}
- Other researches confirmed that a higher clonal plasma cell correlates with poor clinicopathological presentation, therapy response, and OS and progression-free survival (PFS) in multiple myeloma patients.^{7,8,9}
- CD45's impacts on survival and risk stratification are predicted due to its regulation role in interleukin-6 and insulin-like growth factor-1 receptors, which are two significant growth factors for myeloma cells.¹⁰ Our study results is consistent with most of current studies that shows poor prognosis in CD45^{neg} patients.¹¹⁻¹⁶

Association with Risk Stratification (ISS stage)			
Variables	P-value	Multivariate	
		RR (CI 95%)	p-value
Hemoglobin	0,005	20,855 (1,521 - 286,022)	0,023
Creatinine	0,008	29,109 (1,065 - 795,529)	0,046

Association with Overall Survival			
Variables	P log-rank	Multivariate	
		RR (CI 95%)	p-value
CD45 expression	0,014	13,345 (2,025 - 87,932)	0,007
Clonal plasma cell	0,027	2,512 (1,052 - 6,002)	0,038
Treatment	0,000	5,223 (2,156 - 12,652)	0,000

Table 2&3. Association with ISS Stage and Overall Survival

Anemia and elevated creatinine were independently associated with ISS Stage III. Multivariate cox analysis identified CD45 expression, clonal plasma cell (PC) ≥60% and treatment as independent predictor of OS

CONCLUSIONS

- Hemoglobin and creatinine levels were independently associated with higher ISS stage. CD45, clonal PC ≥60%, and treatment predicted OS
- Despite data limitation, combination of clinical staging and immunophenotypic evaluation may provide prognostic value in resource-constrained settings
- Validation in large multicenter prospective cohorts is required

REFERENCES



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