

SUPPLEMENTARY MATERIAL

Burden of Disease, Treatment Patterns and Healthcare Resource Utilization in Multiple Myeloma in the Middle East and North Africa Region: A Targeted Literature Review

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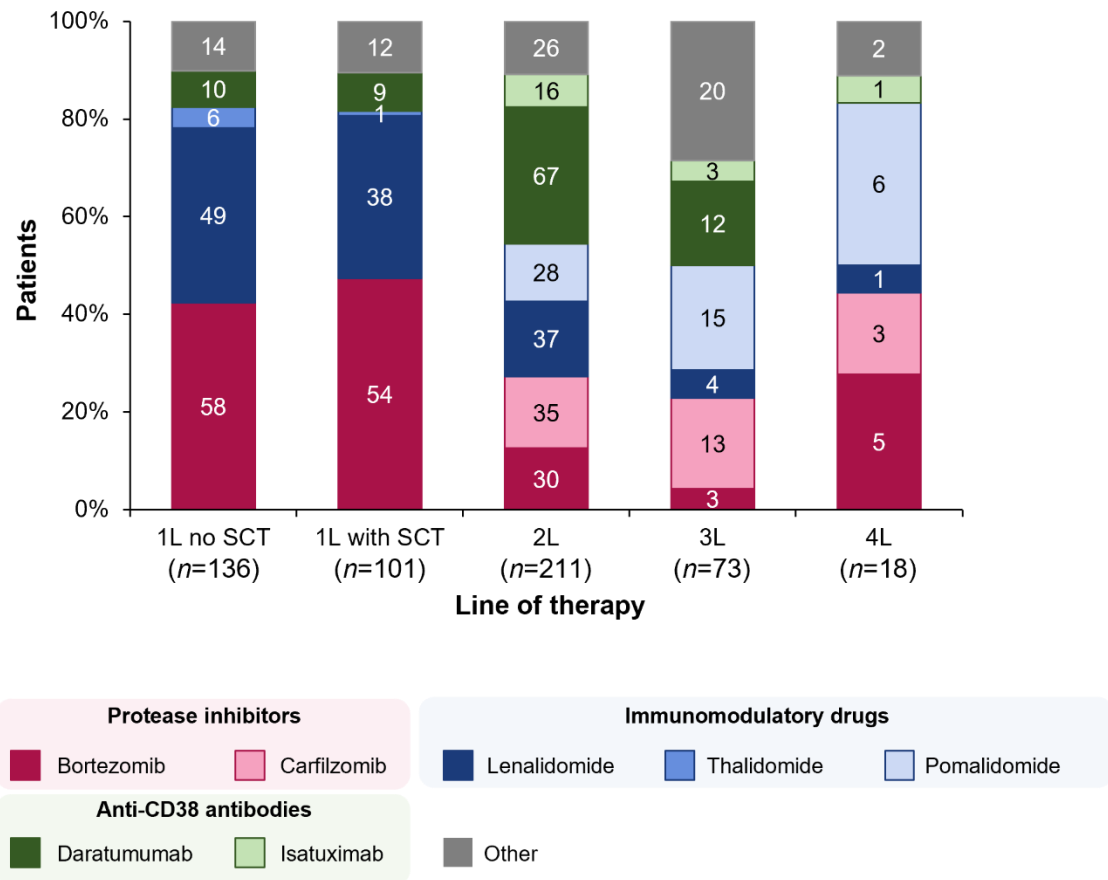
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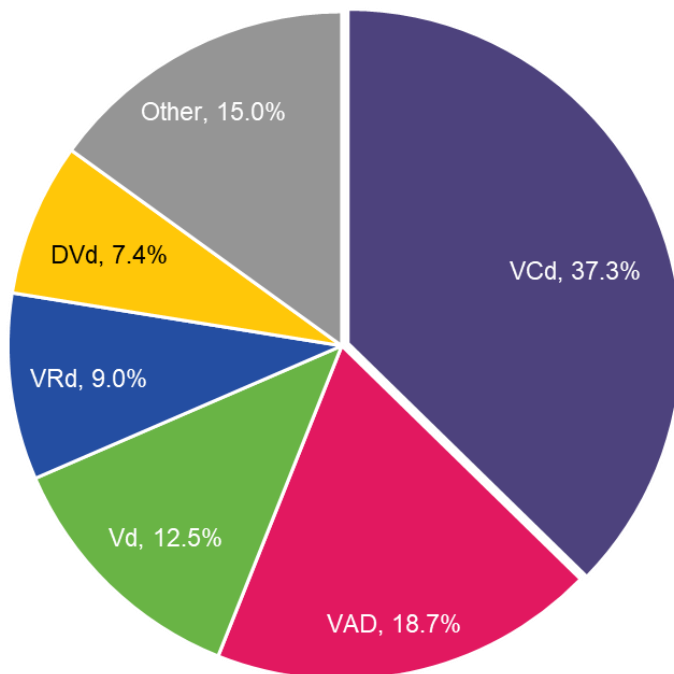
Supplementary Materials

Supplementary Fig. 1 Real-world treatment patterns by line of therapy in the Gulf region [1]



1L first line, 2L second line, 3L third line, 4L fourth line, SCT stem cell transplant

Supplementary Fig. 2 Top five most frequently used treatment regimens in the real-world management of MM [1-18]



DVd daratumumab + bortezomib + dexamethasone, *VAD* vincristine + doxorubicin + dexamethasone, *VCd* bortezomib + cyclophosphamide + dexamethasone, *Vd* bortezomib + dexamethasone, *VRd* bortezomib + lenalidomide + dexamethasone.

Supplementary Table 1 Population, intervention, comparators, and outcomes (PICO)

Patient population	• Patients with multiple myeloma in the following countries: • Egypt • Turkey • Saudi Arabia • United Arab Emirates
Intervention and comparators	• Any 1L or 2L therapy for multiple myeloma • Any therapy for RRMM
Outcome measures	• Epidemiology • Prevalence/incidence • Treated incidence • Presentation/manifestation • Disease progression rates • Treatment patterns • Treatment availability and access • Use of treatment regimens • Re-treatment • Attrition rate from 1L to 2L, and 2L to 3L, including causes of attrition • Patient and clinical outcomes • Efficacy and safety outcomes (overall/per LOT) • Impact on QoL • Policy and guideline development • HCRU • Hospitalization • Outpatient visits • Diagnostic tests • Treatments (incl. SCT)

1L first-line; 2L second-line; 3L third-line; HCRU healthcare resource utilization; LOT line of therapy; QoL quality of life; RRMM relapsed/refractory multiple myeloma; SCT stem cell transplant

Supplementary Table 2 Databases and search strings used

Database	Search string
Pubmed	((((((((((((((Egypt) OR (Egyptian)) OR (UAE)) OR (United Arab Emirates)) OR (Emirati)) OR (Saudi Arabia)) OR (Saudi)) OR (Saudi Arabian)) OR (Turkey)) OR (Turkish)) OR (Turkiye)) OR (Arab)) OR (MENA)) OR (Middle East)) OR (Middle Eastern)) OR (North Africa)) OR (North African)) OR (Gulf)) AND (multiple myeloma)
Embase	((((((((((((((('egypt':ti,ab,kw) OR ('egyptian':ti,ab,kw)) OR ('uae':ti,ab,kw)) OR ('united arab emirates':ti,ab,kw)) OR ('emirati':ti,ab,kw)) OR ('saudi arabia':ti,ab,kw)) OR ('saudi':ti,ab,kw)) OR ('saudi arabian':ti,ab,kw)) OR ('turkey':ti,ab,kw)) OR ('turkish':ti,ab,kw)) OR ('turkiye':ti,ab,kw)) OR ('arab':ti,ab,kw)) OR ('mena':ti,ab,kw)) OR ('middle east':ti,ab,kw) OR ('middle eastern':ti,ab,kw) OR ('north africa':ti,ab,kw)) OR ('north african':ti,ab,kw)) OR ('gulf':ti,ab,kw) AND ('multiple myeloma')

