PCR244

Burden of Myelodysplastic Syndromes Part I: Systematic Literature Review of Epidemiologic and Humanistic Burden

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Background

- Myelodysplastic syndromes (MDS) are a group of clonal neoplastic bone marrow disorders characterized by ineffective hematopoiesis and cytopenia[1,2]
  - The progression of MDS varies across patients; some experience relatively slow disease progression, while others experience progressive cytopenia that eventually leads to death[1,2]
  - Hematopoietic stem cell transplant is the only curative therapy for MDS but is limited to select patients with favorable health status. New treatments and treatment regimens have played a pivotal role in MDS by inducing sustained hematologic responses and delaying progression to leukemia
- An assessment of the disease burden is lacking

Objective

- This review aimed to systematically identify, review, and synthesize the evidence for epidemiologic and humanistic burden of the disease as part of assessing the burden of MDS

Methods

Search Strategies

- EMBASE and MEDLINE were searched on July 13, 2021, following the good practices recommended by the PRISMA guidelines. The search strategies included the terms related to epidemiology (ie, prevalence and incidence) or health-related quality of life (HRQOL), combined with the disease terms. Details can be accessed through the QR code

Table 1. PICOS and Eligibility Criteria

Patients	MDS
Interventions/ comparators	Any
Outcomes	Epidemiology studies reporting data for: • Incidence • Prevalence • Survival outcomes HRQOL studies reporting data on: • Quality of life • HRQOL • Other patient-reported outcomes
Study design	Databases/registries analysis; cross-sectional or observational study designs; clinical trials (HRQOL studies only)
Language	English
Year range	No limit
Sample size	≥100 participants for epidemiology studies No limit for HRQOL studies

PICOS, Population, Intervention, Comparison, Outcomes, and Study Design.

Study Selection

- All articles were screened and reviewed in duplicate by 2 reviewers. Disagreements were resolved through discussion between the reviewers and consultation with a senior team member
- Studies meeting the PICOS criteria were included in data extraction and data analysis
- Relevant systematic reviews identified during screening were reviewed to cross-reference the search strategy and identify missed publications
- A study mapping exercise was conducted to match publications reporting on the same study. By using registration numbers, authors, and sample sizes, the use of the study mapping exercise is a means to prevent double counting of outcomes in the final data set

Data Extraction

- Included studies had their data extracted by 2 reviewers independently and in duplicate. Study and patient characteristics, design, and outcomes were extracted through this process, and any discrepancies between investigators were resolved through discussion

Quality Assessments

- The Newcastle-Ottawa Scale was used to assess the quality of prospective observational studies[3]
- Randomized controlled studies were assessed via the Risk of Bias 2 instrument recommended by the Cochrane Collaboration[4]
- The observational studies in epidemiology (STROBE) checklist was used to evaluate the quality of reporting of the epidemiology studies

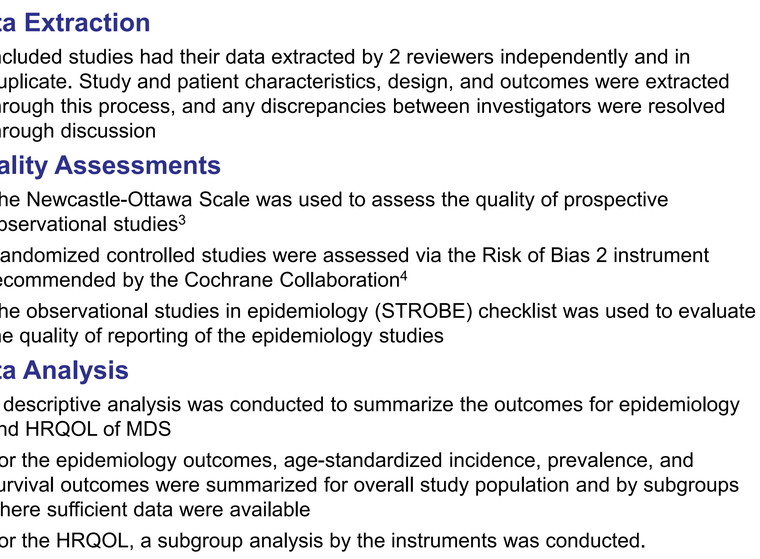
Data Analysis

- A descriptive analysis was conducted to summarize the outcomes for epidemiology and HRQOL of MDS
- For the epidemiology outcomes, age-standardized incidence, prevalence, and survival outcomes were summarized for overall study population and by subgroups where sufficient data were available
- For the HRQOL, a subgroup analysis by the instruments was conducted.
- All data were maintained in Microsoft Excel 2016 workbooks. Plots were produced by R

