CH3

2023-07-18

1. tidyverse

```
library(tidyverse)
dat <- read.csv("C:\\Users\\phl02\\Desktop\\P\\bio\\ch3\\Ch3_chb.csv")</pre>
dat1<-dat
class(dat1)
## [1] "data.frame"
dim(dat1)
## [1] 24 26
colnames(dat1)
  [1] "id"
                     "index_date" "gender"
                                                "age"
                                                             "treat_gr"
##
                     "hcc"
                                                "b_alt"
                                                             "b_bil"
## [6] "lc"
                                   "hcc_yr"
## [11] "b_inr"
                     "b_cr"
                                   "b_plt"
                                                "b_alb"
                                                             "m6_alt"
                                   "m6_cr"
## [16] "m6_bil"
                     "m6_inr"
                                                "m6_plt"
                                                             m6_alb
                     "m12_bil"
## [21] "m12_alt"
                                   "m12_inr"
                                                "m12_cr"
                                                             "m12_plt"
## [26] "m12_alb"
```

2. Select

원하는 변수 선택

R에서 기본으로 사용하는 슬라이싱 코드와 비교

```
dat1 %>%
select(id, b_alt, b_bil, b_alb)
```

```
id b_alt b_bil b_alb
## 1
      1
           67
                1.2
                      3.8
## 2
      2
                1.1
                      3.8
           32
## 3
      3
          106
                1.8
                     3.9
## 4
          159
                1.4
                      4.2
      4
## 5
      5
           94
                0.8
                     4.2
## 6
           32
      6
                0.7
                     3.4
## 7
      7
          104
                1.1
                      NA
## 8
      8
          143
                1.5
                      3.5
## 9
      9
          31
                1.3
                    3.9
## 10 10
                1.3
                     3.2
          239
## 11 11
          359
                0.9
                     4.1
## 12 12
          486
                0.7
                     2.8
## 13 13
           56
               1.3
                     4.2
## 14 14
           34
                1.7
                     NA
## 15 15
          107
                2.1
                      2.1
## 16 16
           40
                1.3
                      3.4
## 17 17
                      4.0
           48
               1.0
## 18 18
           61
                2.1
                      2.7
## 19 19
                      4.3
               1.1
           34
## 20 20
           31
                0.9
                     3.1
## 21 21
           57
               1.1
                      4.1
## 22 22
           81
                1.0
                      4.1
## 23 23
           35
                1.9
                      4.4
## 24 24
           84 1.1
                      4.2
```

dat1[, c('id', 'b_alt', 'b_bil', 'b_alb')]

```
##
     id b_alt b_bil b_alb
## 1
      1
           67
               1.2
                     3.8
## 2
      2
           32
               1.1
                     3.8
## 3
      3
          106
               1.8
                     3.9
## 4
          159
               1.4
                     4.2
      4
## 5
      5
          94
               0.8
                     4.2
## 6
          32
      6
               0.7
                     3.4
## 7
      7
          104
               1.1
                     NA
## 8
          143
               1.5
                    3.5
      8
## 9
      9
          31
               1.3
                    3.9
## 10 10
          239
               1.3
                    3.2
## 11 11
          359
               0.9
                     4.1
## 12 12
          486
               0.7
                     2.8
## 13 13
          56
               1.3
                     4.2
## 14 14
          34
               1.7
                     NA
## 15 15
               2.1
                     2.1
          107
## 16 16
           40
               1.3
                     3.4
## 17 17
           48
               1.0
                    4.0
## 18 18
           61
               2.1
                     2.7
## 19 19
               1.1
                     4.3
           34
## 20 20
           31
               0.9
                     3.1
## 21 21
              1.1
                     4.1
           57
## 22 22
           81
              1.0
                    4.1
## 23 23
           35
              1.9
                    4.4
## 24 24
           84
              1.1
                    4.2
```

숫자를 사용해서도 가능

```
dat1 %>%
  select(1, 8, 9, 13)
```

```
##
     id
        hcc_yr b_alt b_plt
## 2 2 9.763889
                32
                     187
## 3 3 10.594444 106
                      133
## 4 4 6.016667
                 159
                      164
94
                      153
## 6 6.069444
                32
                      170
## 7
    7 8.069444
                 104
                      162
## 8 8 10.716667
                 143
                      165
## 9 9 2.163889
                 31
                      157
## 10 10 10.766667
                 239
                      166
## 11 11 3.713889
                      202
                 359
## 12 12 3.269444
                 486
                      159
## 13 13 10.655556
                56
                      186
## 14 14 4.488889
                34
                      159
## 15 15 5.869444
                 107
                      66
## 16 16 4.008333
                  40
                     118
## 17 17 3.513889
                  48
                      105
## 18 18 2.372222
                  61
                      55
## 19 19 10.677778
                  34
                      NA
## 20 20 5.030556
                  31
                      163
## 21 21 4.725000
                  57
                      91
## 22 22 10.761111
                      292
                  81
## 23 23 10.558333
                  35
                      204
## 24 24 3.994444
                84
                      181
```

다양하게도 선택 가능

```
dat1 %>%
  select(1:4, 7:9, 13)
```

```
##
      id index_date gender age hcc
                                     hcc_yr b_alt b_plt
## 1
      1 2007/01/05
                        M 54
                                1 7.641667
                                               67
                                                    110
                        F 45
## 2
     2 2007/01/10
                                0 9.763889
                                               32
                                                    187
## 3
      3 2007/01/11
                        M 49
                                0 10.594444
                                              106
                                                    133
## 4
      4 2007/01/12
                        M
                           26
                                0 6.016667
                                              159
                                                    164
## 5
      5 2007/01/18
                        M
                           50
                                0 2.355556
                                              94
                                                    153
## 6
      6 2007/01/18
                        M 33
                                0 6.069444
                                               32
                                                    170
## 7
      7 2007/01/26
                        M 49
                                1 8.069444
                                              104
                                                    162
                        F
## 8
     8 2007/01/31
                           50
                                0 10.716667
                                              143
                                                    165
                        F 49
## 9
      9 2007/01/31
                                0 2.163889
                                               31
                                                    157
## 10 10 2007/02/01
                        M 50
                                0 10.766667
                                              239
                                                    166
## 11 11 2007/02/01
                        M
                           32
                                0 3.713889
                                              359
                                                    202
## 12 12 2007/02/01
                        M 48
                                1 3.269444
                                              486
                                                    159
## 13 13 2007/02/01
                        M 51
                                0 10.655556
                                              56
                                                    186
## 14 14 2007/02/02
                        M 41
                                0 4.488889
                                               34
                                                    159
## 15 15 2007/02/08
                                1 5.869444
                        M 50
                                              107
                                                    66
## 16 16 2007/02/08
                        M 51
                                0 4.008333
                                               40
                                                    118
## 17 17 2007/02/09
                        F 62
                                0 3.513889
                                               48
                                                    105
## 18 18 2007/02/14
                        F 51
                                0 2.372222
                                               61
                                                     55
## 19 19 2007/02/15
                        M 48
                                0 10.677778
                                               34
                                                     NA
## 20 20 2007/02/15
                        F 50
                                0 5.030556
                                               31
                                                    163
## 21 21 2007/02/15
                        M 52
                                0 4.725000
                                               57
                                                    91
## 22 22 2007/02/16
                        M 30
                                0 10.761111
                                               81
                                                    292
## 23 23 2007/02/16
                        M 29
                                0 10.558333
                                               35
                                                    204
## 24 24 2007/02/20
                        M 43
                                0 3.994444
                                               84
                                                    181
```

콜론도 가능

dat1 %>%

select(m6_alt:m6_plt)

					_	
##		m6_alt	m6_bil	m6_inr	m6_cr	m6_plt
##	1	35	1.0	1.05	0.9	96
##	2	16	1.1	0.97	0.7	194
##	3	108	1.8	1.03	0.9	120
##	4	24	1.7	1.11	0.9	149
##	5	57	0.9	1.10	1.0	145
##	6	26	0.8	0.97	1.4	NA
##	7	51	1.0	1.05	0.8	128
##	8	24	1.4	1.04	0.8	184
##	9	25	1.3	1.02	0.8	163
##	10	30	1.4	1.00	1.0	158
##	11	23	1.1	0.98	1.0	171
##	12	34	0.9	0.96	0.8	215
##	13	18	1.3	NA	1.1	NA
##	14	23	1.6	0.97	0.9	164
##	15	42	1.0	1.15	1.0	80
##	16	33	1.1	1.09	1.0	129
##	17	28	0.9	1.03	0.7	121
##	18	25	1.2	1.21	0.7	67
##	19	13	0.8	NA	1.1	NA
##	20	29	1.3	1.19	0.7	40
##	21	39	1.3	1.11	0.8	74
##	22	50	1.0	0.93	0.9	264
##	23	26	2.3	1.00	0.9	NA
##	24	63	0.8	1.02	0.9	144

특정 변수 제외하기

```
dat1 %>%
 select(-id, -index_date) %>%
colnames()
                          "treat_gr" "lc"
## [1] "gender"
                "age"
                                              "hcc"
                                                       "hcc yr"
## [7] "b_alt" "b_bil"
                          "b_inr" "b_cr"
                                              "b_plt" "b_alb"
                                             "m6_plt" "m6_alb"
## [13] "m6_alt"
                          "m6_inr"
                                    "m6_cr"
                "m6_bil"
## [19] "m12_alt" "m12_bil" "m12_inr" "m12_cr"
                                             "m12_plt" "m12_alb"
변수 이름 삭제 확인
colnames(dat1)
## [1] "id"
                  "index_date" "gender"
                                         "age"
                                                     "treat_gr"
                  "hcc" "hcc_yr"
## [6] "lc"
                                         "b_alt"
                                                    "b_bil"
## [11] "b_inr"
                  "b cr"
                            "b_plt"
                                         "b alb"
                                                     "m6_alt"
                  "m6 inr" "m6 cr"
## [16] "m6_bil"
                                         "m6_plt"
                                                     m6_alb
                 "m12_bil" "m12_inr" "m12_cr"
## [21] "m12_alt"
                                                    "m12_plt"
## [26] "m12 alb"
순서를 사용해도 가능
dat1 %>%
select(-1, -2) %>%
colnames()
                          "treat_gr" "lc"
                                              "hcc"
                                                       "hcc_yr"
## [1] "gender"
                "age"
                                             "b_plt"
                "b_bil"
                                    "b_cr"
## [7] "b alt"
                          "b inr"
                                                       "b alb"
                          "m6_inr"
## [13] "m6_alt" "m6_bil"
                                              "m6_plt"
                                   "m6_cr"
                                                       "m6_alb"
## [19] "m12_alt" "m12_bil" "m12_inr" "m12_cr"
                                              "m12_plt" "m12_alb"
특정 변수를 조합해서 제외
dat1 %>%
select(-(1:4), -(10:13)) %>%
ncol()
```

[1] 18

같은 특성을 가진 변수만 선택

```
dat1 %>%
select(b_alt, m6_alt, m12_alt)
```

##		b_alt	${\tt m6_alt}$	m12_alt
##	1	67	35	37
##	2	32	16	18
##	3	106	108	27
##	4	159	24	29
##	5	94	57	35
##	6	32	26	17
##	7	104	51	42
##	8	143	24	16
##	9	31	25	24
##	10	239	30	34
##	11	359	23	19
##	12	486	34	24
##	13	56	18	17
##	14	34	23	19
##	15	107	42	36
##	16	40	33	30
##	17	48	28	31
##	18	61	25	24
##	19	34	13	13
##	20	31	29	31
##	21	57	39	34
##	22	81	50	63
##	23	35	26	28
##	24	84	63	52

포함된 단어가 있으면 이 방법이 더 유용

dat1 %>%

select(contains('alt'))

##		b_alt	$m6_alt$	m12_alt
##	1	67	35	37
##	2	32	16	18
##	3	106	108	27
##	4	159	24	29
##	5	94	57	35
##	6	32	26	17
##	7	104	51	42
##	8	143	24	16
##	9	31	25	24
##	10	239	30	34
##	11	359	23	19
##	12	486	34	24
##	13	56	18	17
##	14	34	23	19
##	15	107	42	36
##	16	40	33	30
##	17	48	28	31
##	18	61	25	24
##	19	34	13	13
##	20	31	29	31
##	21	57	39	34
##	22	81	50	63
##	23	35	26	28
##	24	84	63	52

6개월째 측정한 변수만 선택

dat1 %>% select(contains('m6'))

##		m6_alt	m6_bil	m6_inr	m6_cr	m6_plt	m6_alb
##	1	35	1.0	1.05	0.9	96	3.6
##	2	16	1.1	0.97	0.7	194	3.8
##	3	108	1.8	1.03	0.9	120	4.3
##	4	24	1.7	1.11	0.9	149	4.2
##	5	57	0.9	1.10	1.0	145	4.6
##	6	26	0.8	0.97	1.4	NA	3.4
##	7	51	1.0	1.05	0.8	128	3.9
##	8	24	1.4	1.04	0.8	184	3.7
##	9	25	1.3	1.02	0.8	163	4.2
##	10	30	1.4	1.00	1.0	158	3.8
##	11	23	1.1	0.98	1.0	171	4.4
##	12	34	0.9	0.96	0.8	215	3.3
##	13	18	1.3	NA	1.1	NA	4.2
##	14	23	1.6	0.97	0.9	164	3.7
##	15	42	1.0	1.15	1.0	80	3.7
##	16	33	1.1	1.09	1.0	129	4.0
##	17	28	0.9	1.03	0.7	121	3.9
##	18	25	1.2	1.21	0.7	67	3.5
##	19	13	0.8	NA	1.1	NA	4.3
##	20	29	1.3	1.19	0.7	40	3.3
##	21	39	1.3	1.11	0.8	74	4.0
##	22	50	1.0	0.93	0.9	264	4.4
##	23	26	2.3	1.00	0.9	NA	4.1
##	24	63	0.8	1.02	0.9	144	4.5

m6으로 시작하는 변수만 select 하는 방법도 있음

dat1 %>% select(starts_with('m6'))

##		m6_alt	m6_bil	m6_inr	m6_cr	m6_plt	m6_alb
##	1	35	1.0	1.05	0.9	96	3.6
##	2	16	1.1	0.97	0.7	194	3.8
##	3	108	1.8	1.03	0.9	120	4.3
##	4	24	1.7	1.11	0.9	149	4.2
##	5	57	0.9	1.10	1.0	145	4.6
##	6	26	0.8	0.97	1.4	NA	3.4
##	7	51	1.0	1.05	0.8	128	3.9
##	8	24	1.4	1.04	0.8	184	3.7
##	9	25	1.3	1.02	0.8	163	4.2
##	10	30	1.4	1.00	1.0	158	3.8
##	11	23	1.1	0.98	1.0	171	4.4
##	12	34	0.9	0.96	0.8	215	3.3
##	13	18	1.3	NA	1.1	NA	4.2
##	14	23	1.6	0.97	0.9	164	3.7
##	15	42	1.0	1.15	1.0	80	3.7
##	16	33	1.1	1.09	1.0	129	4.0
##	17	28	0.9	1.03	0.7	121	3.9
##	18	25	1.2	1.21	0.7	67	3.5
##	19	13	0.8	NA	1.1	NA	4.3
##	20	29	1.3	1.19	0.7	40	3.3
##	21	39	1.3	1.11	0.8	74	4.0
##	22	50	1.0	0.93	0.9	264	4.4
##	23	26	2.3	1.00	0.9	NA	4.1
##	24	63	0.8	1.02	0.9	144	4.5

cr로 끝나는 변수

dat1 %>% select(ends_with('cr'))

```
##
     b_cr m6_cr m12_cr
## 1 1.00
          0.9
                1.0
## 2 0.60
           0.7
                  0.6
## 3 1.05
           0.9
                  0.9
## 4 0.93
           0.9
                  0.8
## 5 0.90
           1.0
                  1.0
## 6 1.20
           1.4
                1.9
## 7 0.91
            0.8
                   NA
## 8 0.70
           0.8
                  0.7
## 9 0.73
           0.8
                0.7
## 10 1.20
           1.0
                1.0
## 11 1.10
           1.0
                  1.1
## 12 0.81
            0.8
                  0.8
## 13 1.00
           1.1
                  1.1
## 14 0.69
           0.9
                  0.8
## 15 1.00
                  1.1
           1.0
## 16 0.92
           1.0
                  NA
## 17 0.81
            0.7
                   NA
## 18 0.60
            0.7
                  0.6
## 19 1.00
            1.1
                  1.1
## 20 0.63
            0.7
                  0.7
## 21 0.80
            0.8
                  0.8
## 22 0.99
                  1.0
            0.9
## 23 0.91
            0.9
                  0.9
## 24 0.89
          0.9
                  1.0
```