Supplementary Table 3 Article inclusion/exclusion criteria

	Inclusion	Exclusion
Patient population	• Patients with NDMM or RRMM in Egypt, Saudi Arabia, Turkey, United Arab Emirates • Patients with NDMM or RRMM in MENA	• Does not report on patients with NDMM or RRMM in Egypt, Saudi Arabia, Turkey, United Arab Emirates, or MENA as a region
Endpoints	• Reports on outcomes listed in the PICO table	• Does not report on any of the outcomes listed in the PICO table
Study design	• Phase 2/3 clinical trials • Phase 4/real-world studies • Systematic reviews • Narrative reviews • Observational studies (prospective/retrospective) • Case reports (≥ 10 patients) • Conference minutes/published abstracts • Consensus statements/treatment guidelines • Validation studies, e.g., risk scores/QoL tools • Physician surveys	• Animal studies • <i>In vitro/ex vivo</i> studies • Gene/protein expression studies • PCR/laboratory studies • Editorials
Restrictions	• Studies published between January 2015 and May 2025	• Studies without abstracts/access to full texts

MENA Middle East and North Africa; *NDMM* newly diagnosed multiple myeloma; *PCR* polymerase chain reaction; *PICO* population, intervention, comparators, outcomes; *QoL* quality of life; *RRMM* relapsed/refractory multiple myeloma

Supplementary Table 4. Overview of included studies

Study	Study design	Study period	Median (range) follow-up, months	Population	Intervention	N	Median (range) age, years
MENA							
Mafra et al. 2025 [19]	Other	2022	-	GLOBOCAN database	-	-	-
Farghaly et al. 2024 [20]	Other	-	-	-	-	-	-
Mattar et al. 2024 [21]	Systematic review	-	-	Patients aged >18 years with MM	-	33–1010	40–63 years
Zhou et al. 2021 [22]	Observational study (retrospective)	1990–2019	-	Patients with NDMM	-	-	-
Cowan et al. 2018 [23]	Systematic review	1990–2016	-	-	-	-	-
Gulf region							
Alhejazi et al. 2025 [1]	Observational study (retrospective)	July 2022–February 2023	-	Patients aged ≥18 years with RRMM, who experienced 1–3 relapses in the last 2 years preceding data collection; received 1–3 prior LOTs within the last 2 years	-	148	56 (18–84)
Alhuraiji et al. 2025 [24]	Advisory board	May 2024	-	Physicians from the Gulf region	-	10 physicians	-
Alhuraiji et al. 2025 [25]	Guidelines/consensus	2019–2023	-	-	-	-	-
Marashi et al. 2025 [26]	Guidelines/consensus	-	-	-	-	-	64 (30–90)
Hamad et al. 2024 [27]	Narrative review	-	-	Patients with NDMM	Daratumumab: SC vs IV	-	-
Al Sharif et al. 2023 [28]	Narrative review	-	-	-	-	-	-

Study	Study design	Study period	Median (range) follow-up, months	Population	Intervention	N	Median (range) age, years
Egypt							
Elsergany et al. 2024 [29]	Observational study (retrospective)	June 2022–June 2023	-	Patients with MM from the BMT unit at the Oncology Centre, Mansoura University, Egypt	Prophylactic dexamethasone following ASCT to avoid engraftment syndrome	26	52 (34–67)
Elsisi et al. 2023 [30]	Observational study (retrospective)	-	-	Patients with RRMM who received ≥ 1 prior LOT over 20 years	DVd vs Kd	-	-
Hafez et al. 2023 [31]	Observational study (retrospective)	18-month period	-	Patients with NDMM	-	44	51 (25–82)
Kassem et al. 2023 [9]	Observational study (retrospective)	November 2018–May 2019	-	Patients with MM	-	48	54 (36–72)
Morad et al. 2023 [11]	Observational study (prospective)	February 2016–December 2021	-	Patients with MM with renal impairment	ASCT	31	Mean 54 (SD 8.6)
Elsisi et al. 2020 [32]	Budget impact model	-	3-year time horizon	Patients with NDMM and RRMM	Rd vs VCd	NDMM, n=291 RRMM, n=245	-
Kassem et al. 2020 [33]	Observational study (retrospective)	-	-	Patients with MM who underwent HCV serologic testing	-	81	53 (32–75)
Denewer et al. 2020 [34]	Observational study (retrospective)	-	-	Patients with NDMM and available iFISH results for t(4;14),	-	25	Mean 54.4 (SD 7.04)

Study	Study design	Study period	Median (range) follow-up, months	Population	Intervention	N	Median (range) age, years
				del(17p), del(13q) and t(11;14)			
El Gammal et al. 2019 [35]	Phase 2 RCT	-	-	Patients with MM	VCd or VAD	-	54 (32–76)
Abdelgawad et al. 2016 [36]	Observational study (retrospective)	January 2012–December 2014	Range, 1–36	Patients with NDMM	-	89	54 (IQR, 45–59)
El-Ghammaz et al. 2016 [37]	Other	January 2011–August 2015	17.5	Patients with NDMM aged 18–65 years	VAD vs Vd induction followed by high-dose melphalan and ASCT, and maintenance with thalidomide	80	49 (20–62)
Saudi Arabia							
Kim et al. 2025 [38]	Observational study (retrospective)	January 2010–December 2011	57	Patients with NDMM aged ≥18 years, with ≥1 LOT	-	48	52 (29.4–81.5)
Abdrabou et al. 2024 [39]	Observational study (retrospective)	July 2007–July 2020	51	Patients with NDMM who received ≥1 cycle of VCd induction, then underwent ASCT	VCd then ASCT	87	52 (21–69)
SSBMT. 2024 [40]	Other	-	-	-	-	-	-
Alhifany et al. 2023 [41]	Narrative review	Up to 24 March 2023	-	-	-	-	-

Study	Study design	Study period	Median (range) follow-up, months	Population	Intervention	N	Median (range) age, years
Almuhaysen et al. 2023 [42]	Observational study (retrospective)	January–August 2023	-	Patients with MM and renal impairment, and aged ≥18 years	-	85	Mean 68.43 (SD 7.24)
Kaloyannidis et al. 2022 [43]	Observational study (retrospective)	-	48 (6.5–132)	Patients with NDMM treated during the last decade, with a minimum of 6 months of follow-up	-	116	55 (30–85)
Abdrabou et al. 2021 [2]	Observational study (retrospective)	October 1997–March 2015	-	Patients with NDMM who underwent ASCT	ASCT	169	51 (23–69)
Althomali et al. 2020 [4]	Observational study (retrospective)	January 2016–December 2019	-	Patients with RRMM	Daratumumab	32	57
Elghazaly et al. 2020 [44]	Observational study (retrospective)	June 2016–January 2019	-	Patients with NDMM	-	22	70 (40–100)
Shaheen et al. 2020 [13]	Observational study (prospective)	Aug 2016	-	Patients with MM aged >18 years, diagnosed since 2010	-	62	Mean 58.74 (SD 11.49)
Abu Haleeqa et al. 2019 [45]	Observational study (retrospective)	2016–2018	-	Patients with MM	-	62	43 (30–90)
Cowan et al. 2018 [46]	Systematic review/meta-analysis	-	-	-	ASCT	-	-
Gmati et al. 2019 [47]	Observational study (retrospective)	-	828 (18–2790) days	Patients with MM	ASCT	60	53 (31–70)