Results

- 7539 abstracts were identified and 175 publications representing 145 unique studies met the inclusion criteria defined in the PICOS (**Figure 1**). Of these, 56 and 46 studies provided evidence toward the epidemiologic and humanistic burden of MDS, respectively

Figure 1. PRISMA Diagram



[a] 4 studies provided data on both epidemiology and cost, and 2 studies provided data on both cost and HRQOL.

An online version of this poster and supplementary material can be found through this QR code.

Results (cont)

Epidemiology of MDS

- Age at diagnosis ranged from 62 to 79 years
- The annual age-standardized incidence rate (ASIR; per 100,000) of MDS was reported in 18 unique studies from 12 countries
- The median of the ASIR in adults was 3.70, with a range of 0.98 to 11.52 (**Figure 2**)
- Males had higher ASIRs than females, and the ASIR increased with age (**Figures 3** and **4**)
- The crude prevalence rate per 100,000 was reported in 5 studies from 4 countries, ranging from 6.2 to 155 (**Table 2**)
- 1-, 3-, and 5-year survival rates ranged from 66% to 69%, 45% to 51%, and 27% to 45.6%, respectively
- The annual age-standardized mortality rate per 100,000 was reported in 3 studies, ranging from 1.14 to 2.98 (**Table 3**)

Figure 2. Age-Standardized Incidence Rate of MDS

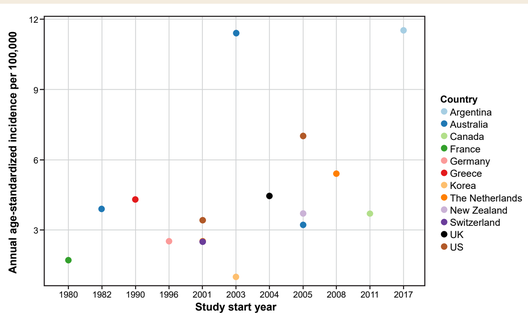


Figure 3. Age-Standardized Incidence Rate by Sex

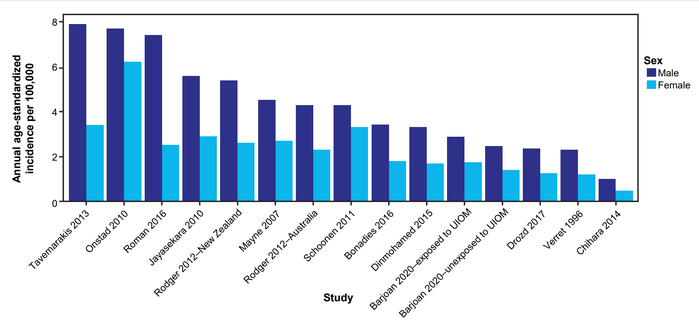


Figure 4. Age-Standardized Incidence by Age Group

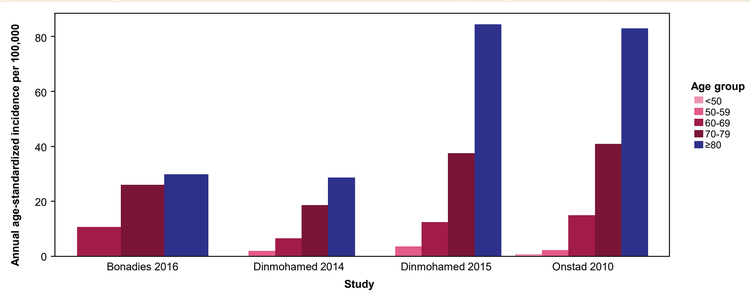


Table 2. Studies Reporting Prevalence of MDS

Country	Study name	Timeframe	Base population (denominator)	No. of cases (numerator)	Crude prevalence per 100,000
Italy	PRIHTA - EMATOLOGIA	2014-2018	–	130	12
Poland	Drozd 2017	2012-2012	38,538,447	414	6.2
UK	Roman 2016	2004-2013	nearly 4 million	1194	6.3 (3-year) 8.7 (5-year) 10.9 (10-year)
US	Cogle 2017	2008-2009	5,942,153	9209	155
US	Simon 2015	2006-2012	–	8341	10

Shimizu 1995 reported an age-standardized prevalence of 2.69 per 100,000 in Japan.