변수 이름 변경

변경한 변수만 보임

```
dat1 %>%
  select(sex = gender)
```

```
##
     sex
## 1
       Μ
## 2
       F
## 3
       М
## 4
       Μ
## 5
       Μ
## 6
       Μ
## 7
       М
## 8
       F
## 9
       F
## 10
## 11
       М
## 12
       Μ
## 13
       М
## 14
       Μ
## 15
       М
## 16
       М
## 17
       F
## 18
       F
## 19
       Μ
## 20
       F
## 21
       М
## 22
       М
## 23
       М
## 24
       Μ
```

dat1 %>% rename(sex = gender)

```
##
       id index_date sex age treat_gr lc hcc
                                                     hcc_yr b_alt b_bil b_inr b_cr b_plt
## 1
       1 2007/01/05
                        М
                            54
                                     ETV
                                           1
                                               1
                                                  7.641667
                                                                67
                                                                      1.2
                                                                           1.17 1.00
                                                                                         110
##
  2
       2 2007/01/10
                         F
                            45
                                     ETV
                                           0
                                                  9.763889
                                                                32
                                                                      1.1
                                                                           0.90 0.60
                                                                                         187
                                               0
##
   3
       3 2007/01/11
                         М
                            49
                                     TDF
                                           1
                                               0 10.594444
                                                               106
                                                                      1.8
                                                                           1.03 1.05
                                                                                         133
##
   4
       4 2007/01/12
                        Μ
                            26
                                     ETV
                                          0
                                               0
                                                  6.016667
                                                               159
                                                                      1.4
                                                                            1.04 0.93
                                                                                         164
## 5
       5 2007/01/18
                        М
                            50
                                     TDF
                                           1
                                                  2.355556
                                                                94
                                                                      0.8
                                                                            1.12 0.90
                                                                                         153
       6 2007/01/18
                            33
                                                                32
                                                                      0.7
                                                                           0.88 1.20
                                                                                         170
## 6
                        Μ
                                     ETV
                                               0
                                                  6.069444
                                           1
##
  7
       7
         2007/01/26
                        Μ
                            49
                                     TDF
                                           1
                                               1
                                                  8.069444
                                                               104
                                                                      1.1
                                                                            1.10 0.91
                                                                                         162
                        F
                            50
## 8
       8 2007/01/31
                                     TDF
                                          0
                                               0 10.716667
                                                               143
                                                                      1.5
                                                                            1.10 0.70
                                                                                         165
##
       9 2007/01/31
                        F
                            49
                                     ETV
                                                   2.163889
                                                                31
                                                                      1.3
                                                                              NA 0.73
                                                                                         157
                                          1
## 10 10 2007/02/01
                            50
                                     ETV
                                               0 10.766667
                                                                           1.03 1.20
                                                                                         166
                        М
                                          0
                                                               239
                                                                      1.3
  11 11 2007/02/01
                        Μ
                            32
                                     ETV
                                          0
                                                  3.713889
                                                               359
                                                                      0.9
                                                                            0.97 1.10
                                                                                         202
## 12 12 2007/02/01
                            48
                                     TDF
                                          0
                                                  3.269444
                                                               486
                                                                      0.7
                                                                           1.02 0.81
                                                                                         159
                        Μ
                                               1
## 13 13 2007/02/01
                            51
                                               0 10.655556
                                                                           1.10 1.00
                        М
                                     ETV
                                          0
                                                                56
                                                                      1.3
                                                                                         186
## 14 14 2007/02/02
                            41
                                     ETV
                                               0
                                                  4.488889
                                                                34
                                                                      1.7
                                                                           1.08 0.69
                                                                                         159
                        М
                                           1
## 15 15 2007/02/08
                        М
                            50
                                     ETV
                                          1
                                               1
                                                  5.869444
                                                               107
                                                                      2.1
                                                                           1.57 1.00
                                                                                          66
## 16 16 2007/02/08
                            51
                                                  4.008333
                                                                      1.3
                                                                           1.15 0.92
                                                                                         118
                        М
                                     ETV
                                           1
                                               0
                                                                40
## 17 17 2007/02/09
                        F
                            62
                                     TDF
                                                  3.513889
                                                                48
                                                                      1.0
                                                                           1.02 0.81
                                                                                         105
                                          1
                                               0
## 18 18 2007/02/14
                        F
                            51
                                     ETV
                                          1
                                               0
                                                  2.372222
                                                                61
                                                                      2.1
                                                                           1.43 0.60
                                                                                          55
##
  19 19 2007/02/15
                        Μ
                            48
                                     TDF
                                          0
                                               0 10.677778
                                                                34
                                                                      1.1
                                                                           1.10 1.00
                                                                                          NA
## 20 20 2007/02/15
                        F
                            50
                                                                                         163
                                     ETV
                                          1
                                                  5.030556
                                                                31
                                                                      0.9
                                                                           1.25 0.63
## 21 21 2007/02/15
                        Μ
                            52
                                     TDF
                                           1
                                               0
                                                  4.725000
                                                                57
                                                                      1.1
                                                                           1.11 0.80
                                                                                          91
## 22 22 2007/02/16
                            30
                        М
                                     ETV
                                          0
                                               0 10.761111
                                                                81
                                                                      1.0
                                                                            0.97 0.99
                                                                                         292
                                               0 10.558333
## 23 23 2007/02/16
                        М
                            29
                                     TDF
                                          0
                                                                35
                                                                      1.9
                                                                           1.03 0.91
                                                                                         204
##
   24 24 2007/02/20
                        М
                            43
                                     ETV
                                          1
                                                  3.994444
                                                                84
                                                                      1.1
                                                                           1.07 0.89
                                                                                         181
##
      b_alb m6_alt m6_bil m6_inr m6_cr m6_plt m6_alb m12_alt
                                                                    m12_bil m12_inr
##
                  35
                               1.05
                                                96
                                                       3.6
                                                                 37
                                                                         1.2
  1
         3.8
                         1.0
                                       0.9
                                                                                    NA
## 2
         3.8
                  16
                         1.1
                               0.97
                                       0.7
                                               194
                                                       3.8
                                                                 18
                                                                         1.1
                                                                                 0.96
## 3
         3.9
                 108
                               1.03
                                       0.9
                                               120
                                                       4.3
                                                                 27
                                                                         1.5
                                                                                 1.02
                         1.8
## 4
         4.2
                  24
                         1.7
                               1.11
                                       0.9
                                               149
                                                       4.2
                                                                 29
                                                                         1.2
                                                                                 0.98
## 5
         4.2
                  57
                         0.9
                               1.10
                                       1.0
                                               145
                                                       4.6
                                                                 35
                                                                         1.2
                                                                                 1.05
## 6
                         0.8
                               0.97
                                       1.4
                                                       3.4
                                                                         0.6
         3.4
                  26
                                                NA
                                                                 17
                                                                                 0.91
                                                       3.9
## 7
         NA
                  51
                         1.0
                               1.05
                                       0.8
                                               128
                                                                 42
                                                                         0.7
                                                                                 1.04
## 8
         3.5
                  24
                               1.04
                                               184
                                                       3.7
                                                                         0.9
                         1.4
                                       0.8
                                                                 16
                                                                                 1.06
## 9
         3.9
                  25
                         1.3
                               1.02
                                       0.8
                                               163
                                                       4.2
                                                                 24
                                                                         0.9
                                                                                 1.04
## 10
         3.2
                  30
                         1.4
                               1.00
                                       1.0
                                               158
                                                       3.8
                                                                 34
                                                                         1.3
                                                                                 1.03
## 11
         4.1
                  23
                         1.1
                               0.98
                                       1.0
                                               171
                                                       4.4
                                                                 19
                                                                         0.9
                                                                                 0.94
## 12
         2.8
                        0.9
                               0.96
                                               215
                                                       3.3
                                                                 24
                                                                         0.8
                  34
                                       0.8
                                                                                 0.95
## 13
         4.2
                  18
                         1.3
                                  NA
                                       1.1
                                                NA
                                                       4.2
                                                                 17
                                                                         1.4
                                                                                 1.01
##
  14
         NA
                  23
                         1.6
                               0.97
                                       0.9
                                               164
                                                       3.7
                                                                 19
                                                                         1.2
                                                                                 0.97
## 15
                  42
                                                80
                                                       3.7
                                                                 36
                                                                                 1.09
         2.1
                         1.0
                               1.15
                                       1.0
                                                                         1.1
##
   16
         3.4
                  33
                               1.09
                                       1.0
                                               129
                                                       4.0
                                                                 30
                                                                         1.1
                                                                                 0.98
                         1.1
                               1.03
##
  17
         4.0
                  28
                        0.9
                                       0.7
                                               121
                                                       3.9
                                                                 31
                                                                         0.9
                                                                                 1.06
## 18
                  25
                         1.2
                               1.21
                                       0.7
                                                67
                                                       3.5
                                                                 24
                                                                         0.7
         2.7
                                                                                 1.15
## 19
         4.3
                  13
                        0.8
                                 NA
                                       1.1
                                                NA
                                                       4.3
                                                                 13
                                                                         1.1
                                                                                 1.02
## 20
         3.1
                  29
                         1.3
                               1.19
                                       0.7
                                                40
                                                       3.3
                                                                 31
                                                                         1.4
                                                                                 1.17
## 21
         4.1
                  39
                         1.3
                               1.11
                                       0.8
                                                74
                                                       4.0
                                                                 34
                                                                         1.3
                                                                                 1.04
## 22
                               0.93
                                       0.9
                                                                                 0.93
         4.1
                  50
                         1.0
                                               264
                                                       4.4
                                                                 63
                                                                         0.8
```

NA

4.1

28

1.3

0.93

1.00

0.9

2.3

23

4.4

26

##	24	4.2	63	0.8	1.02	0.9	144	4.5	52	0.9	1.02
##		${\tt m12_cr}$	$m12_plt$	m12_a	Lb						
##	1	1.0	111	4.	. 0						
##	2	0.6	239	4.	. 0						
##	3	0.9	120	4.	2						
##	4	0.8	185	4.	. 1						
##	5	1.0	141	4.	. 5						
##	6	1.9	179	3.	. 0						
##	7	NA	NA	3.	. 9						
##	8	0.7	138	3.	4						
##	9	0.7	148	3.	. 9						
	10	1.0	151	3.	.7						
##	11	1.1	NA	4.	. 3						
##	12	0.8	272	3.	4						
##	13	1.1	143	4.	. 3						
##	14	0.8	175	3.	. 8						
##	15	1.1	103	4.	2						
##	16	NA	NA	4.	. 1						
##	17	NA	NA	3.	. 9						
##	18	0.6	61	3.							
##	19	1.1	143	4.	. 2						
##	20	0.7	36	3.	. 4						
##	21	0.8	64	3.							
##	22	1.0	286	4.	. 5						
##	23	0.9	113	4.	. 0						
##	24	1.0	136	4.	.3						

여러 개도 가능

```
dat1 %>%
  rename(emr_id = id, baseline_date = index_date, sex = gender) %>%
  colnames()
```

```
## [1] "emr_id"
                     "baseline_date" "sex"
                                                  "age"
## [5] "treat_gr"
                     "lc"
                                   "hcc"
                                                  "hcc_yr"
                     "b_bil"
## [9] "b_alt"
                                   "b_inr"
                                                  "b_cr"
## [13] "b_plt"
                     "b_alb"
                                   "m6_alt"
                                                  "m6_bil"
## [17] "m6_inr"
                     "m6_cr"
                                   "m6_plt"
                                                  "m6_alb"
## [21] "m12_alt"
                     "m12_bil"
                                   "m12_inr"
                                                  "m12_cr"
## [25] "m12_plt"
                     "m12_alb"
```

변수의 순서 변경

```
dat1 %>%
  select(treat_gr, hcc, id, everything()) %>%
  colnames()
```

```
"id"
                                          "index_date" "gender"
## [1] "treat_gr"
                   "hcc"
## [6] "age"
                   "lc"
                              "hcc_yr"
                                          "b_alt"
                                                      "b_bil"
## [11] "b_inr"
                  "b_cr"
                              "b_plt"
                                          "b_alb"
                                                      "m6_alt"
                  "m6_inr"
                              "m6_cr"
                                                      "m6_alb"
## [16] "m6_bil"
                                          "m6_plt"
## [21] "m12_alt" "m12_bil"
                                          "m12_cr"
                              "m12_inr"
                                                      "m12_plt"
## [26] "m12_alb"
```

동시에 기능 사용하기

어떤 코드가 더 가독성이 좋은지 생각해보기 3가지 방법의 결과는 같음

```
dat1 %>%
  select(id, gender, contains('m12')) %>%
  rename(sex = gender) %>%
  select(sex, everything())
```

```
##
      sex id m12_alt m12_bil m12_inr m12_cr m12_plt m12_alb
## 1
        M 1
                  37
                          1.2
                                   NA
                                          1.0
                                                  111
                                                           4.0
## 2
        F
           2
                   18
                          1.1
                                 0.96
                                          0.6
                                                  239
                                                           4.0
## 3
        М 3
                   27
                                 1.02
                                          0.9
                                                  120
                                                          4.2
                          1.5
## 4
           4
                   29
                                 0.98
                                          0.8
                                                  185
                                                           4.1
        M
                          1.2
## 5
        М
           5
                   35
                          1.2
                                 1.05
                                          1.0
                                                  141
                                                           4.5
## 6
           6
                   17
                                                  179
        M
                          0.6
                                 0.91
                                          1.9
                                                          3.0
## 7
        M 7
                   42
                                 1.04
                          0.7
                                          NA
                                                   NA
                                                          3.9
## 8
        F 8
                   16
                          0.9
                                 1.06
                                         0.7
                                                  138
                                                          3.4
## 9
        F 9
                   24
                          0.9
                                 1.04
                                          0.7
                                                  148
                                                           3.9
## 10
        M 10
                   34
                          1.3
                                 1.03
                                          1.0
                                                  151
                                                          3.7
                                 0.94
## 11
        M 11
                   19
                          0.9
                                          1.1
                                                   NA
                                                          4.3
## 12
        M 12
                   24
                          0.8
                                 0.95
                                         0.8
                                                  272
                                                          3.4
## 13
        M 13
                   17
                          1.4
                                 1.01
                                          1.1
                                                  143
                                                          4.3
## 14
                   19
                                 0.97
                                         0.8
                                                  175
                                                          3.8
        M 14
                          1.2
## 15
        M 15
                   36
                          1.1
                                 1.09
                                         1.1
                                                  103
                                                          4.2
## 16
        M 16
                   30
                          1.1
                                 0.98
                                          NA
                                                   NA
                                                           4.1
## 17
        F 17
                   31
                          0.9
                                 1.06
                                          NA
                                                   NA
                                                           3.9
## 18
                                          0.6
        F 18
                   24
                          0.7
                                 1.15
                                                   61
                                                          3.5
## 19
        M 19
                   13
                          1.1
                                 1.02
                                          1.1
                                                  143
                                                          4.2
## 20
        F 20
                          1.4
                                 1.17
                                          0.7
                                                   36
                                                          3.4
                   31
## 21
                   34
                                 1.04
                                          0.8
                                                   64
                                                          3.9
        M 21
                          1.3
## 22
        M 22
                   63
                          0.8
                                 0.93
                                          1.0
                                                  286
                                                           4.5
## 23
        M 23
                   28
                          1.3
                                 0.93
                                          0.9
                                                  113
                                                           4.0
## 24
        M 24
                   52
                                                  136
                                                           4.3
                          0.9
                                 1.02
                                          1.0
```

```
dat1 %>%
  select(sex = gender, id, contains('m12'))
```