Study	Study design	Study period	Median (range) follow-up, months	Population	Intervention	N	Median (range) age, years
Khojah et al. 2019 [48]	Observational study (retrospective)	2012–2016	-	Patients with NDMM and completed molecular cytogenetic testing with FISH	-	123	56.5 (25–97)
Maroun et al. 2019 [49]	Other	-	-	Patients with RRMM	-	-	-
Abduljalil et al. 2016 [50]	Observational study (retrospective)	June 2006–December 2013	-	Patients with NDMM who were diagnosed and treated during the study period	-	63	-
Khojah et al. 2016 [51]	Observational study (retrospective)	2012–2015	-	Patients with NDMM with molecular cytogenetic testing	-	90	55.5 (25–87)
Turkey							
Gursoy et al. 2025 [8]	Observational study (retrospective)	2019–2023	-	Patients with NDMM, with D-dimer value before receiving treatment for MM	-	455	64 (30–90)
Kim et al. 2025 [38]	Observational study (retrospective)	January 2010–December 2011	57	Patients with NDMM aged ≥18 years, with ≥1 LOT	-	348	57.6 (24.4–85.0)
Yilmaz et al. 2025 [18]	Observational study (retrospective)	2012–2021	-	Patients with MM who received melphalan with ASCT	Melphalan: 200 mg/m ² vs 140 mg/m ²	Mel200, n=130 Mel140, n=26	Mel200, 56 (29–70) Mel140, 58 (46–71)

Study	Study design	Study period	Median (range) follow-up, months	Population	Intervention	N	Median (range) age, years
Bostankolu Değirmenci et al. 2024 [52]	Observational study (retrospective)	-	1362 (10–4263) days	Patients with MM who underwent ASCT with melphalan conditioning	Melphalan	256	58 (30–74)
Erdogan Yucel et al. 2024 [53]	Observational study (retrospective)	January 2012–January 2022	48 (1–125)	Patients with MM aged 18–75 years who underwent HDT within 12 months of diagnosis	-	141	58 (26–72)
Karacan et al. 2024 [54]	Other	June 2022–June 2023	-	Patients with MM aged >18 years and registered with Cancer Fighters Association	-	663	Mean 54.4 (SD 10.7)
Kazgı et al. 2024 [10]	Observational study (retrospective)	January 2010–January 2023	-	Patients with NDMM with cytogenetic abnormalities	-	68	59 (29–84)
Öztürk et al. 2024 [55]	Observational study (retrospective)	2005–2020	7 (0.3–152) (after allo-SCT)	Patients with RRMM who received allo-SCT	allo-SCT	30	49.64 (28–64)
Açar et al. 2023 [56]	Observational study (retrospective)	2019–2022	15 (4–36)	Patients with RRMM and extramedullary disease, who received ≥ 2 treatments, including bortezomib and lenalidomide	BPd	11	66 (48–70)

Study	Study design	Study period	Median (range) follow-up, months	Population	Intervention	N	Median (range) age, years
Bakırtaş et al. 2023 [57]	Observational study (retrospective)	-	7.5 (1–21)	Patients with RRMM who received IRd due to relapsed/refractory disease after receiving ≥ 2 LOTs	IRd	54	Mean 66.5 (SD 9.1)
Beksac et al. 2023 [58]	Observational study (retrospective)	June 2004–October 2020	41.9	Patients with RRMM and disease progression, or relapse after PI, and current initiation of a lenalidomide-containing regimen	Revlimid® vs Rivelime	Revlimid®, n=74, Rivelime, n=110	Revlimid®, 63 (35–92) Rivelime, 60 (35–88)
Ipek et al. 2023 [59]	Observational study (retrospective)	2017–2022	36.5 (22–48.5)	Geriatric patients with MM	VCd for induction therapy, lenalidomide maintenance, and Rd, KRd, VRd, Kd, Pd, or Vd as consolidation therapy	72	68 (66–72)
Kul AN, Ipek Y. 2023 [60]	Observational study (retrospective)	May 2016–March 2021	-	Patients with NDMM with normal and abnormal genetic profiles	VCd	Normal genetics, n=68 Abnormal genetics, n=45	Normal genetics, mean 62.8 (SD 13.3) Abnormal genetics, mean 61.6 (SD 10.4)

Study	Study design	Study period	Median (range) follow-up, months	Population	Intervention	N	Median (range) age, years
Pektas et al. 2023 [12]	Observational study (retrospective)	January 2015–December 2020	-	Patients with RRMM initiating 2L or 3L treatment	-	107	-
Sulu et al. 2023 [15]	Observational study (retrospective)	1995–2020	30	Patients with MM who received urgent hemodialysis	-	uHD, n=70 no uHD, n=70	uHD, mean 62.4 (SD 10.4) no uHD, mean 62 (SD 8.1)
Tekinalp et al. 2023 [16]	Observational study (retrospective)	February 2018–April 2022	5.7 (2.1–24.1)	Patients with RRMM	Daratumumab	134	60 (35–88)
Bolaman et al. 2021 [61]	Observational study (retrospective)	-	Revlimid, Mean 12.6 (SD 11.7) Generic lenalidomide, Mean 9.5 (SD 7.9)	Patients with RRMM	Revlimid® vs generic lenalidomide	Revlimid®, n=55 Generic lenalidomide, n=43	Revlimid®, mean 65.8 (SD 10.6) Generic lenalidomide, mean 63.2 (SD 7.6)
Cengiz et al. 2021 [62]	Observational study (retrospective)	January 2015–April 2021	-	Heavily pretreated patients with RRMM	sAHCT vs selinexor	32 (sAHCT, n=22; selinexor, n=10)	sAHCT, 55.5 (38–68) Selinexor, 59.5 (57–72)
Çiftçiler et al. 2021 [63]	Observational study (retrospective)	2001–2018	35.9 (4.2–206.4)	Patients with NDMM who underwent ASCT after induction chemotherapy	-	204	58 (35–76)
Malkan et al. 2021 [64]	Observational study (retrospective)	2003–2020	-	Patients with MM aged >18 who underwent ASCT	Single ASCT vs Double ASCT	Single ASCT, n=211 Double ASCT, n=17	Single ASCT, 55 (34–76) Double ASCT, 54 (42–65)