Table 3. Summary of Survival Outcomes of MDS

Survival outcomes	Range
1-year survival, %	66-69
3-year survival, %	
Overall	45-51
<40	63[a]
40-49	66[a]
50-59	54[a]
60-69	48[a]
70-79	43[a]
80+	37[a]
5-year survival, %	
Overall	27-45.6
15-34	73-77.5[a]
35-49	59.9-66.4[a]
50-64	45.1-50.3[a]
65-79	24.6-28.8[a]
80+	6.6-22.9[a]
Annual age-standardized mortality rate per 100,000	
Overall	1.14-2.98
<65	0.14-0.15[a]
65-74	3.31-4.19[a]
74-84	12.41-12.66[a]
85+	33.37-33.43[a]
Annual crude mortality rate per 100,000[b]	
IPSS-R risk classification	
Very low risk	0.15[a]
Low risk	0.67[a]
Intermediate	1.87[a]
High	3.28[a]
Very high	6.44[a]

IPSS-R, Revised International Prognostic Scoring System.
[a] Information is provided in 1 study instead of a summary from multiple studies.
[b] Nomdedeu 2017 reported annual crude mortality rate by IPSS R based on a 3-year follow-up period.

Humanistic Burden of MDS

- Various HRQOL instruments were used in the included studies, with the QLQ-C30 being the most frequently used (n=17, 36%) (**Figure 5**)
- Overall, the HRQOL of patients with MDS was moderate across all studies and instruments
- The range of the health utility values (0 dead to 1 for full health) among patients with MDS was 0.73 to 0.87 (**Figure 6**)
- Among the QLQ-C30 dimension scores (**Figure 7**), the lowest impact was reported in cognitive function, and the highest impact in physical function. Fatigue was the most severe symptom, and the least severe symptom was nausea/vomiting
- At baseline, the mean FACT-AN total score (scale, 0-188; higher score for better health) across studies was 121.6 (range, 111-132), indicating a moderate level of quality of life. (**Figure 8**) Score changes in the follow-up are also reported if applicable
- The mean EORTC QLQ-C30 global scores (scale, 0-100; higher score for better health) across studies and treatments are reported in **Figure 9**
  - The score ranged from 51 to 62.3 among the patients with lower risk and 50.6 to 59.7 among the patients with higher risk

Figure 5. PRO Instruments Used in the Studies

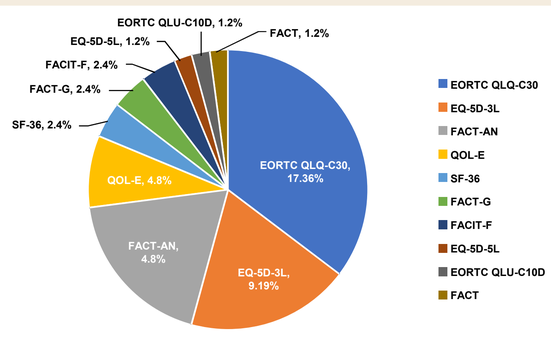


Figure 6. Health Utilities Associated With MDS (n=5)

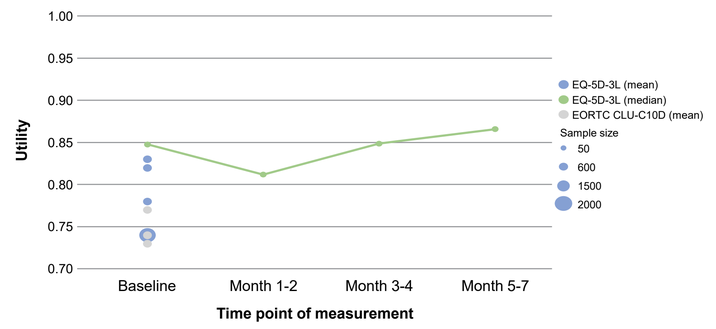


Figure 7. EORTC QLQ-C30 Dimension Scores (n=11)