##		sex	id	${\tt m12_alt}$	${\tt m12_bil}$	${\tt m12_inr}$	${\tt m12_cr}$	$m12_plt$	$m12_alb$
##	1	М	1	37	1.2	NA	1.0	111	4.0
##	2	F	2	18	1.1	0.96	0.6	239	4.0
##	3	М	3	27	1.5	1.02	0.9	120	4.2
##	4	М	4	29	1.2	0.98	0.8	185	4.1
##	5	М	5	35	1.2	1.05	1.0	141	4.5
##	6	М	6	17	0.6	0.91	1.9	179	3.0
##	7	М	7	42	0.7	1.04	NA	NA	3.9
##	8	F	8	16	0.9	1.06	0.7	138	3.4
##	9	F	9	24	0.9	1.04	0.7	148	3.9
##	10	М	10	34	1.3	1.03	1.0	151	3.7
##	11	М	11	19	0.9	0.94	1.1	NA	4.3
##	12	М	12	24	0.8	0.95	0.8	272	3.4
##	13	М	13	17	1.4	1.01	1.1	143	4.3
##	14	М	14	19	1.2	0.97	0.8	175	3.8
##	15	М	15	36	1.1	1.09	1.1	103	4.2
##	16	М	16	30	1.1	0.98	NA	NA	4.1
##	17	F	17	31	0.9	1.06	NA	NA	3.9
##	18	F	18	24	0.7	1.15	0.6	61	3.5
##	19	М	19	13	1.1	1.02	1.1	143	4.2
##	20	F	20	31	1.4	1.17	0.7	36	3.4
##	21	М	21	34	1.3	1.04	0.8	64	3.9
##	22	М	22	63	0.8	0.93	1.0	286	4.5
##	23	М	23	28	1.3	0.93	0.9	113	4.0
##	24	М	24	52	0.9	1.02	1.0	136	4.3

```
dat1 %>%
  select(sex = gender,
        id,
        contains('m12'))
```

##		sex	id	$m12_alt$	${\tt m12_bil}$	m12_inr	${\tt m12_cr}$	m12_plt	m12_alb
##	1	M	1	37	1.2	NA	1.0	111	4.0
##	2	F	2	18	1.1	0.96	0.6	239	4.0
##	3	M	3	27	1.5	1.02	0.9	120	4.2
##	4	M	4	29	1.2	0.98	0.8	185	4.1
##	5	M	5	35	1.2	1.05	1.0	141	4.5
##	6	M	6	17	0.6	0.91	1.9	179	3.0
##	7	M	7	42	0.7	1.04	NA	NA	3.9
##	8	F	8	16	0.9	1.06	0.7	138	3.4
##	9	F	9	24	0.9	1.04	0.7	148	3.9
##	10	M	10	34	1.3	1.03	1.0	151	3.7
##	11	M	11	19	0.9	0.94	1.1	NA	4.3
##	12	M	12	24	0.8	0.95	0.8	272	3.4
##	13	M	13	17	1.4	1.01	1.1	143	4.3
##	14	M	14	19	1.2	0.97	0.8	175	3.8
##	15	M	15	36	1.1	1.09	1.1	103	4.2
##	16	M	16	30	1.1	0.98	NA	NA	4.1
##	17	F	17	31	0.9	1.06	NA	NA	3.9
##	18	F	18	24	0.7	1.15	0.6	61	3.5
##	19	M	19	13	1.1	1.02	1.1	143	4.2
##	20	F	20	31	1.4	1.17	0.7	36	3.4
##	21	M	21	34	1.3	1.04	0.8	64	3.9
##	22	M	22	63	0.8	0.93	1.0	286	4.5
##	23	M	23	28	1.3	0.93	0.9	113	4.0
##	24	М	24	52	0.9	1.02	1.0	136	4.3

흔히 범하는 오류

4번째에서 7번째까지 변수 제외를 원함

첫 번째에서 7번째까지 선택됨 아래와 같이 코드를 짜야 원하는 결과를 얻음

```
dat1 %>%
  select(-c(4:7)) %>%
  colnames()
```

```
"index_date" "gender"
## [1] "id"
                                                 "b_alt"
                                       "hcc_yr"
## [6] "b_bil"
               "b_inr" "b_cr"
                                       "b_plt"
                                                  "b_alb"
## [11] "m6_alt"
## [16] "m6_alb"
                                       "m6_cr"
                 "m6 bil"
                            "m6_inr"
                                                  "m6_plt"
                 "m12_inr"
                                                 "m12_cr"
## [21] "m12_plt" "m12_alb"
```

3. Filter

13 13 2007/02/01

14 14 2007/02/02

15 15 2007/02/08

16 16 2007/02/08

17 17 2007/02/09

18 18 2007/02/14

19 19 2007/02/15

20

1

2

##

163

1.0

0.6

3.1

m12_cr m12_plt m12_alb

111

239

29

1.3

4.0

4.0

1.19

특정 조건을 만족하는 환자(row) 선택하기

M 51

M 41

M 50

M 51

F 62

F

M 48

51

```
dat1 %>%
 filter(id<=20)
##
      id index_date gender age treat_gr lc hcc
                                                      hcc_yr b_alt b_bil b_inr b_cr
## 1
       1 2007/01/05
                           М
                              54
                                       ETV
                                            1
                                                    7.641667
                                                                 67
                                                                      1.2 1.17 1.00
## 2
       2 2007/01/10
                           F
                              45
                                       ETV
                                            0
                                                0
                                                    9.763889
                                                                 32
                                                                           0.90 0.60
                                                                      1.1
## 3
       3 2007/01/11
                           М
                              49
                                       TDF
                                            1
                                                0 10.594444
                                                                106
                                                                      1.8
                                                                           1.03 1.05
                              26
                                      ETV
                                                                159
                                                                      1.4
## 4
       4 2007/01/12
                          М
                                            0
                                                0
                                                    6.016667
                                                                           1.04 0.93
## 5
       5 2007/01/18
                              50
                                       TDF
                                                    2.355556
                                                                 94
                                                                      0.8
                                                                           1.12 0.90
                           Μ
                                            1
## 6
       6 2007/01/18
                              33
                                      ETV
                                                   6.069444
                                                                      0.7
                                                                           0.88 1.20
                           Μ
                                            1
                                                                 32
                                                0
##
  7
       7 2007/01/26
                           М
                              49
                                       TDF
                                            1
                                                    8.069444
                                                                104
                                                                      1.1
                                                                           1.10 0.91
## 8
       8 2007/01/31
                           F
                              50
                                      TDF
                                            0
                                                0 10.716667
                                                                143
                                                                      1.5
                                                                           1.10 0.70
       9 2007/01/31
                          F
                              49
                                                    2.163889
                                                                 31
                                                                      1.3
                                                                              NA 0.73
                                      ETV
                                            1
## 10 10 2007/02/01
                          Μ
                              50
                                      ETV
                                            0
                                                0 10.766667
                                                                239
                                                                      1.3
                                                                          1.03 1.20
## 11 11 2007/02/01
                          Μ
                              32
                                                    3.713889
                                                                      0.9
                                                                           0.97 1.10
                                      ETV
                                            0
                                                                359
## 12 12 2007/02/01
                          Μ
                              48
                                      TDF
                                                1
                                                   3.269444
                                                                486
                                                                      0.7
                                                                           1.02 0.81
                                            0
```

ETV

ETV

ETV

ETV

TDF

ETV

TDF 0

0

1

1

1

1

1

0

1

0

0

0 10.655556

4.488889

5.869444

4.008333

3.513889

2.372222

0 10.677778

56

34

107

40

48

61

34

1.3 1.10 1.00

1.3 1.15 0.92

1.08 0.69

1.57 1.00

1.02 0.81

1.43 0.60

1.10 1.00

1.7

2.1

1.0

2.1

1.1

F ## 20 20 2007/02/15 50 ETV 1 0 5.030556 31 0.9 1.25 0.63 ## b_plt b_alb m6_alt m6_bil m6_inr m6_cr m6_plt m6_alb m12_alt m12_bil m12_inr ## 1 35 1.0 1.05 0.9 96 3.6 37 1.2 110 3.8 NA ## 2 187 3.8 16 1.1 0.97 0.7 194 3.8 18 1.1 0.96 ## 3 133 3.9 108 1.8 1.03 0.9 120 4.3 27 1.5 1.02 ## 4 164 4.2 24 1.7 1.11 0.9 149 4.2 29 1.2 0.98 ## 5 153 4.2 57 0.9 1.10 1.0 145 4.6 35 1.2 1.05 ## 6 26 0.97 1.4 3.4 0.6 0.91 170 3.4 0.8 NA 17 ## 7 3.9 0.7 162 NA 51 1.0 1.05 0.8 128 42 1.04 ## 8 165 24 1.04 184 3.7 16 0.9 1.06 3.5 1.4 0.8 ## 9 157 3.9 25 1.3 1.02 0.8 163 4.2 24 0.9 1.04 ## 10 166 3.2 30 1.4 1.00 1.0 158 3.8 34 1.3 1.03 ## 11 202 4.1 23 1.1 0.98 1.0 171 4.4 19 0.9 0.94 ## 12 2.8 0.9 0.96 215 3.3 24 0.8 0.95 159 34 0.8 ## 13 186 4.2 18 1.3 NA1.1 NA 4.2 17 1.4 1.01 ## 14 159 NA23 1.6 0.97 0.9 164 3.7 19 1.2 0.97 ## 15 42 1.15 80 3.7 36 1.1 1.09 66 2.1 1.0 1.0 ## 16 118 3.4 33 1.1 1.09 1.0 129 4.0 30 1.1 0.98 ## 17 1.03 105 4.0 28 0.9 0.7 121 3.9 31 0.9 1.06 ## 18 55 2.7 25 1.2 1.21 0.7 67 3.5 24 0.7 1.15 ## 19 0.8 1.1 NA4.3 13 NA1.1 NA 4.3 13 1.02

0.7

40

3.3

31

1.4

1.17

##	3	0.9	120	4.2
##	4	0.8	185	4.1
##	5	1.0	141	4.5
##	6	1.9	179	3.0
##	7	NA	NA	3.9
##	8	0.7	138	3.4
##	9	0.7	148	3.9
##	10	1.0	151	3.7
##	11	1.1	NA	4.3
##	12	0.8	272	3.4
##	13	1.1	143	4.3
##	14	0.8	175	3.8
##	15	1.1	103	4.2
##	16	NA	NA	4.1
##	17	NA	NA	3.9
##	18	0.6	61	3.5
##	19	1.1	143	4.2
##	20	0.7	36	3.4

select기능도 같이 사용해보기

```
dat1 %>%
  filter(id<=20) %>%
  select(id, starts_with('b_'))
```

```
##
      id b_alt b_bil b_inr b_cr b_plt b_alb
## 1
            67
                 1.2 1.17 1.00
                                  110
## 2
            32
                 1.1 0.90 0.60
       2
                                  187
                                        3.8
## 3
       3
           106
                 1.8 1.03 1.05
                                  133
                                        3.9
## 4
       4
                 1.4 1.04 0.93
                                        4.2
           159
                                  164
## 5
       5
           94
                 0.8 1.12 0.90
                                  153
                                        4.2
## 6
           32
                 0.7 0.88 1.20
                                  170
                                        3.4
       6
## 7
       7
           104
                 1.1 1.10 0.91
                                  162
                                        NA
## 8
           143
                 1.5 1.10 0.70
                                  165
                                        3.5
       8
## 9
       9
            31
                 1.3
                        NA 0.73
                                  157
                                        3.9
## 10 10
           239
                 1.3 1.03 1.20
                                        3.2
                                  166
## 11 11
           359
                 0.9 0.97 1.10
                                  202
                                        4.1
## 12 12
           486
                 0.7 1.02 0.81
                                        2.8
                                  159
## 13 13
           56
                 1.3 1.10 1.00
                                  186
                                        4.2
## 14 14
            34
                 1.7 1.08 0.69
                                  159
                                         NA
## 15 15
           107
                 2.1 1.57 1.00
                                        2.1
                                   66
                 1.3 1.15 0.92
## 16 16
            40
                                  118
                                        3.4
## 17 17
                 1.0 1.02 0.81
                                        4.0
            48
                                  105
## 18 18
            61
                 2.1 1.43 0.60
                                   55
                                        2.7
                 1.1 1.10 1.00
## 19 19
            34
                                   NA
                                        4.3
## 20 20
            31
                 0.9 1.25 0.63
                                  163
                                        3.1
```

```
dat1 %>%
  filter(gender =='M')
```

```
##
      id index_date gender age treat_gr lc hcc
                                                       hcc_yr b_alt b_bil b_inr b_cr
## 1
       1 2007/01/05
                               54
                                                                        1.2 1.17 1.00
                           М
                                        ETV
                                             1
                                                     7.641667
                                                                   67
       3 2007/01/11
## 2
                           М
                               49
                                        TDF
                                             1
                                                  0 10.594444
                                                                  106
                                                                        1.8 1.03 1.05
## 3
       4 2007/01/12
                           Μ
                               26
                                        ETV
                                             0
                                                  0
                                                     6.016667
                                                                  159
                                                                        1.4
                                                                             1.04 0.93
##
   4
       5 2007/01/18
                           М
                               50
                                        TDF
                                             1
                                                  0
                                                     2.355556
                                                                   94
                                                                        0.8
                                                                              1.12 0.90
## 5
                               33
                                                     6.069444
                                                                   32
       6 2007/01/18
                           Μ
                                        ETV
                                             1
                                                                        0.7
                                                                              0.88 1.20
## 6
       7 2007/01/26
                           Μ
                               49
                                        TDF
                                                     8.069444
                                                                              1.10 0.91
                                             1
                                                  1
                                                                  104
                                                                        1.1
## 7
      10 2007/02/01
                           М
                               50
                                        ETV
                                             0
                                                  0 10.766667
                                                                  239
                                                                        1.3
                                                                              1.03 1.20
                               32
## 8
      11 2007/02/01
                           М
                                        ETV
                                             0
                                                  0
                                                     3.713889
                                                                  359
                                                                        0.9
                                                                              0.97 1.10
      12 2007/02/01
                               48
                                        TDF
                                                     3.269444
                                                                  486
                                                                        0.7
                                                                              1.02 0.81
                           Μ
## 10 13 2007/02/01
                                        ETV
                                                  0 10.655556
                                                                        1.3
                                                                             1.10 1.00
                           М
                               51
                                             0
                                                                   56
## 11 14 2007/02/02
                           М
                               41
                                        ETV
                                             1
                                                     4.488889
                                                                   34
                                                                        1.7
                                                                              1.08 0.69
## 12 15 2007/02/08
                           Μ
                               50
                                        ETV
                                                     5.869444
                                                                  107
                                                                        2.1 1.57 1.00
                                             1
                                                  1
## 13 16 2007/02/08
                               51
                                                     4.008333
                                                                   40
                                                                        1.3
                                                                             1.15 0.92
                           М
                                        ETV
                                             1
## 14 19 2007/02/15
                           М
                               48
                                        TDF
                                             0
                                                  0 10.677778
                                                                   34
                                                                        1.1 1.10 1.00
## 15 21 2007/02/15
                           М
                               52
                                                     4.725000
                                                                              1.11 0.80
                                        TDF
                                             1
                                                  0
                                                                   57
                                                                        1.1
## 16 22 2007/02/16
                           М
                               30
                                        ETV
                                             0
                                                  0 10.761111
                                                                   81
                                                                        1.0
                                                                             0.97 0.99
## 17 23 2007/02/16
                           М
                               29
                                        TDF
                                             0
                                                  0 10.558333
                                                                   35
                                                                        1.9
                                                                             1.03 0.91
   18 24 2007/02/20
                           М
                                        ETV
                                                     3.994444
                                                                             1.07 0.89
##
                               43
                                             1
                                                  0
                                                                   84
                                                                        1.1
##
      b_plt b_alb m6_alt m6_bil m6_inr m6_cr m6_plt m6_alb m12_alt m12_bil m12_inr
## 1
                        35
                               1.0
                                      1.05
                                             0.9
                                                      96
                                                             3.6
                                                                       37
                                                                               1.2
                                                                                         NA
        110
               3.8
## 2
        133
               3.9
                       108
                               1.8
                                      1.03
                                             0.9
                                                     120
                                                             4.3
                                                                       27
                                                                               1.5
                                                                                       1.02
## 3
                                                             4.2
                                                                       29
                                                                               1.2
                                                                                       0.98
        164
               4.2
                        24
                               1.7
                                      1.11
                                             0.9
                                                     149
## 4
        153
                        57
                               0.9
                                      1.10
                                             1.0
                                                     145
                                                             4.6
                                                                       35
                                                                               1.2
                                                                                       1.05
               4.2
## 5
        170
               3.4
                        26
                               0.8
                                      0.97
                                             1.4
                                                      NA
                                                             3.4
                                                                       17
                                                                               0.6
                                                                                       0.91
## 6
        162
                NA
                        51
                               1.0
                                      1.05
                                             0.8
                                                     128
                                                             3.9
                                                                       42
                                                                               0.7
                                                                                       1.04
##
   7
        166
               3.2
                        30
                                      1.00
                                             1.0
                                                     158
                                                             3.8
                                                                       34
                                                                               1.3
                                                                                       1.03
                               1.4
## 8
        202
               4.1
                        23
                               1.1
                                      0.98
                                             1.0
                                                     171
                                                             4.4
                                                                       19
                                                                               0.9
                                                                                       0.94
## 9
        159
               2.8
                        34
                               0.9
                                      0.96
                                             0.8
                                                     215
                                                             3.3
                                                                       24
                                                                               0.8
                                                                                       0.95
## 10
               4.2
                               1.3
                                        NA
                                             1.1
                                                      NA
                                                             4.2
                                                                       17
                                                                               1.4
                                                                                       1.01
        186
                        18
## 11
        159
                NA
                        23
                               1.6
                                      0.97
                                             0.9
                                                     164
                                                             3.7
                                                                       19
                                                                               1.2
                                                                                       0.97
## 12
                        42
                               1.0
                                      1.15
                                             1.0
                                                      80
                                                                       36
                                                                               1.1
                                                                                       1.09
         66
               2.1
                                                             3.7
## 13
                                      1.09
                                                     129
                                                                                       0.98
        118
               3.4
                        33
                               1.1
                                             1.0
                                                             4.0
                                                                       30
                                                                               1.1
## 14
                                        NA
                                                      NA
                                                             4.3
                                                                               1.1
                                                                                       1.02
         NA
               4.3
                        13
                               0.8
                                             1.1
                                                                       13
## 15
         91
               4.1
                        39
                               1.3
                                      1.11
                                             0.8
                                                      74
                                                             4.0
                                                                       34
                                                                               1.3
                                                                                       1.04
## 16
        292
               4.1
                        50
                               1.0
                                      0.93
                                             0.9
                                                     264
                                                             4.4
                                                                       63
                                                                               0.8
                                                                                       0.93
## 17
        204
               4.4
                        26
                               2.3
                                      1.00
                                             0.9
                                                      NA
                                                             4.1
                                                                       28
                                                                               1.3
                                                                                       0.93
## 18
        181
               4.2
                        63
                               0.8
                                      1.02
                                             0.9
                                                     144
                                                                       52
                                                                               0.9
                                                                                       1.02
                                                             4.5
##
      m12_cr m12_plt m12_alb
## 1
          1.0
                   111
                            4.0
## 2
          0.9
                   120
                           4.2
## 3
          0.8
                   185
                           4.1
                           4.5
## 4
          1.0
                   141
## 5
          1.9
                   179
                           3.0
## 6
                           3.9
          NA
                   NA
## 7
          1.0
                   151
                           3.7
## 8
          1.1
                   NA
                           4.3
## 9
          0.8
                   272
                           3.4
## 10
                            4.3
          1.1
                   143
```

