MDS-447

Aditi Kataria | aditi.kataria@novartis.com
Evelina Jaegerskog | evelina.jaegerskog@novartis.com
Ramandeep Jindal | ramandeep.jindal@novartis.com
Xiting Cao | xiting.cao@novartis.com
Amit Ahuja | iamitahuja@gmail.com
Ricardo Viana | ricardo.viana@novartis.com

A Systematic Literature Review of the Economic Burden in Patients with Myelodysplastic Syndrome

Aditi Kataria,[1] Evelina Jaegerskog,[2] Ramandeep Jindal,[1] Xiting Cao,[3] Amit Ahuja,[1] Ricardo Viana[4]

[1]Novartis Healthcare Pvt. Ltd., Hyderabad, India; [2]Novartis Sverige AB, Kista, Sweden; [3]Novartis Pharmaceuticals, East Hanover, NJ, USA; [4]Novartis Pharma AG, Basel, NJ, Switzerland

Scan to obtain:
- Poster

https://bit.ly/KatariaA447

Copies of this poster obtained through Quick Response (QR) code are for personal use only and may not be reproduced without permission of the authors.

LIMITATIONS

- The costs of transplant and adverse events was not reported, which could have shed more light on the effectiveness of HMAs in MDS patients.
- Limited data available from ex-US markets (US n=12) and more studies are needed from across geographies to draw more robust conclusions.
- There is lack of evidence on indirect costs or caregiver costs in MDS population.

CONCLUSIONS

- Overall costs among higher-risk MDS patients was high as compared to lower-risk MDS patients.
- Transfusion and HMAs were the prominent cost drivers, with transfusion being independently leading to ~50% increase in monthly costs.
- HMAs are the only approved therapeutic option for MDS, however non-persistence to this therapy leads to significant economic impact. Hence, there exists an unmet need forappropriate therapies focusing on improving survival and reducing economic burden of MDS.

This study is sponsored by Novartis Pharma AG

Poster presented at: SOHO Annual Meeting; September 28-October 1, 2022; Houston, TX.

BACKGROUND

- Myelodysplastic syndromes (MDS) are a group of disorders characterized by inefficient hematopoiesis leading to cytopenia, with a high risk of progression towards acute myeloid leukemia (AML).[1, 2]
- According to the revised International Prognostic Scoring System (IPSS-R) MDS patients may be classified into five risk categories: very-low, low, intermediate, high, and very-high.[3]
- For planning treatment, the physicians categorize the MDS risk groups in terms of “lower risk” MDS (very low, low, or intermediate risk disease) and “higher risk” MDS (intermediate, high, or very high risk disease).[4]
- Management of MDS is typically based on the patient’s risk category, age, and performance status. Supportive care alone is a major option for lower-risk and older patients. Hematopoietic stem-cell transplantation is a curative treatment option, which is typically used to treat higher-risk, younger patients.[5]
- There is no standard of care for the lower-risk MDS patients and many patients may not be eligible for existing approved therapies.[6]
- MDS patients, especially the higher-risk patients, if left untreated have lower overall survival, a higher rate of progression, and increased economic burden suggesting an unmet need for new effective treatments.[6]
- The current systematic literature review (SLR) aimed to identify comprehensive evidence on the economic burden of disease among patients with low-to-high risk MDS.

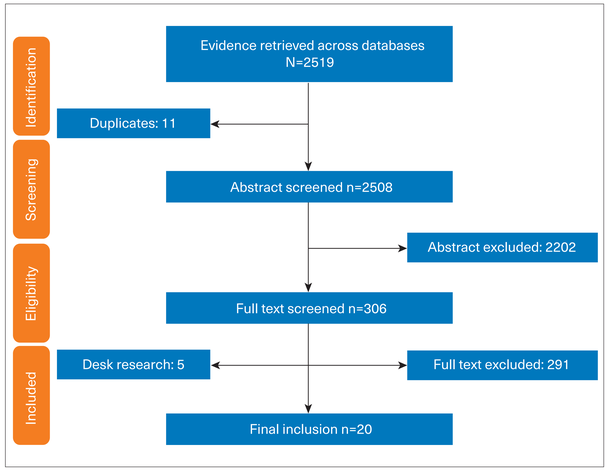
METHODS

- SLR of English publications from 2011-2021 was performed in Embase, MEDLINE and MEDLINE-In-process with a predefined inclusion criteria.
- Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines were followed for reporting of the SLR.[7]
- All the records retrieved from the literature search were screened per the pre-defined inclusion criteria, first based on the title and abstract and then based on the full-text citations.
- The SLR was conducted as a double-review process, i.e. the screening was done by two reviewers followed by resolving conflicts by an independent reviewer.
- Data on study characteristics, patient demographics and economic burden were extracted.