Study	Study design	Study period	Median (range) follow-up, months	Population	Intervention	N	Median (range) age, years
Mersin et al. 2021 [65]	Observational study (retrospective)	2011–2019	-	Patients with NDMM who received VCd	Velcade® vs Bortec	Velcade®, n=42 Bortec, n=53	Velcade®, 64 (36–87) Bortec, 62 (32–85)
Şahin et al. 2021 [66]	Observational study (retrospective)	2004–2020	65 (1–160)	Patients with NDMM	-	310	Mean 65.1 (SD 10.54)
Topkar et al. 2021 [67]	Observational study (retrospective)	2010–2017	Mean 47.7 (SD 21.63)	Patients with MM who underwent surgical treatment for extremity/pelvic lesions	-	49	Mean 60.8 (SD 18.2)
Baysal et al. 2020 [5]	Observational study (retrospective)	May 2013–December 2018	-	Patients with NDMM	-	159	Mean 64.62 (SD 11.07)
Beksac et al. 2020 [68]	Observational study (prospective)	June 2016 –October 2018	14.8 (4.8–16.5)	Patients with RRMM with ≥3 prior LOTs that included PI and an IMiD	Daratumumab monotherapy	42	56.5 (41–81)
Ciftçiler et al. 2020 [69]	Observational study (retrospective)	2009–2018	-	Patients with NDMM, aged 18–70 years who received induction therapy	Vd vs VCd	103	59 (35–76)
Kirik et al. 2020 [70]	Observational study (prospective)	April 2018–January 2019	30 (4.8–155)	Patients with NDMM	-	200	56 (28–82)
Tekin et al. 2020 [71]	Other	2011–2018	-	Patients with MM with fractures due to spinal metastasis	Kyphoplasty/vertebroplasty	42	Mean 64.2

Study	Study design	Study period	Median (range) follow-up, months	Population	Intervention	N	Median (range) age, years
Umit et al. 2020 [72]	Observational study (retrospective)	2015–2018	-	Patients with RRMM aged ≥65 years	-	80	69.5 (IQR, 65–86)
Yıkılmaz et al. 2020 [73]	Observational study (retrospective)	2008–2018	-	Patients with ASCT-eligible MM	VCd vs VAD induction	96	-
Amikishiyev et al. 2019 [74]	Observational study (retrospective)	May 2007–November 2016	30 days post-ASCT	Patients with MM who received ASCT with high-dose melphalan conditioning	VAD induction	-	-
Beksac et al. 2019 [75]	Observational study (retrospective)	January 2011–May 2019	-	Patients with MM	Revlimid vs Generic lenalidomide	102	64 (38–93)
Beksac et al. 2019 [76]	Observational study (retrospective)	September 2012–present	-	Patients with RRMM with ≥2 prior LOTs (with PI and IMiD) or refractory to both PI and IMiDs were included in an early access program or clinical study	Elotuzumab plus pomalidomide or lenalidomide or bortezomib or carfilzomib and dexamethasone	50	-
Bolaman et al. 2019 [77]	Observational study (retrospective)	-	-	Patients with RRMM	Revlimid® vs generic lenalidomide	Revlimid®, n=55 Generic lenalidomide, n=43	-
Çiftçiler et al. 2020 [7]	Observational study (retrospective)	January 2003–January 2017	39.3 (4.2–178.9)	Patients with MM who underwent ASCT	-	180	57 (35–72)

Study	Study design	Study period	Median (range) follow-up, months	Population	Intervention	N	Median (range) age, years
Ciftciler et al. 2019 [6]	Observational study (retrospective)	2001–2018	35.9 (4.2–206.4)	Patients with NDMM who underwent ASCT	-	204	58 (35–76)
Aypar et al. 2018 [78]	Observational study (retrospective)	July 2004–July 2014	-	Patients with symptomatic MM who underwent ASCT	High dose melphalan vs Bortezomib + high-dose melphalan	High dose melphalan, n=114 Bortezomib + high-dose melphalan, n=53	High dose melphalan, 54.5 (28–68) Bortezomib + high-dose melphalan, 59 (46–70)
Dag & Beksac. 2018 [79]	Observational study (retrospective)	2011–2017	-	Patients with NDMM	-	10,146	63.8–66.1
Soyer et al. 2018 [80]	Observational study (retrospective)	October 2010–June 2016	14 (1–72)	Patients with RRMM who received Rd, according to standard practice	Rd	120	61 (29–84)
Beksac et al. 2017 [81]	Phase 4/Real-world post-marketing surveillance study	June 2016–January 2017	-	-	Daratumumab	39	56 (41–81)
Ozsan et al. 2017 [82]	Observational study (retrospective)	-	-	Heavily pretreated patients with MM	Pomalidomide	117	68 (32–85)
Saydam et al. 2017 [83]	Observational study (retrospective)	October 2010–June 2016	-	Patients with RRMM treated with Rd	Rd	120	64 (29–84)
Sevindik et al. 2017 [84]	Observational study (retrospective)	-	-	Heavily pretreated patients with MM	Carfilzomib	152	69 (43–86)

Study	Study design	Study period	Median (range) follow-up, months	Population	Intervention	N	Median (range) age, years
Tekgündüz et al. 2017 [85]	Guidelines/consensus	-	-	-	-	-	-
Yalnız et al. 2017 [17]	Observational study (retrospective)	January 2012–May 2015	-	Patients with RRMM who are refractory to ≥ 1 IMiD and 1 PI	-	19	62 (38–83)
Onec et al. 2016 [86]	Observational study (retrospective)	2009–2013	-	Patients with MM	-	66	Mean 66.55 (SD 12.149)
Ateşagağlu et al. 2015 [87]	Observational study (retrospective)	2008–2013	-	Patients diagnosed with MM and completed ≥ 3 cycles of a bortezomib-based protocol at diagnosis or at relapse	Bortezomib: SC vs IV	Bortezomib SC, n=74 Bortezomib IV, n=55	Bortezomib SC, 57 (26–75) Bortezomib IV, 57 (37–83)
Firatlı Tuglular et al. 2015 [88]	Phase 4/Real-world post-marketing surveillance study	2010–January 2015	19.9 (1.4–56.4) weeks	Patients with RRMM aged ≥ 18 years who started Rd	Rd	111	62 (29–85)
Ozkan et al. 2015 [89]	Observational study (retrospective)	January 2005–July 2012	-	Patients with MM treated with IMiD	Thalidomide vs lenalidomide	Thalidomide, n=34 Lenalidomide, n=34	Thalidomide, 58.8 (39–78) Lenalidomide, 61.3 (45–78)
Topcuoglu et al. 2015 [90]	Observational study (retrospective)	2012–2014	-	Patients with MM who received high dose melphalan with ASCT	High dose melphalan	39	57 (36–66)
UAE							
Alam et al. 2018 [3]	Observational study (retrospective)	January 2016–June 2018	216 days (3–839)	Patients with NDMM	-	32	58 (26–94)

2L second line, *3L* third line, *allo-SCT* allogeneic stem cell transplant, *ASCT* autologous stem cell transplant, *BMT* bone marrow transplant, *BPd* bendamustine + pomalidomide + dexamethasone, *DVd* daratumumab + bortezomib + dexamethasone, *FISH* fluorescence in situ hybridization, *iFISH* immunofluorescence *in situ* hybridization, *HCV* hepatitis C virus, *HDT* high-dose therapy, *IMiD* immunomodulatory imide drug, *IQR* interquartile range, *IRd* ixazomib + lenalidomide + dexamethasone, *IV* intravenous, *Kd* carfilzomib + dexamethasone, *KRd* carfilzomib + lenalidomide + dexamethasone, *LOT* line of therapy, *MeI* melphalan, *MM* multiple myeloma, *NDMM*, newly diagnosed multiple myeloma, *Pd* pomalidomide + low-dose dexamethasone, *RCT* randomized controlled trial, *Rd* lenalidomide + dexamethasone, *RRMM* relapsed and/or refractory multiple myeloma, *sAHCT* salvage autologous stem cell transplant, *SC* subcutaneous, *SCT* stem cell transplant, *SD* standard deviation, *SSBMT* Saudi Society of Blood & Marrow Transplantation, *uHD* urgent hemodialysis, *VAD* vincristine + doxorubicin + dexamethasone, *VCd* bortezomib + cyclophosphamide + dexamethasone, *Vd* bortezomib + dexamethasone, *VRd* bortezomib + lenalidomide + dexamethasone