##	11	0.8	175	3.8
##	12	1.1	103	4.2
##	13	NA	NA	4.1
##	14	1.1	143	4.2
##	15	0.8	64	3.9
##	16	1.0	286	4.5
##	17	0.9	113	4.0
##	18	1.0	136	4.3

복합조건 사용하기

50세 이상의 남자 환자 선택

```
dat1 %>%
  filter(age>=50, gender=='M')
```

```
id index_date gender age treat_gr lc hcc
                                                 hcc_yr b_alt b_bil b_inr b_cr
## 1 1 2007/01/05
                        M 54
                                   ETV 1
                                            1 7.641667
                                                           67
                                                                1.2 1.17 1.00
## 2 5 2007/01/18
                        M 50
                                   TDF 1
                                            0 2.355556
                                                                0.8 1.12 0.90
                                                           94
## 3 10 2007/02/01
                        M 50
                                   ETV 0
                                            0 10.766667
                                                                1.3 1.03 1.20
                                                          239
## 4 13 2007/02/01
                        M 51
                                   ETV 0
                                            0 10.655556
                                                                1.3 1.10 1.00
                                                           56
## 5 15 2007/02/08
                        M 50
                                   ETV
                                            1 5.869444
                                                                2.1 1.57 1.00
                                       1
                                                          107
                                            0 4.008333
## 6 16 2007/02/08
                        M 51
                                   ETV
                                       1
                                                           40
                                                                1.3 1.15 0.92
## 7 21 2007/02/15
                                   TDF 1
                                            0 4.725000
                                                           57
                                                                1.1 1.11 0.80
                        M 52
     b_plt b_alb m6_alt m6_bil m6_inr m6_cr m6_plt m6_alb m12_alt m12_bil m12_inr
                                                      3.6
## 1
       110
            3.8
                     35
                           1.0
                                 1.05
                                        0.9
                                                96
                                                               37
                                                                      1.2
                                                                               NA
## 2
       153
            4.2
                     57
                           0.9
                                 1.10
                                        1.0
                                                      4.6
                                                               35
                                                                      1.2
                                                                             1.05
                                               145
## 3
       166
             3.2
                     30
                           1.4
                                 1.00
                                        1.0
                                                      3.8
                                                               34
                                                                      1.3
                                                                             1.03
                                               158
## 4
       186
             4.2
                     18
                           1.3
                                   NA
                                        1.1
                                                NA
                                                      4.2
                                                               17
                                                                      1.4
                                                                             1.01
## 5
       66
             2.1
                     42
                           1.0
                                 1.15
                                        1.0
                                                80
                                                      3.7
                                                               36
                                                                      1.1
                                                                             1.09
## 6
       118
             3.4
                     33
                           1.1
                                 1.09
                                        1.0
                                               129
                                                      4.0
                                                               30
                                                                      1.1
                                                                             0.98
## 7
       91
             4.1
                     39
                           1.3
                                 1.11
                                        0.8
                                               74
                                                      4.0
                                                               34
                                                                      1.3
                                                                             1.04
##
    m12_cr m12_plt m12_alb
        1.0
## 1
                111
                        4.0
## 2
        1.0
                141
                        4.5
## 3
        1.0
                151
                        3.7
## 4
        1.1
                143
                        4.3
## 5
                103
                        4.2
        1.1
## 6
                        4.1
        NA
                NA
## 7
        0.8
                 64
                        3.9
```

dat1 %>% filter(age >=30 & age<=60)</pre>

```
##
      id index_date gender age treat_gr lc hcc
                                                        hcc_yr b_alt b_bil b_inr b_cr
## 1
       1 2007/01/05
                               54
                                                                             1.17 1.00
                           М
                                        ETV
                                                     7.641667
                                                                   67
                                                                         1.2
## 2
       2 2007/01/10
                            F
                               45
                                        ETV
                                             0
                                                  0
                                                     9.763889
                                                                   32
                                                                         1.1
                                                                              0.90 0.60
## 3
       3 2007/01/11
                            Μ
                               49
                                        TDF
                                             1
                                                  0 10.594444
                                                                  106
                                                                         1.8
                                                                              1.03 1.05
##
   4
       5 2007/01/18
                           М
                               50
                                        TDF
                                             1
                                                  0
                                                     2.355556
                                                                   94
                                                                         0.8
                                                                              1.12 0.90
                                                                   32
## 5
       6 2007/01/18
                           Μ
                               33
                                        ETV
                                             1
                                                     6.069444
                                                                         0.7
                                                                              0.88 1.20
       7 2007/01/26
                           Μ
                               49
                                        TDF
                                                     8.069444
                                                                              1.10 0.91
## 6
                                              1
                                                  1
                                                                  104
                                                                         1.1
## 7
       8 2007/01/31
                           F
                               50
                                        TDF
                                             0
                                                  0 10.716667
                                                                  143
                                                                         1.5
                                                                              1.10 0.70
                           F
                               49
                                                                                NA 0.73
## 8
       9 2007/01/31
                                        ETV
                                             1
                                                  0
                                                     2.163889
                                                                   31
                                                                         1.3
      10 2007/02/01
                           М
                               50
                                        ETV
                                                  0 10.766667
                                                                  239
                                                                         1.3
                                                                              1.03 1.20
## 10 11 2007/02/01
                               32
                                        ETV
                                                     3.713889
                                                                  359
                                                                         0.9
                                                                              0.97 1.10
                           М
                                             0
                                                  0
## 11 12 2007/02/01
                           М
                               48
                                        TDF
                                             0
                                                     3.269444
                                                                  486
                                                                         0.7
                                                                              1.02 0.81
## 12 13 2007/02/01
                           Μ
                               51
                                        ETV
                                             0
                                                  0 10.655556
                                                                   56
                                                                         1.3
                                                                             1.10 1.00
## 13 14 2007/02/02
                               41
                                                     4.488889
                                                                              1.08 0.69
                           М
                                        ETV
                                              1
                                                                   34
                                                                         1.7
                                                                         2.1 1.57 1.00
## 14 15 2007/02/08
                           М
                               50
                                        ETV
                                                  1
                                                     5.869444
                                                                  107
                                              1
## 15 16 2007/02/08
                           М
                                                     4.008333
                                                                         1.3
                                                                              1.15 0.92
                               51
                                        ETV
                                             1
                                                  \cap
                                                                   40
## 16 18 2007/02/14
                           F
                               51
                                                  Λ
                                                     2.372222
                                                                         2.1
                                                                             1.43 0.60
                                        ETV
                                             1
                                                                   61
## 17 19 2007/02/15
                           М
                               48
                                        TDF
                                             0
                                                  0 10.677778
                                                                   34
                                                                         1.1
                                                                              1.10 1.00
## 18 20 2007/02/15
                            F
                                                     5.030556
                                                                              1.25 0.63
                               50
                                        ETV
                                             1
                                                  0
                                                                   31
                                                                         0.9
  19 21 2007/02/15
                            Μ
                               52
                                        TDF
                                             1
                                                  0
                                                     4.725000
                                                                   57
                                                                         1.1
                                                                              1.11 0.80
## 20 22 2007/02/16
                            M
                               30
                                        ETV
                                             0
                                                  0 10.761111
                                                                   81
                                                                         1.0 0.97 0.99
## 21 24 2007/02/20
                            Μ
                               43
                                        ETV
                                             1
                                                  0
                                                     3.994444
                                                                   84
                                                                         1.1 1.07 0.89
      b_plt b_alb m6_alt m6_bil m6_inr m6_cr m6_plt m6_alb m12_alt m12_bil m12_inr
##
## 1
                        35
                                      1.05
                                              0.9
                                                       96
                                                             3.6
                                                                       37
                                                                               1.2
                                                                                          NA
         110
               3.8
                               1.0
## 2
         187
               3.8
                        16
                               1.1
                                      0.97
                                              0.7
                                                      194
                                                             3.8
                                                                        18
                                                                               1.1
                                                                                       0.96
## 3
         133
               3.9
                       108
                               1.8
                                      1.03
                                              0.9
                                                      120
                                                             4.3
                                                                       27
                                                                               1.5
                                                                                       1.02
## 4
         153
                        57
                               0.9
                                      1.10
                                              1.0
                                                      145
                                                             4.6
                                                                        35
                                                                               1.2
                                                                                       1.05
               4.2
## 5
         170
               3.4
                        26
                               0.8
                                      0.97
                                              1.4
                                                       NA
                                                             3.4
                                                                       17
                                                                               0.6
                                                                                       0.91
## 6
         162
                        51
                               1.0
                                      1.05
                                              0.8
                                                      128
                                                             3.9
                                                                       42
                                                                               0.7
                                                                                       1.04
                NA
## 7
         165
                        24
                               1.4
                                      1.04
                                              0.8
                                                      184
                                                             3.7
                                                                       16
                                                                               0.9
                                                                                       1.06
               3.5
## 8
         157
               3.9
                        25
                               1.3
                                      1.02
                                              0.8
                                                      163
                                                             4.2
                                                                       24
                                                                               0.9
                                                                                       1.04
## 9
         166
                        30
                                      1.00
                                              1.0
                                                      158
                                                             3.8
                                                                               1.3
                                                                                       1.03
               3.2
                               1.4
                                                                       34
                                      0.98
## 10
         202
               4.1
                        23
                               1.1
                                              1.0
                                                      171
                                                             4.4
                                                                       19
                                                                               0.9
                                                                                       0.94
## 11
         159
               2.8
                               0.9
                                      0.96
                                                      215
                                                             3.3
                                                                       24
                                                                               0.8
                                                                                       0.95
                        34
                                              0.8
## 12
         186
               4.2
                        18
                               1.3
                                        NA
                                              1.1
                                                       NA
                                                             4.2
                                                                       17
                                                                               1.4
                                                                                       1.01
## 13
         159
                NA
                        23
                               1.6
                                      0.97
                                              0.9
                                                      164
                                                             3.7
                                                                       19
                                                                               1.2
                                                                                       0.97
## 14
          66
               2.1
                        42
                               1.0
                                      1.15
                                              1.0
                                                       80
                                                             3.7
                                                                       36
                                                                               1.1
                                                                                       1.09
## 15
                        33
                                      1.09
                                              1.0
                                                      129
                                                             4.0
                                                                       30
                                                                               1.1
                                                                                       0.98
         118
               3.4
                               1.1
## 16
          55
               2.7
                        25
                               1.2
                                      1.21
                                              0.7
                                                       67
                                                             3.5
                                                                       24
                                                                               0.7
                                                                                       1.15
## 17
          NA
               4.3
                        13
                               0.8
                                        NA
                                              1.1
                                                       NA
                                                             4.3
                                                                        13
                                                                               1.1
                                                                                       1.02
                                                                       31
## 18
                        29
                               1.3
                                              0.7
                                                       40
                                                             3.3
                                                                                       1.17
         163
               3.1
                                      1.19
                                                                               1.4
##
  19
          91
               4.1
                        39
                               1.3
                                      1.11
                                              0.8
                                                       74
                                                             4.0
                                                                       34
                                                                               1.3
                                                                                       1.04
         292
                        50
                               1.0
##
  20
               4.1
                                      0.93
                                              0.9
                                                      264
                                                             4.4
                                                                       63
                                                                               0.8
                                                                                       0.93
## 21
               4.2
                        63
                               0.8
                                      1.02
                                              0.9
                                                      144
                                                             4.5
                                                                       52
                                                                               0.9
                                                                                       1.02
         181
##
      m12_cr m12_plt m12_alb
## 1
          1.0
                   111
                            4.0
                   239
## 2
          0.6
                            4.0
## 3
          0.9
                   120
                            4.2
## 4
          1.0
                   141
                            4.5
```