RESULTS

- A total of 20 studies reported data on economic burden of MDS.
- PRISMA flow for the SLR is presented in (**Figure 1**).

Figure 1. PRISMA flow diagram



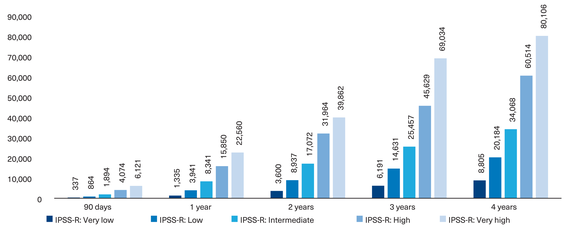
PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses

- Of the included studies, three studies each were conducted across all MDS risk groups and higher-risk MDS patients, six studies reported data for lower-risk patients, and the remaining eight studies reported data for MDS patients in which disease risk category was not defined.
- The mean/median age ranged from 62.9 years to 81.0 years, with a high male predominance (44.3-66.9%) compared with the female patients (33.1-54.8%).
- Sample size varied largely in these studies and ranged from 100 to 6,556 patients.[8, 9]

Cost use

- Across the studies the overall costs were three folds higher among higher-risk versus lower-risk MDS patients (approximately $15,000 vs. $5,200). The majority of these studies (n=12) reported costs from the US.
- Transfusion and hypomethylating agents (HMAs) were the prominent cost drivers, with transfusion independently leading to ~50% increase in monthly costs.
- It was observed that transfusion costs markedly varied as per IPSS-R risk categories of MDS patients diagnosed between 2008 and 2017.[10]
- The total transfusion costs increased significantly from 90 days to 4 years of follow up among all risk categories (**Figure 2**).

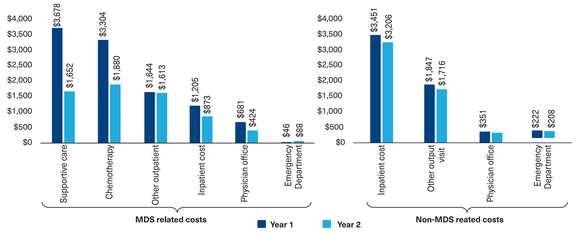
Figure 2. Total costs of transfusion therapy, stratified by IPSS-R category at diagnosis, 2018 US dollars



Source: Zhao et al 2020 (N=2311)[10]

- Assessment of MDS by year of diagnosis, revealed that the overall, costs were particularly high in the first year of higher-risk MDS diagnosis [Mean (SD): $17,337 ($19,696)] compared to the second year of higher-risk MDS diagnosis [Mean (SD): $12,976 ($14,135)].[11]
  - Costs associated with chemotherapy (including HMAs) and supportive care (including transfusions) of MDS-related medical costs also decreased from first year to second year following MDS diagnosis.[11]
  - Among the non-MDS related medical costs, inpatient admissions and outpatient services did not change significantly between first year and second year following MDS diagnosis (**Figure 3**)[11]

Figure 3. MDS-related and non MDS-related costs among higher-risk MDS patients, 2015 US dollars*



Source: Bell et al 2019 (N=209)[11]
*per patient per month costs reported

- The transfusion dependent patients experience a higher mean total cost per month compared to transfusion independent patients ($17,815 versus $7874).[12]
- Another component of high economic burden was transfusion dependence in MDS patients.[10]
  - Transfused patients had a greater use of hospital inpatient and outpatient services and incurred significantly higher mean costs than non-transfused patients ($88,824 versus $29,519, p<0.001).[13]
- Transfusion cost of iron chelation therapy required in transfusion dependent patients increased ranged from $526,880 to $2,064,800 over 10 years in the UK[14, 15]
- Only study provided data on indirect costs which was in MDS patients with low-risk refractory anemia in Italy. Cost related to lost of work day and hospital was €1100, €1200 and €3750 in patients receiving oral iron therapy, no iron therapy and intravenous iron therapy, respectively.[16]