REFERENCES:

1. Alhejazi A, Alhuraiji A, Nourallah A, Alshehri A, Usman B, ElGohary G, et al. Analysis of pharmacotherapeutic approaches for multiple myeloma and correlated renal and pulmonary impairments: a retrospective real-world registry study in the Greater Gulf Region (REPAIR Study). *Front Oncol.* 2025;15:1547138.
2. Abdrabou AK, Al Sharif F, El Fakih R, Hashmi S, Khafaga YM, Alhayli S, et al. Outcomes of autologous stem cell transplantation for multiple myeloma in Saudi Arabia. *Ann Saudi Med.* 2021;41(4):198-205. doi: 10.5144/0256-4947.2021.198.
3. Alam A, Al Qawasmeh K, Aamir M, McCarthy PL. Multiple myeloma therapy in Tawam Hospital. First report from United Arab Emirates (UAE). *Blood.* 2018;132. doi: 10.1182/blood-2018-99-110503.
4. Althomali M, Mutahar E, Al Hashmi H, Alhejazi A, Al Hazmi M, Al Saeed A, et al. Efficacy and safety of daratumumab in the treatment of relapsed/ refractory multiple myeloma, local experience from Saudi Arabia. *HemaSphere.* 2020;4:945. doi: 10.1097/HS9.0000000000000404.
5. Baysal M, Demirci U, Umit E, Kirkizlar HO, Atli EI, Gurkan H, et al. Concepts of double hit and triple hit disease in multiple myeloma, entity and prognostic significance. *Sci Rep.* 2020;10(1):5991. doi: 10.1038/s41598-020-62885-0.
6. Ciftciler R, Goker H, Buyukasik Y, Aladag E, Demiroglu H. Impact of pre-transplant and post-transplant remission status of patients on survival in newly diagnosed multiple myeloma. *Indian J Hematol Blood Transfus.* 2019;35(4):655-61. doi: 10.1007/s12288-019-01108-7.
7. Çiftçi R, Göker H, Demiroğlu H, Aksu S, Sayinalp N, Haznedaroğlu İ C, et al. Evaluation of the survival outcomes of multiple myeloma patients according to their plasmacytoma presentation at diagnosis. *Turk J Hematol.* 2020;37(4):256-62. doi: 10.4274/tjh.galenos.2019.2019.0061.

8. Gursoy V, Baysal M, Sadri S, Hunutlu FC, Ersal T, Gul OO, et al. Comparative analysis and validation of the IMPEDED VTE, IMPEDE VTE, and SAVED risk models in predicting venous thromboembolism in multiple myeloma patients: A retrospective study in Türkiye. *Diagnostics*. 2025;15(5):633. doi: 10.3390/diagnostics15050633
9. Kassem NM, Saadeldin I, Zawam H, Kassem HA. Clinical significance of serum biomarkers: vascular endothelial growth factor- α and chemokine (c-x-c motif) ligand 13 in Egyptian multiple myeloma patients. *Acta Medica Iranica*. 2023;61(3):150-60. doi: 10.18502/acta.v61i3.12737
10. Kazgı MA, Bayram E, Koseci T, Mete B, Toyran T, Ergin M, et al. Exploring the impact of cytogenetic abnormalities on treatment responses and survival outcomes in multiple myeloma: a single-centre experience of 13 years of follow-up. *Biomedicines*. 2024;12(5). doi: 10.3390/biomedicines12051014.
11. Morad MA, Fahmy O, Marie MA, Samir E, Abdullah REE. Comparison of renal function before and after autologous stem cell transplantation in Egyptian patients with multiple myeloma and renal insufficiency: A retrospective study. *Saudi J Kidney Dis Transpl*. 2023;34(Suppl 1):S14-s23. doi: 10.4103/sjkdt.sjkdt_333_22.
12. Pektas O, Navaratnam P, Rajput T, Friedman HS, Demirkır E, Tekle C, et al. Real-world (RW) treatment patterns and outcomes in patients (pts) with relapsed/refractory multiple myeloma (RRMM) with at least one prior therapy in Turkey. *Hematol Transfus Cell Ther*. 2023;45:S15. doi: 10.1016/j.htct.2023.09.026.
13. Shaheen NA, Alqahtani M, Alawbthani NS, Thomas A, Alaskar A. Chemotherapy-induced peripheral neuropathy and its impact on health-related quality of life among multiple myeloma patients: A single-center experience. *Indian J Palliat Care*. 2020;26(4):506-11. doi: 10.4103/ijpc.ijpc_233_19.
14. Soyer N, Patır P, Uysal A, Duran M, Ünal HD, Durusoy R, et al. Efficacy and safety of lenalidomide and dexamethasone in patients with relapsed/ refractory multiple myeloma: a real-life experience. *Turk J Med Sci*. 2018;48(4):777-85. doi: 10.3906/sag-1712-160.

15. Sulu C, Yalın SF, Gürer T, Ar MC, Altıparmak MR. Renal recovery after acute kidney injury requiring urgent hemodialysis is not associated with improved survival of the patients with multiple myeloma. *Ir J Med Sci.* 2023;192(2):757-63. doi: 10.1007/s11845-022-03014-w.
16. Tekinalp A, Gedük A, Akdeniz A, Terzi Demirsoy ET, Gürsoy V, Aslaner Ak MA, et al. Experience of daratumumab in relapsed/refractory multiple myeloma: A multicenter study from Türkiye. *Turk J Hematol.* 2023;40(4):242-50. doi: 10.4274/tjh.galenos.2023.2023.0029.
17. Yalnız FF, Akkoç N, Salihoğlu A, Ar MC, Öngören Ş, Eşkazan AE, et al. Clinical outcomes related to the use of bendamustine therapy for multiple myeloma patients relapsed/refractory to immunomodulatory drugs and proteasome inhibitors. *Turk J Hematol.* 2017;34(3):233-8. doi: 10.4274/tjh.2016.0397.
18. Yılmaz U, Erdem Nurcan S, Özmen D, Salihoğlu A, Eşkazan AE, Öngören Ş, et al. Retrospective study to compare outcomes in 159 patients undergoing first autologous stem cell transplantation for myeloma treated with melphalan 140 mg/m² or 200 mg/m². *Ann Transplant.* 2025;30:e947186. doi: 10.12659/aot.947186.
19. Mafra A, Laversanne M, Marcos-Gragera R, Chaves HVS, Mcshane C, Bray F, et al. The global multiple myeloma incidence and mortality burden in 2022 and predictions for 2045. *J Natl Cancer Inst.* 2024;117(5):907-14. doi: 10.1093/jnci/djae321.
20. Farghaly M, Fasseeh A, Korra N, Abd-El Aziz A, Al Dallal S, Badr M, et al. EE178 The burden of multiple myeloma in the Gulf Region. *Value Health.* 2024;27:S88. doi: 10.1016/j.jval.2024.10.462.
21. Mattar M, Bazarbach A, Abduljalil O, Francis B, Alam A, Blunk V. Epidemiology, treatment trends, and outcomes of multiple myeloma in the Middle East and Africa: a systematic review. *Clin Hematol Int.* 2024;6(1):67-83. doi: 10.46989/001c.92555.
22. Zhou L, Yu Q, Wei G, Wang L, Huang Y, Hu K, et al. Measuring the global, regional, and national burden of multiple myeloma from 1990 to 2019. *BMC Cancer.* 2021;21(1):606. doi: 10.1186/s12885-021-08280-y.