##	5	1.9	179	3.0
##	6	NA	NA	3.9
##	7	0.7	138	3.4
##	8	0.7	148	3.9
##	9	1.0	151	3.7
##	10	1.1	NA	4.3
##	11	0.8	272	3.4
##	12	1.1	143	4.3
##	13	0.8	175	3.8
##	14	1.1	103	4.2
##	15	NA	NA	4.1
##	16	0.6	61	3.5
##	17	1.1	143	4.2
##	18	0.7	36	3.4
##	19	0.8	64	3.9
##	20	1.0	286	4.5
##	21	1.0	136	4.3

dat1 %>% filter(between (age, 30, 60))

```
##
      id index_date gender age treat_gr lc hcc
                                                        hcc_yr b_alt b_bil b_inr b_cr
## 1
       1 2007/01/05
                           М
                               54
                                        ETV
                                              1
                                                      7.641667
                                                                   67
                                                                         1.2
                                                                             1.17 1.00
## 2
       2 2007/01/10
                            F
                               45
                                        ETV
                                              0
                                                      9.763889
                                                                   32
                                                                         1.1
                                                                              0.90 0.60
                                                  0
## 3
       3 2007/01/11
                            Μ
                               49
                                        TDF
                                              1
                                                  0 10.594444
                                                                  106
                                                                         1.8
                                                                              1.03 1.05
##
   4
       5 2007/01/18
                           М
                               50
                                        TDF
                                              1
                                                  0
                                                      2.355556
                                                                   94
                                                                         0.8
                                                                              1.12 0.90
                                                                   32
## 5
       6 2007/01/18
                           Μ
                               33
                                        ETV
                                              1
                                                      6.069444
                                                                         0.7
                                                                              0.88 1.20
       7 2007/01/26
                               49
                                        TDF
                                                      8.069444
                                                                              1.10 0.91
## 6
                           М
                                              1
                                                  1
                                                                  104
                                                                         1.1
## 7
       8 2007/01/31
                           F
                               50
                                        TDF
                                              0
                                                  0 10.716667
                                                                  143
                                                                         1.5
                                                                              1.10 0.70
                           F
                               49
## 8
       9 2007/01/31
                                        ETV
                                              1
                                                  0
                                                      2.163889
                                                                   31
                                                                         1.3
                                                                                 NA 0.73
      10 2007/02/01
                           М
                               50
                                        ETV
                                                  0 10.766667
                                                                  239
                                                                         1.3
                                                                              1.03 1.20
## 9
                                              0
## 10 11 2007/02/01
                               32
                                        ETV
                                                      3.713889
                                                                              0.97 1.10
                           М
                                              0
                                                                  359
                                                                         0.9
                                                  0
## 11 12 2007/02/01
                           М
                               48
                                        TDF
                                              0
                                                      3.269444
                                                                  486
                                                                         0.7
                                                                              1.02 0.81
                                                  0 10.655556
## 12 13 2007/02/01
                               51
                                              0
                                                                   56
                                                                         1.3
                                                                              1.10 1.00
                           М
                                        ETV
## 13 14 2007/02/02
                                                      4.488889
                                                                              1.08 0.69
                           М
                               41
                                        ETV
                                              1
                                                                   34
                                                                         1.7
                                                                         2.1 1.57 1.00
## 14 15 2007/02/08
                           М
                               50
                                                      5.869444
                                                                  107
                                        ETV
                                              1
                                                  1
## 15 16 2007/02/08
                                                      4.008333
                           М
                               51
                                        ETV
                                              1
                                                  \cap
                                                                   40
                                                                         1.3
                                                                              1.15 0.92
## 16 18 2007/02/14
                           F
                               51
                                                      2.372222
                                                                         2.1
                                                                              1.43 0.60
                                        ETV
                                              1
                                                  \cap
                                                                   61
## 17 19 2007/02/15
                           М
                               48
                                        TDF
                                              0
                                                  0 10.677778
                                                                   34
                                                                         1.1
                                                                              1.10 1.00
## 18 20 2007/02/15
                            F
                                                     5.030556
                                                                              1.25 0.63
                               50
                                        ETV
                                              1
                                                  0
                                                                   31
                                                                         0.9
  19 21 2007/02/15
                            Μ
                               52
                                        TDF
                                              1
                                                  0
                                                      4.725000
                                                                   57
                                                                         1.1
                                                                              1.11 0.80
## 20 22 2007/02/16
                            M
                               30
                                        ETV
                                              0
                                                  0 10.761111
                                                                         1.0 0.97 0.99
                                                                   81
## 21 24 2007/02/20
                            Μ
                               43
                                        ETV
                                              1
                                                  0
                                                      3.994444
                                                                   84
                                                                         1.1 1.07 0.89
##
      b_plt b_alb m6_alt m6_bil m6_inr m6_cr m6_plt m6_alb m12_alt m12_bil m12_inr
## 1
                        35
                                      1.05
                                              0.9
                                                       96
                                                              3.6
                                                                        37
                                                                                1.2
                                                                                          NA
         110
               3.8
                               1.0
## 2
         187
               3.8
                        16
                               1.1
                                      0.97
                                              0.7
                                                      194
                                                              3.8
                                                                        18
                                                                                1.1
                                                                                        0.96
## 3
         133
               3.9
                       108
                               1.8
                                      1.03
                                              0.9
                                                      120
                                                              4.3
                                                                        27
                                                                                1.5
                                                                                        1.02
## 4
         153
                        57
                               0.9
                                      1.10
                                                      145
                                                              4.6
                                                                        35
                                                                                1.2
                                                                                        1.05
               4.2
                                              1.0
                                                                                0.6
## 5
         170
               3.4
                        26
                               0.8
                                      0.97
                                              1.4
                                                       NA
                                                              3.4
                                                                        17
                                                                                       0.91
## 6
         162
                                      1.05
                                              0.8
                                                      128
                                                              3.9
                                                                        42
                                                                                0.7
                                                                                        1.04
                NA
                        51
                               1.0
## 7
         165
                               1.4
                                      1.04
                                              0.8
                                                      184
                                                              3.7
                                                                                0.9
                                                                                        1.06
               3.5
                        24
                                                                        16
## 8
         157
               3.9
                        25
                               1.3
                                      1.02
                                              0.8
                                                      163
                                                              4.2
                                                                        24
                                                                                0.9
                                                                                        1.04
## 9
                                      1.00
                                              1.0
                                                              3.8
                                                                                1.3
                                                                                        1.03
         166
               3.2
                        30
                               1.4
                                                      158
                                                                        34
## 10
         202
               4.1
                        23
                               1.1
                                      0.98
                                              1.0
                                                      171
                                                              4.4
                                                                        19
                                                                                0.9
                                                                                        0.94
## 11
         159
                               0.9
                                      0.96
                                                      215
                                                                        24
                                                                                0.8
                                                                                        0.95
               2.8
                        34
                                              0.8
                                                              3.3
## 12
         186
               4.2
                        18
                               1.3
                                        NA
                                              1.1
                                                       NA
                                                              4.2
                                                                        17
                                                                                1.4
                                                                                        1.01
## 13
         159
                NA
                        23
                               1.6
                                      0.97
                                              0.9
                                                      164
                                                              3.7
                                                                        19
                                                                                1.2
                                                                                        0.97
## 14
          66
               2.1
                        42
                               1.0
                                      1.15
                                              1.0
                                                       80
                                                              3.7
                                                                        36
                                                                                1.1
                                                                                        1.09
## 15
                        33
                                      1.09
                                                      129
                                                                                1.1
                                                                                        0.98
         118
               3.4
                               1.1
                                              1.0
                                                              4.0
                                                                        30
## 16
          55
               2.7
                        25
                               1.2
                                      1.21
                                              0.7
                                                       67
                                                              3.5
                                                                        24
                                                                                0.7
                                                                                        1.15
## 17
          NA
               4.3
                        13
                               0.8
                                        NA
                                              1.1
                                                       NA
                                                              4.3
                                                                        13
                                                                                1.1
                                                                                        1.02
## 18
                        29
                                                       40
                                                                        31
         163
               3.1
                               1.3
                                      1.19
                                              0.7
                                                              3.3
                                                                                1.4
                                                                                        1.17
##
  19
          91
               4.1
                        39
                               1.3
                                      1.11
                                              0.8
                                                       74
                                                              4.0
                                                                        34
                                                                                1.3
                                                                                        1.04
                               1.0
##
  20
         292
               4.1
                        50
                                      0.93
                                              0.9
                                                      264
                                                              4.4
                                                                        63
                                                                                0.8
                                                                                        0.93
## 21
               4.2
                        63
                               0.8
                                      1.02
                                              0.9
                                                      144
                                                              4.5
                                                                        52
                                                                                0.9
                                                                                        1.02
         181
##
      m12_cr m12_plt m12_alb
## 1
          1.0
                   111
                            4.0
                   239
## 2
          0.6
                            4.0
## 3
          0.9
                   120
                            4.2
## 4
          1.0
                   141
                            4.5
```

##	5	1.9	179	3.0
##	6	NA	NA	3.9
##	7	0.7	138	3.4
##	8	0.7	148	3.9
##	9	1.0	151	3.7
##	10	1.1	NA	4.3
##	11	0.8	272	3.4
##	12	1.1	143	4.3
##	13	0.8	175	3.8
##	14	1.1	103	4.2
##	15	NA	NA	4.1
##	16	0.6	61	3.5
##	17	1.1	143	4.2
##	18	0.7	36	3.4
##	19	0.8	64	3.9
##	20	1.0	286	4.5
##	21	1.0	136	4.3

dat1 %>% filter(age >=50 | lc==1)

```
hcc_yr b_alt b_bil b_inr b_cr
##
      id index_date gender age treat_gr lc hcc
## 1
       1 2007/01/05
                              54
                                            1
                                                    7.641667
                                                                       1.2 1.17 1.00
                           М
                                       ETV
                                                 1
                                                                 67
       3 2007/01/11
                                                 0 10.594444
## 2
                           М
                              49
                                       TDF
                                            1
                                                                 106
                                                                       1.8 1.03 1.05
## 3
       5 2007/01/18
                           Μ
                              50
                                       TDF
                                            1
                                                 0
                                                    2.355556
                                                                 94
                                                                       0.8 1.12 0.90
## 4
       6 2007/01/18
                           М
                              33
                                       ETV
                                            1
                                                 0
                                                    6.069444
                                                                 32
                                                                       0.7
                                                                            0.88 1.20
## 5
                              49
                                       TDF
                                                    8.069444
       7 2007/01/26
                           М
                                            1
                                                                 104
                                                                       1.1
                                                                            1.10 0.91
## 6
       8 2007/01/31
                           F
                              50
                                       TDF
                                            0
                                                 0 10.716667
                                                                 143
                                                                       1.5
                                                                            1.10 0.70
                           F
## 7
       9 2007/01/31
                              49
                                       ETV
                                            1
                                                 0
                                                   2.163889
                                                                 31
                                                                       1.3
                                                                               NA 0.73
                                                 0 10.766667
      10 2007/02/01
                              50
                                       ETV
                                            0
                                                                            1.03 1.20
## 8
                           М
                                                                239
                                                                       1.3
      13 2007/02/01
                           М
                              51
                                       ETV
                                            0
                                                 0 10.655556
                                                                 56
                                                                       1.3
                                                                           1.10 1.00
## 10 14 2007/02/02
                              41
                                       ETV
                                                    4.488889
                                                                       1.7 1.08 0.69
                           М
                                            1
                                                 0
                                                                 34
## 11 15 2007/02/08
                           М
                              50
                                       ETV
                                            1
                                                    5.869444
                                                                 107
                                                                       2.1
                                                                            1.57 1.00
                                                 1
## 12 16 2007/02/08
                           М
                              51
                                       ETV
                                            1
                                                 Λ
                                                    4.008333
                                                                 40
                                                                       1.3 1.15 0.92
## 13 17 2007/02/09
                           F
                              62
                                       TDF
                                            1
                                                    3.513889
                                                                  48
                                                                       1.0 1.02 0.81
## 14 18 2007/02/14
                           F
                              51
                                       ETV
                                            1
                                                 0
                                                    2.372222
                                                                 61
                                                                       2.1 1.43 0.60
## 15 20 2007/02/15
                           F
                              50
                                       ETV
                                                 0
                                                    5.030556
                                                                       0.9
                                                                            1.25 0.63
                                            1
                                                                  31
## 16 21 2007/02/15
                           М
                              52
                                       TDF
                                            1
                                                 Λ
                                                    4.725000
                                                                  57
                                                                       1.1 1.11 0.80
## 17 24 2007/02/20
                           Μ
                              43
                                       ETV 1
                                                 0
                                                    3.994444
                                                                 84
                                                                       1.1 1.07 0.89
      b_plt b_alb m6_alt m6_bil m6_inr m6_cr m6_plt m6_alb m12_alt m12_bil m12_inr
##
                        35
                                     1.05
                                            0.9
                                                     96
                                                                      37
                                                                              1.2
## 1
        110
               3.8
                              1.0
                                                            3.6
                                                                                        NA
## 2
        133
               3.9
                       108
                              1.8
                                     1.03
                                            0.9
                                                    120
                                                            4.3
                                                                      27
                                                                              1.5
                                                                                     1.02
## 3
        153
               4.2
                        57
                              0.9
                                     1.10
                                             1.0
                                                    145
                                                            4.6
                                                                      35
                                                                              1.2
                                                                                     1.05
## 4
        170
                        26
                                     0.97
                                                                      17
                                                                              0.6
                                                                                     0.91
               3.4
                              0.8
                                             1.4
                                                     NA
                                                            3.4
## 5
        162
                        51
                              1.0
                                     1.05
                                             0.8
                                                    128
                                                            3.9
                                                                      42
                                                                              0.7
                                                                                     1.04
                NA
## 6
        165
               3.5
                        24
                              1.4
                                     1.04
                                             0.8
                                                    184
                                                            3.7
                                                                      16
                                                                              0.9
                                                                                     1.06
                                                                      24
## 7
        157
               3.9
                        25
                              1.3
                                     1.02
                                             0.8
                                                    163
                                                            4.2
                                                                              0.9
                                                                                     1.04
## 8
        166
               3.2
                        30
                              1.4
                                     1.00
                                             1.0
                                                    158
                                                            3.8
                                                                      34
                                                                              1.3
                                                                                     1.03
## 9
        186
               4.2
                        18
                              1.3
                                       NA
                                             1.1
                                                     NA
                                                            4.2
                                                                      17
                                                                              1.4
                                                                                     1.01
## 10
        159
                NA
                        23
                              1.6
                                     0.97
                                             0.9
                                                    164
                                                            3.7
                                                                      19
                                                                              1.2
                                                                                     0.97
## 11
                                                                              1.1
         66
               2.1
                        42
                              1.0
                                     1.15
                                             1.0
                                                     80
                                                            3.7
                                                                      36
                                                                                     1.09
## 12
        118
               3.4
                        33
                              1.1
                                     1.09
                                             1.0
                                                    129
                                                            4.0
                                                                      30
                                                                              1.1
                                                                                     0.98
## 13
        105
                        28
                              0.9
                                     1.03
                                             0.7
                                                    121
                                                            3.9
                                                                      31
                                                                              0.9
                                                                                     1.06
               4.0
                                                     67
                                                            3.5
                                                                              0.7
## 14
         55
               2.7
                        25
                              1.2
                                     1.21
                                             0.7
                                                                      24
                                                                                     1.15
## 15
        163
               3.1
                        29
                              1.3
                                     1.19
                                             0.7
                                                     40
                                                            3.3
                                                                      31
                                                                              1.4
                                                                                     1.17
                                                     74
## 16
         91
               4.1
                        39
                              1.3
                                     1.11
                                             0.8
                                                            4.0
                                                                      34
                                                                              1.3
                                                                                     1.04
## 17
        181
               4.2
                        63
                              0.8
                                     1.02
                                            0.9
                                                    144
                                                            4.5
                                                                      52
                                                                              0.9
                                                                                     1.02
##
      m12_cr m12_plt m12_alb
## 1
         1.0
                           4.0
                  111
## 2
         0.9
                  120
                           4.2
## 3
         1.0
                  141
                           4.5
## 4
         1.9
                  179
                           3.0
## 5
          NA
                   NA
                           3.9
## 6
         0.7
                  138
                           3.4
## 7
         0.7
                  148
                           3.9
## 8
         1.0
                  151
                           3.7
## 9
         1.1
                  143
                           4.3
                           3.8
## 10
         0.8
                  175
## 11
         1.1
                  103
                           4.2
## 12
                   NA
                           4.1
          NA
```

##	13	NA	NA	3.9
##	14	0.6	61	3.5
##	15	0.7	36	3.4
##	16	0.8	64	3.9
##	17	1 0	136	43

and와 or을 같이 사용

```
dat1 %>%
  filter( (age>=60 & gender=="M") | (age<=50 & gender=="F"))</pre>
```

```
## 1 2 2007/01/10 F 45
                          ETV 0 0 9.763889
                                           32 1.1 0.90 0.60
## 2 8 2007/01/31
                F 50
                          TDF 0
                                0 10.716667
                                           143
                                                1.5 1.10 0.70
## 3 9 2007/01/31
                F 49
                          ETV 1 0 2.163889
                                            31
                                               1.3
                                                     NA 0.73
## 4 20 2007/02/15 F 50
                                            31 0.9 1.25 0.63
                          ETV 1
                                0 5.030556
## b_plt b_alb m6_alt m6_bil m6_inr m6_cr m6_plt m6_alb m12_alt m12_bil m12_inr
## 1 187 3.8
             16 1.1
                        0.97
                             0.7
                                   194
                                       3.8
                                               18
                                                     1.1
                                                          0.96
        3.5
## 2
    165
                24
                    1.4
                        1.04
                              0.8
                                        3.7
                                               16
                                                     0.9
                                                          1.06
                                   184
                   1.3
                                       4.2
## 3
    157
        3.9
                25
                        1.02
                              0.8
                                  163
                                               24
                                                     0.9
                                                          1.04
## 4
    163
        3.1
              29
                  1.3
                        1.19
                             0.7
                                  40
                                        3.3
                                               31
                                                     1.4
                                                          1.17
## m12_cr m12_plt m12_alb
     0.6
## 1
           239
                  4.0
## 2
     0.7
            138
                  3.4
                  3.9
## 3
     0.7
          148
## 4
     0.7
           36
                  3.4
```