Healthcare resource utilization

- Blood transfusion constituted major healthcare resource use among MDS patients.
- A nationwide cohort study conducted in Sweden described that the average (95% CI) number of transfusions were highest for very high risk groups 171 (135–200) and lowest for very low risk groups 25 (20–32) over a period of 4 years.[10]
- In the very low risk MDS category conducted in 2020 Sweden, patients with >80 years at diagnosis received more red cell transfusions but fewer platelet transfusions compared to those <65 years.[10]
- A study conducted in Australia, reported that median number of hospitalizations per year were higher in transfusion-dependent 6 (IQR, 4-9) than non-transfusion-dependent patients 2 (IQR, 1-4).[17]
- A study conducted in the US reported that the resource utilization was higher in HMA non-persistent patients than HMA persistent patient (**Table 1**).[18]
- It was observed that the resource utilization per patient per month (PPPM) among HMA non-persistent patients was 1.2 more than the HMA persistent patients in terms of physician visits (16.9 (15.7-18.2) versus 13.8 (12.9-14.7) and 4 times more in terms of length of hospital stay (4.1 (2.9-5.8) versus 1.8 (1.2-2.6), (p< 0.005 for both)).[18]
- Premature withdrawal of HMAs (before completing 4 cycles) was associated substantial economic impact compared to HMA persistent group in terms of total healthcare costs, increased emergency room (ER) visits, physician visits, prescription drug use and hospice care.

Table 1. Weighted Healthcare Resource Utilization PPPM by HMA Persistence Status

Resource Type	HMA Persistent	HMA Non-Persistent
Hospitalizations	0.10 (0.06-0.08)	0.10 (0.08-0.13)
ER visits	0.30 (0.27-0.31)	0.40 (0.30-0.42)
Length of hospital stay	1.80 (1.20-2.60)	4.10 (2.90-5.80)
SNF visits	0.02 (0.01-0.03)	0.05 (0.03-0.07)
DME use	0.26 (0.22-0.32)	0.34 (0.28-0.42)
Hospice visits	0.07 (0.06-0.08)	0.17 (0.16-0.20)
Home health visits	0.06 (0.04-0.08)	0.08 (0.06-0.09)
Outpatient visits	3.40 (3.10-3.60)	2.93 (2.70-3.20)
Physician visits	13.80 (12.90-14.70)	16.90 (15.70-18.20)
Prescription drugs	3.00 (2.50-3.60)	2.90 (2.30-3.60)

Values presented as mean (95% confidence interval)
DME: Durable medical equipment; ER: Emergency room; SNF: Skilled nursing facility

Source: Joshi et al 2021 (N=664)[18]

Acknowledgements

The authors acknowledge Sreenu Lavudiya (Novartis, Hyderabad) for developing the poster and YY (Design team associate name) for designing the poster layout. The final responsibility for the content lies with the authors.

Conflict of interest

Aditi Kataria, Ramandeep Jindal are employees of Novartis Healthcare Pvt. Ltd., Hyderabad, Telangana, India. Evelina Jaegerskog is an employee of Novartis Sverige AB and holds stocks. Ricardo Viana is an employee of Novartis Pharma AG, Basel, Switzerland and holds stocks.Amit Ahuja is a former employee of Novartis Healthcare Pvt. Ltd and was involved in the conduct of this study. Xiting Cao is an employee of Novartis pharmaceuticals, East Hanover and holds stocks.

References

1.Cazzola M, et al. *The New England journal of medicine*. 2020;383(14):1358-74. 2.Fenaux P, et al. *Annals of oncology : official journal of the European Society for Medical Oncology*. 2021;32(2):142-56. 3. Garcia-Manero G, et al. *Am J Hematol*. 2020;95(11):1399-420. 4. National comprehensive cancer network guidelines for MDS patients. 2021. Available online at NCCN.org/patients 5. Powers A, et al. *American Health and Drug Benefits* 2012 5:7 6. Platzbecker U, et al. *Leukemia*. 2021;35(8):2182-98. 7. Hutton B, et al. *Annals of Internal Medicine*. 2015;162(11):777-84. 8. Jouzier C, et al. *Blood*. 2020;136(SUPPL 1):42-3 9. Wang R, et al. *Leukemia Research*. 2012;36(11):1370-5.
10. Zhao LP, et al. *Blood*. 2020;136(SUPPL 1):31-2 .11. Bell JA, et al. *PharmacoEconomics - Open*. 2019;3(2):237-45. 12. Jeanblanc G, et al. *Value in Health*. 2020;23:S448. 13. Goldberg SL, et al. *Transfusion*. 2012;52(10):2131-8. 14. de Jongh AD, et al *Eur J Haematol*. 2017;98(5):478-84. 15. Durairaj S, et al. *American Journal of Hematology*. 2011;86(5):406-10 16. Giordano G, et al. *Acta Haematologica*. 2020;143(2):155-62 17. McQuilten ZK, et al. *Transfusion*. 2013;53(8):1714-21. 18. Joshi N, et al. *Clinical Lymphoma, Myeloma and Leukemia*. 2021;21(3):e248-e54.