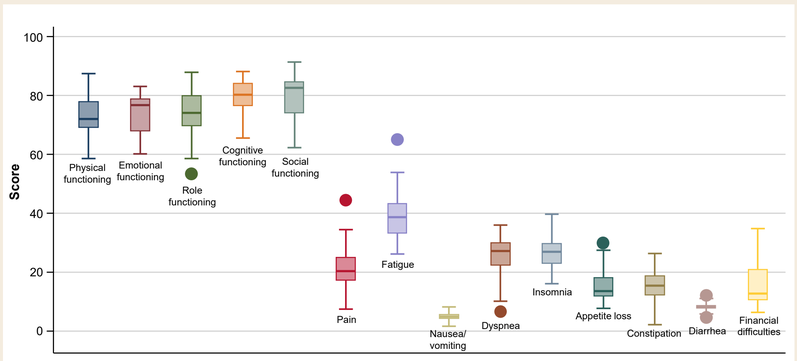


Figure 8. FACT-AN Total Scores Reported in the Studies (n=5)

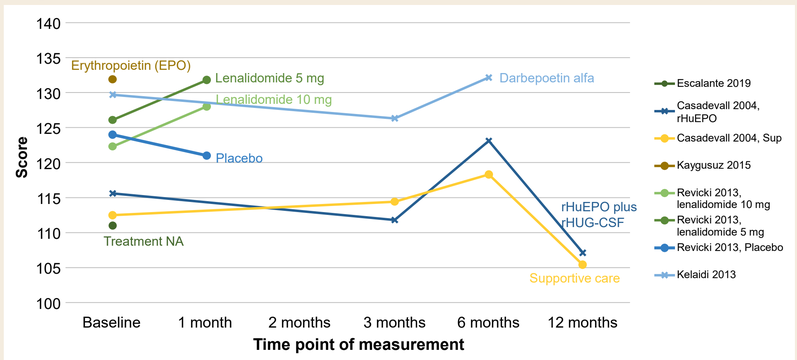
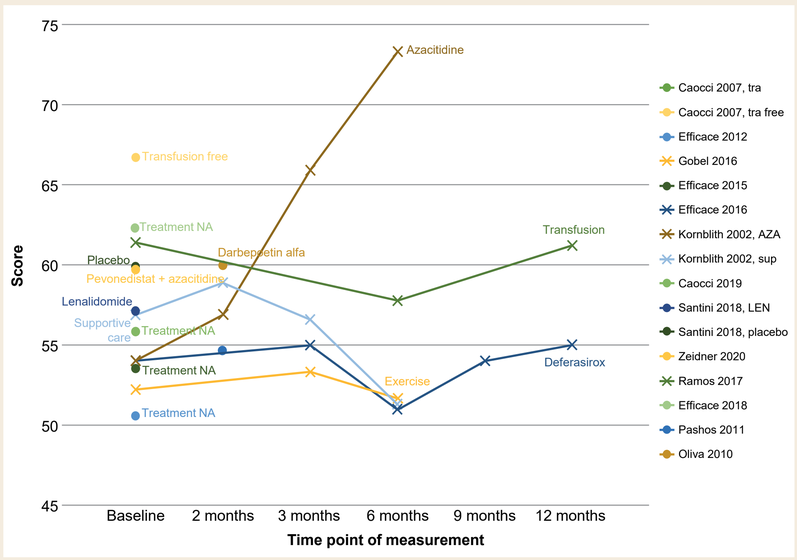


Figure 9. EORTC QLQ-C30 Global Scores Reported in the Studies (n=13)



Conclusions

- There has been an increase in the incidence of MDS over time. The incidence was higher in males than females and increased with age
- MDS has affected the HRQOL of patients, but the overall impact has been moderate
- Based on limited data, no pattern was observed in the difference in HRQOL between risk profiles. More QOL research stratified by IPSS risk classification is needed to draw robust conclusions

References

1. Sekeres MA. *Expert Opin Biol Ther*. 2007;7:369-377. 2. Aul C, et al. *Med Klin* (*Munich*). 2002;97:666-676.
3. Wells GA, et al. Accessed September, 21, 2022. http://www.ohri.ca/programs/clinical_epidemiology/oxford.htm
4. Sterne JAC, et al. *BMJ*. 2019;366:l4898.
Bibliographic information for the papers included in this review are accessible through the QR code.

Acknowledgments

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