조건을 만족하지 않는 경우 골라내기

여자 환자만

```
dat1 %>%
  filter(gender!="M")
```

```
id index_date gender age treat_gr lc hcc
                                                hcc_yr b_alt b_bil b_inr b_cr
## 1 2 2007/01/10
                       F 45
                                  ETV 0
                                           0 9.763889
                                                         32
                                                               1.1 0.90 0.60
## 2 8 2007/01/31
                       F 50
                                  TDF 0
                                           0 10.716667
                                                               1.5 1.10 0.70
                                                         143
## 3 9 2007/01/31
                       F 49
                                  ETV 1
                                           0 2.163889
                                                          31
                                                               1.3
                                                                      NA 0.73
## 4 17 2007/02/09
                       F 62
                                  TDF 1
                                           0 3.513889
                                                          48
                                                               1.0 1.02 0.81
## 5 18 2007/02/14
                       F 51
                                  ETV 1
                                           0 2.372222
                                                               2.1 1.43 0.60
                                                          61
## 6 20 2007/02/15
                       F 50
                                           0 5.030556
                                                               0.9 1.25 0.63
                                  ETV 1
                                                          31
     b_plt b_alb m6_alt m6_bil m6_inr m6_cr m6_plt m6_alb m12_alt m12_bil m12_inr
                                0.97
## 1
      187
            3.8
                    16
                          1.1
                                       0.7
                                              194
                                                     3.8
                                                              18
                                                                     1.1
                                                                           0.96
## 2
            3.5
                    24
                                1.04
                                       0.8
                                                     3.7
                                                                           1.06
      165
                          1.4
                                              184
                                                              16
                                                                     0.9
## 3
      157
            3.9
                    25
                          1.3
                                1.02
                                       0.8
                                              163
                                                     4.2
                                                              24
                                                                     0.9
                                                                           1.04
## 4
      105
           4.0
                    28
                          0.9
                                1.03
                                       0.7
                                              121
                                                     3.9
                                                              31
                                                                     0.9
                                                                           1.06
                                                     3.5
## 5
       55
            2.7
                    25
                          1.2
                                1.21
                                       0.7
                                              67
                                                              24
                                                                     0.7
                                                                           1.15
## 6
      163
            3.1
                    29
                          1.3
                                1.19
                                       0.7
                                             40
                                                     3.3
                                                              31
                                                                     1.4
                                                                           1.17
    m12_cr m12_plt m12_alb
## 1
       0.6
               239
                       4.0
## 2
       0.7
               138
                       3.4
## 3
       0.7
               148
                       3.9
## 4
        NA
               NA
                       3.9
## 5
       0.6
                61
                       3.5
## 6
       0.7
                36
                       3.4
```

간경변증이 없는 50세 이상의 환자

```
dat1 %>%
  filter(lc !=1 & age >=50)
```

```
## id index_date gender age treat_gr lc hcc hcc_yr b_alt b_bil b_inr b_cr
## 1 8 2007/01/31 F 50 TDF 0 0 10.71667 143 1.5 1.10 0.7
## 2 10 2007/02/01
                 M 50
                           ETV 0 0 10.76667
                                             239 1.3 1.03 1.2
## 3 13 2007/02/01
                 M 51
                           ETV 0 0 10.65556
                                            56 1.3 1.10 1.0
## b_plt b_alb m6_alt m6_bil m6_inr m6_cr m6_plt m6_alb m12_alt m12_bil m12_inr
## 1 165 3.5 24 1.4 1.04
                               0.8
                                     184 3.7
                                                 16
                                                       0.9
                                                             1.06
## 2 166
         3.2
                30 1.4
                         1.00
                               1.0
                                     158
                                          3.8
                                                  34
                                                       1.3
                                                             1.03
## 3 186 4.2
                18 1.3
                                                 17
                              1.1
                                          4.2
                                                             1.01
                           NA
                                    NA
                                                       1.4
## m12_cr m12_plt m12_alb
## 1 0.7 138
                  3.4
## 2
      1.0
            151
                   3.7
## 3
      1.1
            143
                  4.3
```

count기능

3

4

TDF 0 3

TDF 1 1

성별에 따라 몇 명?

```
dat1 %>%
count(gender)
## gender n
## 1 F 6
## 2
      M 18
남성이면서 간암이 있는 환자는?
dat1 %>%
filter(gender == 'M' & hcc ==1) %>%
count()
## n
## 1 4
남성이면서 간경변증이 있는 환자 중 hcc가 발생한 환자는?
dat1 %>%
filter(gender == 'M' & lc ==1) %>%
count(hcc)
## hcc n
## 1 0 7
## 2 1 3
남성이면서 간경변증이 있는 환자 중 hcc가 발생한 환자는 항바이러스 종류에 따라 몇 명?
dat1 %>%
filter(gender == 'M' & lc ==1) %>%
count(treat_gr, hcc)
## treat_gr hcc n
## 1
      ETV 0 4
       ETV 1 2
## 2
```

결측값 다루기

결측값

```
dat1 %>%
  filter(is.na(b_inr)) %>%
  count()
```

n ## 1 1

결측값이 없는 경우

```
dat1 %>%
  filter(!is.na(b_inr))
```

```
##
      id index_date gender age treat_gr lc hcc
                                                      hcc_yr b_alt b_bil b_inr b_cr
## 1
       1 2007/01/05
                           М
                              54
                                       ETV
                                                    7.641667
                                                                 67
                                                                       1.2 1.17 1.00
## 2
       2 2007/01/10
                           F
                              45
                                            0
                                                 0
                                                    9.763889
                                                                 32
                                                                       1.1 0.90 0.60
                                       ETV
## 3
       3 2007/01/11
                           М
                              49
                                       TDF
                                            1
                                                0 10.594444
                                                                106
                                                                       1.8
                                                                            1.03 1.05
## 4
                           М
                              26
                                                    6.016667
                                                                159
                                                                       1.4
       4 2007/01/12
                                       ETV
                                            0
                                                 \cap
                                                                           1.04 0.93
## 5
       5 2007/01/18
                           Μ
                              50
                                       TDF
                                                    2.355556
                                                                 94
                                                                       0.8
                                                                           1.12 0.90
                                            1
                                                 0
                                                                       0.7
## 6
       6 2007/01/18
                           М
                              33
                                       ETV
                                            1
                                                 0
                                                    6.069444
                                                                 32
                                                                           0.88 1.20
## 7
       7 2007/01/26
                           Μ
                              49
                                       TDF
                                            1
                                                    8.069444
                                                                104
                                                                       1.1 1.10 0.91
## 8
                           F
                              50
       8 2007/01/31
                                       TDF
                                            0
                                                 0 10.716667
                                                                143
                                                                       1.5 1.10 0.70
## 9
      10 2007/02/01
                           Μ
                              50
                                       ETV
                                            0
                                                 0 10.766667
                                                                239
                                                                       1.3 1.03 1.20
                              32
## 10 11 2007/02/01
                           Μ
                                       ETV
                                            0
                                                 0
                                                    3.713889
                                                                359
                                                                       0.9
                                                                            0.97 1.10
## 11 12 2007/02/01
                           М
                              48
                                       TDF
                                            0
                                                                486
                                                                       0.7
                                                                           1.02 0.81
                                                 1
                                                    3.269444
## 12 13 2007/02/01
                              51
                                       ETV
                                                 0 10.655556
                                                                 56
                                                                       1.3
                                                                           1.10 1.00
## 13 14 2007/02/02
                              41
                                       ETV
                                                   4.488889
                                                                 34
                                                                       1.7
                                                                           1.08 0.69
                           М
                                            1
                                                 0
## 14 15 2007/02/08
                           М
                              50
                                       ETV
                                                    5.869444
                                                                107
                                                                           1.57 1.00
                                            1
                                                                       2.1
                                                                       1.3 1.15 0.92
## 15 16 2007/02/08
                           Μ
                              51
                                       ETV
                                            1
                                                 Λ
                                                    4.008333
                                                                 40
## 16 17 2007/02/09
                           F
                              62
                                       TDF
                                                    3.513889
                                                                 48
                                                                       1.0 1.02 0.81
## 17 18 2007/02/14
                           F
                              51
                                                 0
                                                    2.372222
                                                                       2.1 1.43 0.60
                                       ETV
                                            1
                                                                 61
## 18 19 2007/02/15
                           Μ
                              48
                                       TDF
                                            0
                                                 0 10.677778
                                                                 34
                                                                       1.1
                                                                           1.10 1.00
## 19 20 2007/02/15
                           F
                              50
                                       ETV
                                            1
                                                 0
                                                    5.030556
                                                                 31
                                                                       0.9 1.25 0.63
                              52
## 20 21 2007/02/15
                           М
                                       TDF
                                            1
                                                    4.725000
                                                                 57
                                                                       1.1
                                                                           1.11 0.80
## 21 22 2007/02/16
                              30
                                                 0 10.761111
                                                                       1.0
                                                                           0.97 0.99
                           М
                                       ETV
                                            0
                                                                 81
## 22 23 2007/02/16
                           Μ
                              29
                                       TDF
                                            0
                                                 0 10.558333
                                                                 35
                                                                       1.9
                                                                           1.03 0.91
## 23 24 2007/02/20
                           М
                              43
                                       ETV
                                            1
                                                 0
                                                   3.994444
                                                                 84
                                                                       1.1 1.07 0.89
##
      b_plt b_alb m6_alt m6_bil m6_inr m6_cr m6_plt m6_alb m12_alt m12_bil m12_inr
                       35
                                            0.9
                                                                             1.2
## 1
        110
               3.8
                              1.0
                                     1.05
                                                     96
                                                            3.6
                                                                     37
                                                                                       NA
## 2
        187
               3.8
                        16
                              1.1
                                     0.97
                                            0.7
                                                    194
                                                            3.8
                                                                     18
                                                                             1.1
                                                                                    0.96
                                                                     27
## 3
        133
               3.9
                       108
                              1.8
                                     1.03
                                            0.9
                                                    120
                                                            4.3
                                                                             1.5
                                                                                     1.02
## 4
                       24
                                                    149
                                                           4.2
                                                                     29
                                                                             1.2
                                                                                     0.98
        164
               4.2
                              1.7
                                     1.11
                                            0.9
## 5
        153
               4.2
                        57
                              0.9
                                     1.10
                                            1.0
                                                    145
                                                            4.6
                                                                     35
                                                                             1.2
                                                                                     1.05
## 6
        170
               3.4
                        26
                              0.8
                                     0.97
                                            1.4
                                                     NA
                                                            3.4
                                                                     17
                                                                             0.6
                                                                                    0.91
## 7
                        51
                              1.0
                                     1.05
                                            0.8
                                                    128
                                                            3.9
                                                                     42
                                                                             0.7
        162
                NA
                                                                                     1.04
## 8
                                                                             0.9
        165
               3.5
                       24
                              1.4
                                     1.04
                                            0.8
                                                    184
                                                            3.7
                                                                     16
                                                                                     1.06
## 9
        166
               3.2
                       30
                              1.4
                                     1.00
                                            1.0
                                                    158
                                                            3.8
                                                                     34
                                                                             1.3
                                                                                     1.03
## 10
        202
               4.1
                       23
                              1.1
                                     0.98
                                            1.0
                                                    171
                                                           4.4
                                                                     19
                                                                             0.9
                                                                                    0.94
## 11
                                     0.96
                                            0.8
                                                    215
                                                            3.3
                                                                             0.8
        159
               2.8
                        34
                              0.9
                                                                     24
                                                                                     0.95
## 12
        186
               4.2
                        18
                              1.3
                                       NA
                                            1.1
                                                     NA
                                                            4.2
                                                                     17
                                                                             1.4
                                                                                     1.01
```

```
## 13
        159
                        23
                              1.6
                                     0.97
                                             0.9
                                                    164
                                                            3.7
                                                                      19
                                                                              1.2
                                                                                     0.97
                NA
## 14
                                                                                     1.09
         66
               2.1
                        42
                              1.0
                                     1.15
                                             1.0
                                                     80
                                                            3.7
                                                                      36
                                                                              1.1
## 15
               3.4
                        33
                              1.1
                                     1.09
                                             1.0
                                                    129
                                                            4.0
                                                                      30
                                                                              1.1
                                                                                     0.98
        118
## 16
        105
               4.0
                        28
                              0.9
                                     1.03
                                             0.7
                                                    121
                                                            3.9
                                                                      31
                                                                              0.9
                                                                                     1.06
## 17
         55
               2.7
                        25
                              1.2
                                     1.21
                                             0.7
                                                     67
                                                            3.5
                                                                      24
                                                                              0.7
                                                                                     1.15
## 18
         NA
               4.3
                        13
                              0.8
                                       NA
                                             1.1
                                                     NA
                                                            4.3
                                                                      13
                                                                              1.1
                                                                                     1.02
## 19
        163
               3.1
                        29
                              1.3
                                     1.19
                                             0.7
                                                     40
                                                            3.3
                                                                      31
                                                                              1.4
                                                                                     1.17
                                                                              1.3
                                                                                     1.04
## 20
               4.1
                        39
                              1.3
                                     1.11
                                             0.8
                                                     74
                                                            4.0
                                                                      34
         91
## 21
        292
               4.1
                        50
                              1.0
                                     0.93
                                             0.9
                                                    264
                                                            4.4
                                                                      63
                                                                              0.8
                                                                                     0.93
## 22
        204
               4.4
                        26
                              2.3
                                     1.00
                                             0.9
                                                     NA
                                                            4.1
                                                                      28
                                                                              1.3
                                                                                     0.93
## 23
        181
               4.2
                        63
                              0.8
                                     1.02
                                             0.9
                                                    144
                                                            4.5
                                                                      52
                                                                              0.9
                                                                                     1.02
##
      m12_cr m12_plt m12_alb
## 1
         1.0
                  111
                           4.0
## 2
                  239
                           4.0
         0.6
## 3
         0.9
                  120
                           4.2
                           4.1
## 4
         0.8
                  185
## 5
         1.0
                  141
                           4.5
## 6
         1.9
                  179
                           3.0
                           3.9
## 7
          NA
                   NA
## 8
         0.7
                           3.4
                  138
## 9
         1.0
                  151
                           3.7
## 10
          1.1
                   NA
                           4.3
## 11
         0.8
                  272
                           3.4
                           4.3
## 12
         1.1
                  143
         0.8
                           3.8
## 13
                  175
## 14
         1.1
                  103
                           4.2
## 15
          NA
                   NA
                           4.1
## 16
          NA
                   NA
                           3.9
                           3.5
## 17
         0.6
                   61
## 18
          1.1
                  143
                           4.2
                           3.4
## 19
         0.7
                   36
## 20
         0.8
                   64
                           3.9
## 21
          1.0
                  286
                           4.5
                           4.0
## 22
         0.9
                  113
```

23

1.0

136

4.3

여러 변수에서 동시에 확인

```
dat1 %>%
  filter(!is.na(b_inr),
     !is.na(b_alt),
     !is.na(b_plt)) %>%
  count()
```

n ## 1 22

결측값이 존재하지 않는 케이스만 남기기

특정 변수에서 결측값이 없는 환자

```
dat1 %>%
  drop_na(b_inr, b_alt, b_plt) %>%
  count()
```

n ## 1 22

모든 변수에서 결측값이 없는 환자

```
dat1 %>%
  drop_na() %>%
  count()
```

n ## 1 13

모든 변수에서 결측값이 없는 환자

```
na.count <- apply(dat1, 2, function(x)sum(is.na(x)))
na.count</pre>
```