23. Cowan AJ, Allen C, Barac A, Basaleem H, Bensenor I, Curado MP, et al. Global burden of multiple myeloma: A systematic analysis for the global burden of disease study 2016. *JAMA Oncol.* 2018;4(9):1221-7. doi: 10.1001/jamaoncol.2018.2128.
24. Alhuraiji A, Lal A, Al Mehairi A, Alam A, Mudawi D, Khan F, et al. Epidemiology and approaches for management of relapsed and refractory multiple myeloma in Gulf Countries: a narrative review and insights from the Gulf multiple myeloma experts. *Curr Med Res Opin.* 2025;41(4):593-600. doi: 10.1080/03007995.2025.2502125.
25. Alhuraiji A, Al Farsi K, Mheidly K, Elsabah H, Cherif H, Hamad A, et al. Relapsed/refractory multiple myeloma: Standard of care management of patients in the Gulf region. *Clin Hematol Int.* 2025;7(2):20.
26. Marashi M, Al Farsi K, Al Hateeti H, Alhuraiji A, Elsabah H, Cherif H, et al. Frontline management of multiple myeloma patients: optimizing treatment for patients in the Gulf region. *Clin Hematol Int.* 2025;7(1):14.
27. Hamad A, Elazzazy S, Taha RY, Osman H, Blooshi S, Elkonaissi I, et al. Cost-minimization analysis for subcutaneous daratumumab in the treatment of newly diagnosed multiple myeloma in 3 Gulf countries. *J Health Econ Outcome Res.* 2024;11(2):9-19. doi: 10.36469/001c.120288.
28. Al Sharif FZ, Alhuraiji A, Alam A, Alhejazi A, Osman H, El Sabah H, et al. Approaches to multiple myeloma management in gulf countries: A narrative review insights from the Kingdom of Saudi Arabia and gulf multiple myeloma experts. *J Appl Hematol.* 2023;14(2):71-7. doi: 10.4103/joah.joah_110_22.
29. Elsergany AR, Shamaa S, Awad M, Ibrahim M, Elkhodary T, Abd Elhamid M, et al. MM-095 Safety and efficacy of dexamethasone for prevention of engraftment syndrome in a patient with multiple myeloma undergoing ASCT: A single-center experience. *Clin Lymphoma Myeloma Leuk.* 2024;24:S535-S6. doi: 10.1016/S2152-2650(24)01641-0.

30. Elsisi G, Elattar M, Eldesouky N. EE260 Cost-effectiveness analysis of daratumumab triplet therapy vs carfilzomib duplet therapy in patients with relapsed or refractory multiple myeloma in Egypt from payer perspective. *Value Health*. 2023;26(12):S101. doi: 10.1016/j.jval.2023.09.527.
31. Hafez N, Refaat L, ElGebaly OK, Elhariry HM, Ghareeb M, Fathalla LA. Prognostic value of RGS1 and mTOR Immunohistochemical expression in Egyptian multiple myeloma patients; A single center study. *PLoS One*. 2023;18(7):e0288357. doi: 10.1371/journal.pone.0288357.
32. Elsisi GH, Carapinha JL, Afify R, Elmoty MA, Khalaf M. A budget impact analysis of lenalidomide in multiple myeloma Egyptian patients. *J Med Econ*. 2020;23(10):1168-75. doi: 10.1080/13696998.2020.1796288.
33. Kassem NM, Kassem HA, Ibrahim M, Zawam H, Hamada E. The clinical impact of hepatitis C virus infection in Egyptian multiple myeloma patients. *J Egypt Natl Canc Inst*. 2020;32(1):43. doi: 10.1186/s43046-020-00054-0.
34. Denewer M, Shamaa S, Samra M, El-Nahass YEN, Azmy E. MM-375: Prognostic impact of multiple myeloma cytogenetic abnormalities on outcome of autologous bone marrow transplantation: A single-center experience. *Clin Lymphoma Myeloma Leukemia*. 2020;20:S309. doi: 10.1016/S2152-2650(20)30957-5.
35. El Gammal M, Hassan N, Abdel Fatah M. Superiority of CyBorD over VAD is more evident in first than in second line treatment of multiple myeloma. *HemaSphere*. 2019;3:979-80. doi: 10.1097/01.hs9.0000567212.75019.39.
36. Abdelgawad IA, Radwan NH, Shafik RE, Shokralla HA. Significance of proliferation markers and prognostic factors in Egyptian patients with multiple myeloma. *Asian Pac J Cancer Prev*. 2016;17(3):1351-5. doi: 10.7314/apjcp.2016.17.3.1351.
37. El-Ghammaz AM, Abdelwahed E. Bortezomib-based induction improves progression-free survival of myeloma patients harboring 17p deletion and/or t(4;14) and overcomes their adverse prognosis. *Ann Hematol*. 2016;95(8):1315-21. doi: 10.1007/s00277-016-2692-0.

38. Kim K, Verburgh E, Mitina T, Chen W, Yeh SP, Schutz N, et al. Treatment pathways and clinical outcomes in newly diagnosed multiple myeloma outside Europe and North America: The INTEGRATE study. *Int J Hematol*. 2025. doi: 10.1007/s12185-025-03972-8.
39. Abdrabou AK, Al Sharif F, El Fakih R, Zahrani HA, Al Yamany R, Saleh M, et al. Improved long-term survival rate in the responders to bortezomib, cyclophosphamide, dexamethasone induction therapy in a transplant-eligible cohort of predominantly middle-age multiple myeloma patients. *Ann Saudi Med*. 2024;44(2):93-103. doi: 10.5144/0256-4947.2024.93.
40. Hematopoietic cell transplantation and cell therapy activity landscape survey in the Kingdom of Saudi Arabia; a report from the Saudi Society of Blood and Marrow Transplantation (SSBMT). *Bone Marrow Transplant*. 2024;59(6):867-73. doi: 10.1038/s41409-024-02240-3.
41. Alhifany AA, Ghilais AT, Jammal JA, Alfaifi FM, Khayyat SM, Alotaibi AS, et al. Home infusion services in Saudi Arabia: Where are we standing? *Saudi Pharm J*. 2023;31(10). doi: 10.1016/j.jsps.2023.101750.
42. Almuhaysen LM, Alaa A. A study on renal failure management in patients diagnosed with multiple myeloma. *Cureus*. 2023;15(10):e47460. doi: 10.7759/cureus.47460.
43. Kaloyannidis P, Abdulla F, Mutahar E, Al Hashim H, Al Harbi S, Estanislao A, et al. Risk assessment for newly diagnosed fit young patients with multiple myeloma in the era of novel treatment modalities: Should there be additional factors taken into consideration?? *J Blood Med*. 2022;13:619-30. doi: 10.2147/jbm.S380133.
44. Elghazaly A, Alswayyan A, Algreshah H. Impact of delayed diagnosis of multiple myeloma. *J Appl Hematol*. 2020;11(3):149-52. doi: 10.4103/joah.joah_90_19.
45. Abu Haleeqa M, Alkaabi F, Janodi R, Raidullah E. First review of multiple myeloma patients in Sheikh Khalifa Medical City, Abu Dhabi, United Arab Emirates. *Blood*. 2019;134:5587. doi: 10.1182/blood-2019-128769.