##	id	index_date	gender	age	treat_gr	lc	hcc
##	0	0	0	0	0	0	0
##	hcc_yr	b_alt	b_bil	b_inr	b_cr	b_plt	b_alb
##	0	0	0	1	0	1	2
##	${\tt m6_alt}$	${\tt m6_bil}$	m6_inr	m6_cr	${\tt m6_plt}$	${\tt m6_alb}$	${\tt m12_alt}$
##	0	0	2	0	4	0	0
##	m12_bil	${\tt m12_inr}$	m12_cr	m12_plt	$m12_alb$		
##	0	1	3	4	0		

4. Mutate

기존 변수를 이용해서 새로운 변수 만들기

```
dat1 %>%
  mutate(alt_plt = b_alt / b_plt) %>%
  select(b_alt, b_plt, alt_plt)
```

```
b_alt b_plt alt_plt
## 1
        67 110 0.6090909
## 2
        32
            187 0.1711230
## 3
       106 133 0.7969925
             164 0.9695122
## 4
       159
## 5
        94
            153 0.6143791
        32
## 6
            170 0.1882353
## 7
       104
            162 0.6419753
## 8
       143
             165 0.8666667
## 9
       31
             157 0.1974522
## 10
       239
            166 1.4397590
## 11
       359
             202 1.7772277
## 12
       486
             159 3.0566038
## 13
        56
            186 0.3010753
## 14
        34
            159 0.2138365
## 15
       107
             66 1.6212121
## 16
        40
             118 0.3389831
## 17
        48 105 0.4571429
## 18
        61 55 1.1090909
## 19
        34
             NA
                       NA
            163 0.1901840
## 20
        31
## 21
        57
             91 0.6263736
## 22
        81 292 0.2773973
## 23
        35 204 0.1715686
## 24
        84 181 0.4640884
```

결측값이 있는 경우 새로운 변수 값이 어떻게 나오는지 확인

```
dat1 %>%
  mutate(alt_plt = b_alt /b_plt) %>%
  select(id, b_alt, b_plt, alt_plt) %>%
  filter(is.na(b_alt) | is.na(b_plt))
```

```
## id b_alt b_plt alt_plt
## 1 19 34 NA NA
```

결측값이 있으면 계산이 불가능하므로 결측값이 있는 경우 제거

```
dat1 %>%
  drop_na(b_alt, b_plt) %>%
  mutate(alt_plt = b_alt /b_plt) %>%
  select(id, b_alt, b_plt, alt_plt)
```

```
id b_alt b_plt alt_plt
## 1
           67
                110 0.6090909
      1
## 2
      2
           32
                187 0.1711230
## 3
      3
          106
                133 0.7969925
## 4
      4
          159 164 0.9695122
## 5
           94
      5
                153 0.6143791
## 6
      6
           32
                170 0.1882353
## 7
      7
          104
               162 0.6419753
## 8
          143
               165 0.8666667
      8
## 9
      9
           31
                157 0.1974522
          239
## 10 10
                166 1.4397590
## 11 11
          359
                202 1.7772277
## 12 12
          486
                159 3.0566038
## 13 13
           56
                186 0.3010753
## 14 14
           34
                159 0.2138365
## 15 15
          107
                66 1.6212121
## 16 16
           40
               118 0.3389831
## 17 17
           48
                105 0.4571429
## 18 18
           61
                55 1.1090909
## 19 20
           31 163 0.1901840
## 20 21
           57
                91 0.6263736
## 21 22
           81
               292 0.2773973
## 22 23
           35 204 0.1715686
## 23 24
         84 181 0.4640884
```

조건을 이용해서 새로운 변수 만들기

```
dat1 %>%
 mutate(age_gr=ifelse(age >=50, 'above_50', 'below_50')) %>%
select(id, age, age_gr)
     id age age_gr
## 1
     1 54 above_50
## 2 2 45 below_50
## 3 3 49 below_50
## 4 4 26 below 50
## 5 5 50 above_50
## 6 6 33 below_50
## 7 7 49 below_50
## 8 8 50 above_50
## 9
     9 49 below_50
## 10 10 50 above_50
## 11 11 32 below_50
## 12 12 48 below_50
## 13 13 51 above_50
## 14 14 41 below_50
## 15 15 50 above_50
## 16 16 51 above_50
## 17 17 62 above 50
## 18 18 51 above 50
## 19 19 48 below_50
## 20 20 50 above_50
## 21 21 52 above_50
## 22 22 30 below 50
## 23 23 29 below_50
## 24 24 43 below_50
 mutate(age_gr=ifelse(age >=50, 'above_50', 'below_50'))%>%
count(age_gr)
      age_gr n
## 1 above_50 11
## 2 below_50 13
```

```
dat1 %>%
  mutate(bil_gr=ifelse(b_bil<2,'A',ifelse(b_bil<3,'B','C'))) %>%
  select(id, b_bil, bil_gr)
      id b_bil bil_gr
##
## 1
           1.2
                    Α
       1
## 2
       2
           1.1
                    Α
## 3
       3
           1.8
                    Α
## 4
       4
           1.4
                    Α
## 5
           0.8
       5
                    Α
## 6
       6
           0.7
                    Α
## 7
       7
                    Α
           1.1
## 8
       8
           1.5
                    Α
## 9
       9
           1.3
                    Α
## 10 10
           1.3
                    Α
## 11 11
           0.9
                    Α
## 12 12
           0.7
                    Α
## 13 13
           1.3
                    Α
## 14 14
           1.7
                    Α
## 15 15
                    В
           2.1
## 16 16
           1.3
                    Α
## 17 17
           1.0
                    Α
## 18 18
           2.1
                    В
## 19 19
           1.1
                    Α
## 20 20
           0.9
                    Α
## 21 21
           1.1
                    Α
## 22 22
                    Α
           1.0
## 23 23
           1.9
                    Α
## 24 24
           1.1
                    Α
dat1 %>%
 mutate(bil_gr=ifelse(b_bil<2,'A',</pre>
                       ifelse(b_bil<3,'B','C'))) %>%
count(bil_gr)
##
   bil_gr n
## 1
         A 22
```

2

B 2

```
##
      id index_date gender age treat_gr lc hcc
                                                        hcc_yr b_alt b_bil b_inr b_cr
## 1
       1 2007/01/05
                            M
                               54
                                        ETV
                                              1
                                                      7.641667
                                                                    67
                                                                         1.2
                                                                              1.17 1.00
##
  2
       2 2007/01/10
                            F
                               45
                                        ETV
                                              0
                                                   0
                                                      9.763889
                                                                    32
                                                                               0.90 0.60
                                                                         1.1
##
   3
       3 2007/01/11
                            M
                               49
                                        TDF
                                                   0 10.594444
                                                                   106
                                                                         1.8
                                                                               1.03 1.05
       4 2007/01/12
                                        ETV
##
                            М
                               26
                                              0
                                                      6.016667
                                                                   159
                                                                         1.4
                                                                               1.04 0.93
   4
                                                   0
##
       5 2007/01/18
                            М
                               50
                                        TDF
                                              1
                                                      2.355556
                                                                    94
                                                                         0.8
                                                                               1.12 0.90
       6 2007/01/18
##
   6
                            M
                               33
                                        ETV
                                              1
                                                      6.069444
                                                                    32
                                                                         0.7
                                                                               0.88 1.20
                                                   0
       7 2007/01/26
##
                            М
                               49
                                        TDF
                                              1
                                                      8.069444
                                                                   104
                                                                         1.1
                                                                               1.10 0.91
       8 2007/01/31
## 8
                            F
                               50
                                        TDF
                                              0
                                                   0 10.716667
                                                                   143
                                                                         1.5
                                                                               1.10 0.70
## 9
       9 2007/01/31
                            F
                               49
                                        ETV
                                                   0
                                                      2.163889
                                                                    31
                                                                         1.3
                                                                                 NA 0.73
                                              1
## 10 10 2007/02/01
                               50
                                                                  239
                                                                         1.3
                                                                              1.03 1.20
                            М
                                        ETV
                                              0
                                                   0 10.766667
## 11 11 2007/02/01
                               32
                            М
                                        ETV
                                              0
                                                      3.713889
                                                                   359
                                                                         0.9
                                                                               0.97 1.10
## 12 12 2007/02/01
                            М
                               48
                                        TDF
                                              0
                                                   1
                                                      3.269444
                                                                   486
                                                                         0.7
                                                                               1.02 0.81
## 13 13 2007/02/01
                            М
                               51
                                        ETV
                                              0
                                                   0
                                                    10.655556
                                                                    56
                                                                         1.3
                                                                               1.10 1.00
## 14 14 2007/02/02
                            М
                               41
                                        ETV
                                              1
                                                      4.488889
                                                                    34
                                                                         1.7
                                                                               1.08 0.69
## 15 15 2007/02/08
                            М
                               50
                                        ETV
                                                      5.869444
                                                                   107
                                                                         2.1
                                                                               1.57 1.00
                                              1
                                                   1
## 16 16 2007/02/08
                            М
                               51
                                        ETV
                                              1
                                                   0
                                                      4.008333
                                                                    40
                                                                         1.3
                                                                               1.15 0.92
## 17 17 2007/02/09
                            F
                               62
                                        TDF
                                              1
                                                   0
                                                      3.513889
                                                                    48
                                                                         1.0
                                                                               1.02 0.81
## 18 18 2007/02/14
                            F
                               51
                                        ETV
                                              1
                                                      2.372222
                                                                    61
                                                                         2.1
                                                                              1.43 0.60
## 19 19 2007/02/15
                            М
                               48
                                        TDF
                                              0
                                                   0 10.677778
                                                                    34
                                                                         1.1
                                                                               1.10 1.00
## 20 20 2007/02/15
                            F
                               50
                                        ETV
                                              1
                                                   0
                                                      5.030556
                                                                    31
                                                                         0.9
                                                                               1.25 0.63
  21 21 2007/02/15
                               52
                                        TDF
                                                                         1.1
##
                            М
                                              1
                                                   0
                                                      4.725000
                                                                    57
                                                                              1.11 0.80
## 22 22 2007/02/16
                            М
                               30
                                        ETV
                                              0
                                                   0 10.761111
                                                                    81
                                                                         1.0
                                                                               0.97 0.99
## 23 23 2007/02/16
                            М
                               29
                                        TDF
                                              0
                                                   0 10.558333
                                                                    35
                                                                         1.9
                                                                              1.03 0.91
##
   24 24 2007/02/20
                            Μ
                               43
                                        ETV
                                             1
                                                   0
                                                      3.994444
                                                                    84
                                                                         1.1
                                                                              1.07 0.89
##
      b_plt b_alb m6_alt m6_bil m6_inr m6_cr m6_plt m6_alb m12_alt m12_bil m12_inr
## 1
         110
                         35
                                      1.05
                                              0.9
                                                       96
                                                              3.6
                                                                        37
                                                                                1.2
               3.8
                               1.0
                                                                                          NA
## 2
         187
               3.8
                                      0.97
                                                      194
                                                                        18
                                                                                1.1
                                                                                        0.96
                         16
                               1.1
                                              0.7
                                                              3.8
## 3
                       108
                                      1.03
                                                      120
                                                              4.3
                                                                        27
                                                                                1.5
                                                                                        1.02
         133
               3.9
                               1.8
                                              0.9
## 4
         164
               4.2
                         24
                                      1.11
                                              0.9
                                                      149
                                                              4.2
                                                                        29
                                                                                1.2
                                                                                        0.98
                               1.7
## 5
         153
               4.2
                         57
                               0.9
                                      1.10
                                              1.0
                                                      145
                                                              4.6
                                                                        35
                                                                                1.2
                                                                                        1.05
## 6
         170
               3.4
                         26
                               0.8
                                      0.97
                                                                        17
                                                                                0.6
                                              1.4
                                                       NA
                                                              3.4
                                                                                        0.91
## 7
         162
                NA
                         51
                               1.0
                                      1.05
                                              0.8
                                                      128
                                                              3.9
                                                                        42
                                                                                0.7
                                                                                        1.04
## 8
         165
                         24
                                      1.04
                                              0.8
                                                      184
                                                              3.7
                                                                        16
                                                                                0.9
               3.5
                               1.4
                                                                                        1.06
## 9
         157
               3.9
                         25
                               1.3
                                      1.02
                                              0.8
                                                      163
                                                              4.2
                                                                        24
                                                                                0.9
                                                                                        1.04
                                                      158
## 10
         166
               3.2
                         30
                               1.4
                                      1.00
                                              1.0
                                                              3.8
                                                                        34
                                                                                1.3
                                                                                        1.03
## 11
         202
               4.1
                         23
                               1.1
                                      0.98
                                              1.0
                                                      171
                                                              4.4
                                                                        19
                                                                                0.9
                                                                                        0.94
## 12
         159
               2.8
                         34
                               0.9
                                      0.96
                                              0.8
                                                      215
                                                              3.3
                                                                        24
                                                                                0.8
                                                                                        0.95
                                                                        17
                                                                                1.4
## 13
         186
               4.2
                         18
                               1.3
                                        NA
                                              1.1
                                                       NA
                                                              4.2
                                                                                        1.01
## 14
         159
                NA
                         23
                               1.6
                                      0.97
                                              0.9
                                                      164
                                                              3.7
                                                                        19
                                                                                1.2
                                                                                        0.97
## 15
          66
                         42
                               1.0
                                      1.15
                                              1.0
                                                       80
                                                              3.7
                                                                        36
                                                                                1.1
                                                                                        1.09
               2.1
##
  16
         118
               3.4
                         33
                               1.1
                                      1.09
                                              1.0
                                                      129
                                                              4.0
                                                                        30
                                                                                1.1
                                                                                        0.98
##
  17
         105
               4.0
                         28
                               0.9
                                      1.03
                                              0.7
                                                      121
                                                              3.9
                                                                        31
                                                                                0.9
                                                                                        1.06
##
  18
          55
                         25
                               1.2
                                      1.21
                                              0.7
                                                       67
                                                              3.5
                                                                        24
                                                                                0.7
               2.7
                                                                                        1.15
## 19
                               0.8
                                        NA
                                                                        13
          NA
               4.3
                         13
                                              1.1
                                                       NA
                                                              4.3
                                                                                1.1
                                                                                        1.02
## 20
         163
               3.1
                         29
                               1.3
                                      1.19
                                              0.7
                                                       40
                                                              3.3
                                                                        31
                                                                                1.4
                                                                                        1.17
                                              0.8
                                                              4.0
## 21
                               1.3
                                      1.11
                                                       74
                                                                        34
                                                                                1.3
          91
               4.1
                         39
                                                                                        1.04
## 22
         292
               4.1
                         50
                               1.0
                                      0.93
                                              0.9
                                                      264
                                                              4.4
                                                                        63
                                                                                0.8
                                                                                        0.93
```

```
## 23
        204
              4.4
                       26
                             2.3
                                   1.00
                                           0.9
                                                                                  0.93
                                                   NA
                                                          4.1
                                                                   28
                                                                          1.3
                                                                                  1.02
## 24
        181
              4.2
                       63
                             0.8
                                   1.02
                                          0.9
                                                  144
                                                          4.5
                                                                   52
                                                                          0.9
##
      m12_cr m12_plt m12_alb
                                         risk_gr
## 1
         1.0
                 111
                                      high_risk
                          4.0
## 2
                  239
         0.6
                          4.0
                                        low_risk
## 3
         0.9
                 120
                          4.2 intermediate risk
## 4
         0.8
                 185
                          4.1
                                       low risk
                                      high_risk
## 5
         1.0
                 141
                          4.5
## 6
         1.9
                 179
                          3.0 intermediate_risk
## 7
         NA
                          3.9 intermediate_risk
                  NA
## 8
         0.7
                 138
                          3.4 intermediate_risk
## 9
         0.7
                 148
                          3.9 intermediate_risk
## 10
         1.0
                 151
                          3.7 intermediate_risk
## 11
         1.1
                  NA
                          4.3
                                        low_risk
## 12
         0.8
                 272
                          3.4
                                        low_risk
## 13
         1.1
                 143
                          4.3 intermediate_risk
## 14
         0.8
                 175
                          3.8 intermediate_risk
## 15
                 103
                          4.2
         1.1
                                      high_risk
## 16
         NA
                  NA
                          4.1
                                      high_risk
                          3.9
                                      high_risk
## 17
          NA
                  NA
## 18
         0.6
                  61
                          3.5
                                      high_risk
## 19
         1.1
                 143
                          4.2
                                       low_risk
## 20
         0.7
                  36
                          3.4
                                      high_risk
## 21
         0.8
                  64
                          3.9
                                      high risk
## 22
                                       low_risk
         1.0
                 286
                          4.5
## 23
         0.9
                 113
                          4.0
                                        low risk
## 24
         1.0
                  136
                          4.3 intermediate_risk
dat1 %>%
  mutate(risk_gr=ifelse(age>=50 & lc==1, 'high_risk',
                         ifelse(age<50 & 1c==0,
                         'low_risk', 'intermediate_risk'))) %>%
  count(risk_gr)
##
               risk_gr n
## 1
             high_risk 8
```