46. Cowan AJ, Libby EN, Fitzmaurice C. Global burden of multiple myeloma: a systematic analysis for the Global Burden of Disease study 2016. *J Clin Oncol*. 2018;36(15). doi: 10.1200/JCO.2018.36.15_suppl.e20023.
47. Gmati GE, Damlaj M, Alzaharani M, Altamimi S, Alherz N, Khalid F, et al. Outcome of autologous stem cell transplantation in multiple myeloma; experience from a single center in Saudi Arabia. *HemaSphere*. 2019;3:973-4.
48. Khojah O, Al-Majed M, Al-Mozain N, Al-Rajeh A, Al-Sharif F, Khalil S. Genetic characteristic of 123 newly diagnosed plasma cell myeloma patients: A 5 years' experience of a single oncology center. *J Appl Hematol*. 2019;10:S18-S9.
49. Maroun R, Kilic E, Dokuyucu O, Coggia A. PCN215 Cost comparison of lenalidomide based triple combination therapies for the treatment of relapsed/refractory multiple myeloma in the Kingdom of Saudi Arabia. *Value Health*. 2019;22:S477. doi: 10.1016/j.jval.2019.09.411.
50. Abduljalil OZ, Al Hashmi HH. Retrospective observational study on multiple myeloma cases admitted to King Fahad Specialist Hospital: Dammam between 1st of June 2006 till the end of December 2013. *J Appl Hematol*. 2016;7:S17-S8.
51. Khojah O, Al-Rajeh A, Al-Majed M, Ramadan S, Al-Mozain N, Al-Sharif F, et al. Molecular cytogenetic analysis of 103 newly diagnosed plasma cell myeloma patients resulting in a novel biphasic approach. *J Appl Hematol*. 2016;7:S13-S4.
52. Bostankolu Değirmenci B, Yegin ZA, Akdemir Ü, Dede A, Gündem GG, Özkurt ZN, et al. Clinical factors associated with autologous stem cell transplantation outcomes in multiple myeloma: Upfront transplant with MEL200 remains the standard of care. *Ann Hematol*. 2024;103(1):269-83. doi: 10.1007/s00277-023-05511-z.
53. Erdogan Yucel E, Kirmaz AT, Kakci M, Yavuz AF, Sencelikel T, Alacacioglu I, et al. The effect of age on high-dose therapy with autologous stem cell support in multiple myeloma: A single-center experience. *J Clin Med*. 2024;13(14):4142.

54. Karacan Y, Akkus Y, Bayram R, Budak S, Ünlü AA. Do spiritual well-being and pain intensity predict physical or mental components of health-related quality-of-life scale in patients with multiple myeloma? *Pain Manag Nurs.* 2024;25(5):e367-e74. doi: 10.1016/j.pmn.2024.05.006.
55. Öztürk H, Dikyar A, Yeğin Z, Kaynar L, Can F, Özkurt Z. Allogeneic hematopoietic stem cell transplantation in relapsed refractory multiple myeloma. *Niger J Clin Pract.* 2024;27(12):1405-9. doi: 10.4103/njcp.njcp_107_24.
56. Açar İH, Güvenç B. Efficacy of bendamustine, pomalidomide, and dexamethasone (BPD) regimen in relapsed/refractory extramedullary myeloma: a retrospective single-centre study, real-life experience. *Hematol Rep.* 2023;15(3):465-73.
57. Bakırtaş M, Dal MS, Yiğenoğlu TN, Giden AO, Serin I, Başcı S, et al. Real-world data on the effectiveness and safety of ixazomib-lenalidomide-dexamethasone therapy in relapsed/refractory multiple myeloma patients: A multicenter experience in Turkey. *J Chemother.* 2023;35(6):563-9. doi: 10.1080/1120009x.2023.2208439.
58. Beksac M, Seval GC, Koyun D, Topcuoglu P, Yuksel MK, Gurman G, et al. Generic lenalidomide Rivelime versus brand-name Revlimid® in the treatment of relapsed/refractory multiple myeloma: A retrospective single-center experience on efficacy, safety and survival outcome. *Clin Lymphoma Myeloma Leuk.* 2023;23(3):e164-e70. doi: 10.1016/j.clml.2022.12.007.
59. Ipek Y, Karademir N, Yilmazer O, Yilmaz G. The effects of second primary malignancies and frailty on overall survival and mortality in geriatric Turkish patients with multiple myeloma. *Curr Oncol.* 2023;30(6):5615-30. doi: 10.3390/curroncol30060423.
60. Kul AN, Ipek Y. Investigation of the frequency of bortezomib neuropathy in patients with multiple myeloma diagnosis with normal and abnormal genetic characteristics. *J Oncol Pharm Pract.* 2023;29(7):1652-60. doi: 10.1177/10781552221132554.
61. Bolaman AZ, Turgutkaya A, Sahip B, Selim C, Eroğlu Küçükerdiler H, Ertop Ş, et al. Original versus generic lenalidomide in patients with relapsed/refractory multiple myeloma: Comparison

of efficacy and adverse events. Turk J Hematol. 2021;38(1):41-8. doi:

10.4274/tjh.galenos.2020.2020.0169.

62. Cengiz G, Karakaya B, Yilmaz H, Koyun D, Kircali E, Basboga S, et al. Comparison of salvage autologous hematopoietic cell transplantation with outcomes following selinexor combinations among double/triple refractory myeloma patients. Blood. 2021;138:4904. doi: 10.1182/blood-2021-148835.

63. Çiftçiler R, Göker H, Demiroğlu H, Haznedaroğlu İ C, Sayınalp N, Aksu S, et al. Evaluation of prognostic significance of the international staging system according to glomerular filtration rate in newly diagnosed multiple myeloma patients eligible for autologous stem cell transplantation. Turk J Hematol. 2021;38(1):33-40. doi: 10.4274/tjh.galenos.2020.2020.0115.

64. Malkan UY, Demiroglu H, Buyukasik Y, Karatas A, Aladag E, Goker H. Comparison of single and double autologous stem cell transplantation in multiple myeloma patients. Open Med (Wars). 2021;16(1):192-7. doi: 10.1515/med-2021-0216.

65. Mersin S, Gedük A, Mehtap Ö, Tarkun P, Ünal S, Polat MG, et al. Evaluation of a generic bortezomib molecule in newly diagnosed multiple myeloma patients. Turk J Hematol. 2021;38(3):211-7. doi: 10.4274/tjh.galenos.2021.2020.0555.

66. Şahin T, Turgutkaya A, Kadıköylü G, Bolaman AZ, Yavaşoğlu İ. Investigation of demographic features, performance, comorbidity status and mortality causes among multiple myeloma patients: real-life data. Expert Rev Hematol. 2021;14(12):1147-53. doi: 10.1080/17474086.2021.1962279.

67. Topkar OM, Erol B. Clinical outcomes and complications of surgical interventions for multiple myeloma lesions in the extremities and pelvis: A retrospective clinical study. Acta Orthop Traumatol Turc. 2021;55(2):159-65. doi: 10.5152/j.aott.2021.20130.

68. Beksac M, Aydin Y, Goker H, Turgut M, Besisik SK, Cagirgan S, et al. Early access program results from Turkey and a literature review on daratumumab monotherapy among heavily

pretreated patients with relapsed/refractory myeloma. Clin Lymphoma Myeloma Leuk.

2020;20(8):e474-e84. doi: 10.1016/j.clml.2020.02.017.

69. Ciftciler R, Goker H, Buyukasik Y, Sayinalp N, Haznedaroglu IC, Aksu S, et al. Comparison of bortezomibcyclophosphamide- dexamethasone versus bortezomib-dexamethasone based regimens in newly diagnosed multiple myeloma patients. Hematol Rep. 2020;12(1):8267. doi: 10.4081/hr.2020.8267.

70. Kirik MP, Pehlivan M, Nursal AF, Oyaci Y, Pehlivan S, Serin I. The miRNA 196a2 rs11614913 variant has prognostic impact on Turkish patients with multiple myeloma. BMC Res Notes. 2020;13(1):545. doi: 10.1186/s13104-020-05392-9.

71. Tekin SB, Karslı B, Büyükbebeci O, Demir İ H, Gökalp AY, Kılınçoğlu V. How do vertebroplasty and kyphoplasty affect the quality of life of patients with multiple myeloma spinal metastasis? Eur J Orthop Surg Traumatol. 2020;30(8):1447-51. doi: 10.1007/s00590-020-02721-3.

72. Umit EG, Baysal M, Bas V, Asker I, Kırkızlar O, Demir AM. Polypharmacy and potentially inappropriate medication use in older patients with multiple myeloma, related to fall risk and autonomous neuropathy. J Oncol Pharm Pract. 2020;26(1):43-50. doi: 10.1177/1078155219835303.

73. Yıkılmaz A, Akinci S, Bakanay Ş M, Dilek İ. VAD chemotherapy versus bortezomib containing regimens as remission induction for ASCT in multiple myeloma: A single center experience. Int J Hematol Oncol Stem Cell Res. 2020;14(4):248-56. doi: 10.18502/ijhoscr.v14i4.4481.

74. Amikishiyev S, Hindilerden IY, Erdem S, Aktan M, Nalcaci M, Sargin D, et al. Infectious epidemiology in multiple myeloma patients after autologous stem cell transplantation: A single-center analysis from Turkey. Bone Marrow Transplant. 2019;53:566-7. doi: 10.1038/s41409-018-0354-7.

75. Beksac M, Seval GC, Koyun D, Topcuoglu P, Yuksel MK, Gurman G, et al. A retrospective single center experience with the generic of lenalidomide Rivelime® compared with original patented drug Revlimid®. *Am J Hematol*. 2019;94:S7. doi: 10.1002/ajh.25639.
76. Beksac M, Seval GC, Paydas S, Tuglular TF, Arslan O, Goker H, et al. Elotuzumab plus pomalidomide or lenalidomide is able to achieve durable $\geq$ VGPR responses among immunomodulatory / proteasome inhibitor refractory myeloma patients: A report on multicenter experience from Turkey. *Clin Lymphoma Myeloma Leuk*. 2019;19(10):e242-e3. doi: 10.1016/j.clml.2019.09.402.
77. Bolaman Z, Ertop S, Turgutkaya A, Cem S, Eroglu Kucukerdiler AH, Sahip B, et al. Original versus generic lenalidomide in patients with relapsed multipl myeloma: Comprasion of effectivity and adverse events. *Blood*. 2019;134:5594. doi: 10.1182/blood-2019-131093.
78. Aypar E, İzzettin FV, Akı ŞZ, Sancar M, Yeğın ZA, Türköz-Sucak G. Comparison of conditioning regimen toxicities among autologous stem cell transplantation eligible multiple myeloma patients: High-dose melphalan versus high-dose melphalan and bortezomib. *J Oncol Pharm Pract*. 2018;24(4):281-9. doi: 10.1177/1078155217697486.
79. Dag M, Beksac M. A cross sectional epidemiological and survival analysis of all patients with plasma cell disorders recorded between 2011-2017 in the social insurance system of Turkey. *Blood*. 2018;132. doi: 10.1182/blood-2018-99-118185.
80. Soyer N, Patir P, Uysal A, Duran M, Ünal HD, Durusoy R, et al. Efficacy and safety of lenalidomide and dexamethasone in patients with relapsed/ refractory multiple myeloma: A real-life experience. *Turkish Journal of Medical Sciences*. 2018;48(4):777-85. doi: 10.3906/sag-1712-160.
81. Beksac M, Aydin Y, Goker H, Turgut M, Besisik SK, Cagiran S, et al. Multicenter early access program results from Turkey: Efficacy and safety of daratumumab among heavily pretreated relapse/refractory multiple myeloma patients. *Blood*. 2017;130.

82. Ozsan GH, Sevindik OG, Sadri S, Hacıoglu SK, Kaya SY, Geduk A, et al. Real-world data in relapsed refractory myeloma patients treated with pomalidomide, a multicenter turkish experience. *Blood*. 2017;130. doi: 10.1182/blood-2019-131093
83. Saydam G, Soyer N, Patir P, Uysal A, Duran M, Durusoy R, et al. Efficacy and safety of lenalidomide and dexamethasone in patients with relapsed/refractory multiple myeloma: A real life experience from Turkey. *Haematologica*. 2017;102:784.
84. Sevindik OG, Pehlivan M, Tuglular TF, Solmaz SM, Dogu MH, Yalniz F, et al. Real-world data in relapsed refractory myeloma patients treated with carfilzomib, a multicenter turkish experience. *Blood*. 2017;130. doi: 10.1182/blood.V130.Suppl_1.5405.5405.
85. Tekgündüz E, Demirkan F, Vural F, Göker H, Özdoğu H, Kiki İ, et al. Current practice of autologous hematopoietic progenitor cell mobilization in adult patients with multiple myeloma and lymphoma: The results of a survey from Turkish hematology research and education group (ThREG). *Transfus Apher Sci*. 2017;56(6):804-8. doi: 10.1016/j.transci.2017.11.010.
86. Onec B, Okutan H, Albayrak M, Can ES, Aslan V, Soyer Kosemehmetoglu O, et al. Comparative evaluation of common comorbidity scores and freiburger comorbidity index as prognostic variables in a real life multiple myeloma population. *Indian J Hematol Blood Transfus*. 2016;32(4):424-30. doi: 10.1007/s12288-015-0618-y.
87. Ateşalağlu B, Topcuoğlu P, Merter M, Sungurlu M, Şener Ö, Beksac, M. Subcutaneous bortezomib is as effective and less neurotoxic than intravenous bortezomib: Ankara university experience. *Haematologica*. 2015;100:740-1.
88. Firatlı Tuğlular T, Pehlivan M, I Sari H, Ayyıldız MO, Saydam G, Sönmez M, et al. Post-authorization safety of lenalidomide + dexamethasone in patients with relapsed/refractory multiple myeloma in Turkey. *Clin Lymphoma Myeloma Leukemia*. 2015;15:e301-e2.
89. Ozkan MC, Tombuloglu M, Sahin F, Saydam G. Evaluation of immunomodulatory drugs in multiple myeloma: Single center experience. *Am J Blood Res*. 2015;5(2):95-100.

90. Topcuoglu P, Gultay D, Ozturk N, Kilic O, Okay M, Eraslan Karadag Y, et al. Generic (Bioequivalent) melphalan has similar efficacy and toxicity but lower cost in the conditioning regimen for autologous hematopoietic stem cell transplantation. Bone Marrow Transplant. 2015;50:S440. doi: 10.1038/bmt.2015.30.