2 intermediate_risk 9

low_risk 7

3

새로운 변수 만들고 나머지 변수 제거

```
##
                risk_gr
## 1
              high_risk
## 2
               low_risk
## 3 intermediate_risk
## 4
               low risk
## 5
             high_risk
## 6 intermediate_risk
## 7 intermediate_risk
## 8 intermediate_risk
## 9 intermediate_risk
## 10 intermediate_risk
## 11
               low_risk
## 12
               low_risk
## 13 intermediate_risk
## 14 intermediate_risk
## 15
              high_risk
## 16
             high_risk
## 17
              high_risk
## 18
              high_risk
## 19
               low_risk
## 20
              high_risk
## 21
              high_risk
## 22
               low_risk
## 23
               low_risk
## 24 intermediate_risk
```

변수값의 순서를 새로운 변수로 만들기

```
dat1 %>%
  mutate(age_rank = min_rank(age)) %>%
  select(id, age, age_rank)
```

```
id age age_rank
## 1
     1 54
## 2
     2 45
                 8
## 3 3 49
                11
## 4 4 26
                 1
## 5 5 50
               14
## 6 6 33
                5
## 7 7 49
                11
## 8 8 50
                14
## 9
     9 49
                11
## 10 10 50
                14
## 11 11 32
                 4
## 12 12 48
                 9
## 13 13 51
                19
## 14 14 41
                 6
## 15 15 50
                14
## 16 16 51
                 19
                24
## 17 17 62
                19
## 18 18 51
## 19 19 48
                 9
## 20 20 50
                14
## 21 21 52
                22
## 22 22 30
                 3
## 23 23 29
                 2
## 24 24 43
```

내림차순

```
dat1 %>%
  mutate(age_rank = min_rank(desc(age))) %>%
  select(id, age, age_rank)
```

```
##
     id age age_rank
## 1
     1 54
## 2
     2 45
                 17
## 3
      3 49
                 12
## 4
      4 26
                 24
## 5
      5 50
                  7
## 6
      6 33
                 20
## 7
      7 49
                 12
## 8 8 50
                  7
## 9
      9 49
                 12
                  7
## 10 10 50
## 11 11 32
                 21
## 12 12
                 15
## 13 13 51
                  4
## 14 14 41
                 19
                  7
## 15 15 50
## 16 16 51
                  4
## 17 17 62
                  1
## 18 18 51
                  4
## 19 19 48
                 15
## 20 20 50
                  7
## 21 21 52
                  3
## 22 22 30
                 22
## 23 23 29
                 23
## 24 24 43
                 18
```

순서를 정할 때 중간에 gap없이 새로운 변수 만들기

min_rank와 차이는 1등이 2명인 경우 3등이 아니라 2등으로 나옴

```
dat1 %>%
  mutate(age_rank = dense_rank(age)) %>%
  select(id, age, age_rank)
```

```
##
     id age age_rank
## 1
     1 54
                  14
## 2
      2 45
                   8
## 3
      3 49
                  10
## 4
      4 26
                   1
## 5
      5 50
                  11
## 6
      6 33
                  5
## 7
      7 49
                  10
## 8
      8 50
                  11
## 9
      9 49
                  10
## 10 10 50
                  11
## 11 11
        32
                   4
                   9
## 12 12 48
## 13 13 51
                  12
## 14 14 41
                   6
## 15 15 50
                  11
## 16 16 51
                  12
## 17 17 62
                  15
                  12
## 18 18 51
## 19 19 48
                   9
## 20 20 50
                  11
## 21 21 52
                  13
## 22 22 30
                   3
## 23 23 29
                   2
## 24 24 43
                   7
```

퍼센트 순위로 새로운 변수 만들기

```
dat1 %>%
  mutate(age_rank = percent_rank(age)) %>%
  select(id, age, age_rank) %>%
  arrange(age_rank)
```

```
##
     id age
              age_rank
## 1
     4 26 0.00000000
## 2 23 29 0.04347826
## 3 22 30 0.08695652
## 4 11 32 0.13043478
## 5
      6 33 0.17391304
## 6
     14 41 0.21739130
## 7
     24 43 0.26086957
      2 45 0.30434783
## 8
## 9 12 48 0.34782609
## 10 19 48 0.34782609
## 11
     3 49 0.43478261
## 12
     7 49 0.43478261
## 13
     9 49 0.43478261
## 14
      5 50 0.56521739
## 15
      8 50 0.56521739
## 16 10 50 0.56521739
## 17 15 50 0.56521739
## 18 20 50 0.56521739
## 19 13 51 0.78260870
## 20 16 51 0.78260870
## 21 18 51 0.78260870
## 22 21 52 0.91304348
## 23 1 54 0.95652174
## 24 17 62 1.00000000
```

누적합계를 변수로 만들기

```
dat1 %>%
  mutate(id_sum = cumsum(id)) %>%
  select(id, id_sum)
```

```
##
      id id_sum
## 1
      1
             1
## 2
      2
             3
## 3
      3
             6
## 4
      4
            10
## 5
      5
            15
## 6
      6
            21
## 7
      7
            28
## 8
            36
      8
## 9
      9
            45
## 10 10
            55
## 11 11
            66
## 12 12
            78
## 13 13
            91
## 14 14
            105
## 15 15
            120
## 16 16
            136
## 17 17
            153
## 18 18
            171
## 19 19
            190
## 20 20
            210
## 21 21
           231
## 22 22
           253
## 23 23
           276
## 24 24
           300
```

동시에 여러 개의 새로운 변수 만들기

```
##
            age_gr b_bil bil_gr
      age
## 1
      54 above 50
                     1.2
## 2
      45 below 50
                     1.1
                              Α
## 3
      49 below 50
                     1.8
                              Α
## 4
      26 below 50
                     1.4
## 5
       50 above 50
                     0.8
                              Α
## 6
       33 below 50
                     0.7
## 7
       49 below 50
                     1.1
                              Α
## 8
       50 above 50
                     1.5
## 9
       49 below 50
                     1.3
                              Α
## 10 50 above 50
                     1.3
                              Α
## 11 32 below 50
                     0.9
                              Α
## 12 48 below 50
                     0.7
                              Α
## 13 51 above 50
                     1.3
                              Α
## 14 41 below 50
                     1.7
                              Α
## 15 50 above 50
                              В
                     2.1
## 16 51 above 50
                     1.3
                              Α
## 17 62 above 50
                     1.0
                              Α
## 18 51 above 50
                     2.1
                              В
## 19 48 below 50
                     1.1
                              Α
## 20 50 above 50
                     0.9
                              Α
## 21 52 above 50
                     1.1
                              Α
## 22 30 below 50
                     1.0
                              Α
## 23 29 below 50
                     1.9
## 24 43 below 50
                     1.1
                              Α
```

연속형 변수를 일정 범위마다 그룹화하기

```
##
      age age_gr
## 1
      54
            >=50
## 2
       45
            >=40
## 3
       49
            >=40
## 4
       26
            <30
            >=50
## 5
       50
## 6
       33
            >=30
## 7
       49
            >=40
## 8
            >=50
       50
## 9
            >=40
       49
## 10
       50
            >=50
## 11
       32
            >=30
            >=40
## 12
       48
       51
            >=50
## 13
## 14
      41
            >=40
## 15
       50
            >=50
## 16
            >=50
      51
## 17
       62
            >=60
## 18 51
            >=50
## 19
      48
            >=40
## 20
       50
            >=50
## 21
       52
            >=50
## 22
       30
            >=30
## 23
      29
            <30
## 24
      43
            >=40
```

간단하게

```
##
      age age_gr
## 1
      54
            >=50
## 2
            >=40
       45
## 3
       49
            >=40
## 4
       26
             <30
## 5
       50
            >=40
## 6
            >=30
       33
## 7
       49
            >=40
## 8
       50
            >=40
## 9
       49
            >=40
## 10
       50
            >=40
## 11
       32
            >=30
## 12
       48
            >=40
## 13
       51
            >=50
## 14
      41
            >=40
## 15
      50
            >=40
## 16
       51
            >=50
## 17
      62
            >=60
## 18
      51
            >=50
## 19
       48
            >=40
## 20
       50
            >=40
## 21
      52
            >=50
## 22
       30
            <30
## 23
       29
             <30
## 24 43
            >=40
```

10세 차이를 기준으로 분류하기

```
dat1 %>%
  mutate(age_gr=cut_width(age, width=10)) %>%
  select(age, age_gr)
```

```
##
     age age_gr
## 1 54 (45,55]
## 2 45 (35,45]
## 3
     49 (45,55]
## 4 26 [25,35]
## 5 50 (45,55]
## 6
     33 [25,35]
## 7
     49 (45,55]
## 8
      50 (45,55]
## 9
      49 (45,55]
## 10 50 (45,55]
## 11 32 [25,35]
## 12 48 (45,55]
## 13 51 (45,55]
## 14 41 (35,45]
## 15 50 (45,55]
## 16 51 (45,55]
## 17 62 (55,65]
## 18 51 (45,55]
## 19 48 (45,55]
## 20 50 (45,55]
## 21 52 (45,55]
## 22 30 [25,35]
## 23 29 [25,35]
## 24 43 (35,45]
```

구간 범위에 옵션주기

```
dat1 %>%
  mutate(age_gr=cut_width(age, width=10, boundary=0)) %>%
  mutate(age_gr2=cut_width(age, width=10, boundary=9)) %>%
  select(age, age_gr, age_gr2)
```

```
age age_gr age_gr2
## 1
     54 (50,60] (49,59]
## 2
      45 (40,50] (39,49]
## 3
      49 (40,50] (39,49]
## 4
      26 [20,30] [19,29]
      50 (40,50] (49,59]
## 5
## 6
      33 (30,40] (29,39]
## 7
      49 (40,50] (39,49]
## 8
       50 (40,50] (49,59]
## 9
       49 (40,50] (39,49]
## 10 50 (40,50] (49,59]
## 11
      32 (30,40] (29,39]
## 12 48 (40,50] (39,49]
## 13 51 (50,60] (49,59]
## 14
      41 (40,50] (39,49]
## 15 50 (40,50] (49,59]
## 16 51 (50,60] (49,59]
## 17 62 (60,70] (59,69]
## 18 51 (50,60] (49,59]
## 19 48 (40,50] (39,49]
## 20 50 (40,50] (49,59]
## 21 52 (50,60] (49,59]
## 22 30 [20,30] (29,39]
## 23 29 [20,30] [19,29]
## 24 43 (40,50] (39,49]
```

연속형 변수를 균일한 범위를 가지는 그룹으로 나누기

```
dat1 %>%
  mutate(age_gr=cut_interval(age, n=4)) %>%
  select(age, age_gr) %>%
  count(age_gr)
```

```
## age_gr n
## 1 [26,35] 5
## 2 (35,44] 2
## 3 (44,53] 15
## 4 (53,62] 2
```

연속형 변수를 원하는 개수의 그룹으로 나누기

```
dat1 %>%
 mutate(age_gr = cut_number(age, n=5)) %>%
select(age, age_gr)
##
      age
               age_gr
## 1
       54
              (51,62]
## 2
       45 (37.8,48.2]
## 3
       49
            (48.2,50]
## 4
       26
            [26,37.8]
            (48.2,50]
## 5
       50
## 6
       33
            [26,37.8]
## 7
            (48.2,50]
       49
## 8
       50
            (48.2,50]
## 9
       49
            (48.2,50]
## 10 50
            (48.2,50]
## 11
      32
            [26,37.8]
## 12
       48 (37.8,48.2]
## 13 51
              (50,51]
## 14
      41 (37.8,48.2]
## 15 50
            (48.2,50]
## 16 51
              (50,51]
## 17 62
              (51,62]
## 18 51
              (50,51]
## 19 48 (37.8,48.2]
## 20 50
           (48.2,50]
## 21 52
             (51,62]
## 22 30
            [26,37.8]
## 23 29
            [26,37.8]
## 24 43 (37.8,48.2]
  mutate(age_gr = cut_number(age, n=5)) %>%
 select(age, age_gr) %>%
count(age_gr)
##
          age_gr n
## 1
       [26,37.8] 5
## 2 (37.8,48.2] 5
## 3
       (48.2,50] 8
## 4
         (50,51] 3
## 5
         (51,62] 3
```

5. Arrange

오름차순

```
dat1 %>%
  arrange(age)
```

```
##
      id index_date gender age treat_gr lc hcc
                                                        hcc_yr b_alt b_bil b_inr b_cr
## 1
       4 2007/01/12
                            М
                               26
                                        ETV
                                                     6.016667
                                                                  159
                                                                         1.4
                                                                             1.04 0.93
## 2
      23 2007/02/16
                               29
                                        TDF
                                              0
                                                  0 10.558333
                                                                   35
                                                                         1.9
                                                                              1.03 0.91
                            М
## 3
      22 2007/02/16
                            М
                               30
                                        ETV
                                             0
                                                  0
                                                    10.761111
                                                                   81
                                                                         1.0
                                                                              0.97 0.99
                               32
                                                                  359
## 4
      11 2007/02/01
                           М
                                        ETV
                                             0
                                                  0
                                                     3.713889
                                                                         0.9
                                                                              0.97 1.10
       6 2007/01/18
                               33
                                        ETV
                                                     6.069444
                                                                   32
                                                                         0.7
                                                                              0.88 1.20
                           Μ
                                              1
      14 2007/02/02
                                        ETV
                                                     4.488889
                                                                         1.7
                                                                              1.08 0.69
## 6
                           Μ
                               41
                                              1
                                                  0
                                                                   34
  7
      24 2007/02/20
                           Μ
                               43
                                        ETV
                                              1
                                                     3.994444
                                                                   84
                                                                         1.1
                                                                              1.07 0.89
##
## 8
       2 2007/01/10
                           F
                               45
                                        ETV
                                             0
                                                     9.763889
                                                                   32
                                                                         1.1
                                                                             0.90 0.60
                                                  0
## 9
      12 2007/02/01
                           Μ
                               48
                                        TDF
                                                     3.269444
                                                                  486
                                                                         0.7
                                                                              1.02 0.81
                                                                         1.1 1.10 1.00
## 10 19 2007/02/15
                           М
                               48
                                        TDF
                                             0
                                                  0 10.677778
                                                                   34
       3 2007/01/11
                                        TDF
                                                  0 10.594444
                                                                         1.8
## 11
                           М
                               49
                                             1
                                                                  106
                                                                              1.03 1.05
## 12
       7 2007/01/26
                           Μ
                               49
                                        TDF
                                             1
                                                  1
                                                     8.069444
                                                                  104
                                                                         1.1
                                                                              1.10 0.91
## 13
       9 2007/01/31
                           F
                               49
                                        ETV
                                             1
                                                     2.163889
                                                                   31
                                                                         1.3
                                                                                NA 0.73
                                                  0
       5 2007/01/18
                                        TDF
                                                     2.355556
                                                                         0.8
                                                                             1.12 0.90
##
   14
                           М
                               50
                                             1
                                                  0
                                                                   94
                           F
##
   15
       8 2007/01/31
                               50
                                        TDF
                                             0
                                                  0 10.716667
                                                                  143
                                                                         1.5
                                                                              1.10 0.70
                           Μ
                               50
                                        ETV
                                             0
                                                  0 10.766667
   16 10 2007/02/01
                                                                  239
                                                                         1.3
                                                                             1.03 1.20
## 17 15 2007/02/08
                           М
                               50
                                        ETV
                                              1
                                                     5.869444
                                                                  107
                                                                         2.1
                                                                              1.57 1.00
## 18 20 2007/02/15
                           F
                               50
                                        ETV
                                              1
                                                  0
                                                     5.030556
                                                                   31
                                                                         0.9
                                                                              1.25 0.63
                                                  0 10.655556
## 19 13 2007/02/01
                           Μ
                               51
                                        ETV
                                             0
                                                                         1.3
                                                                              1.10 1.00
                                                                   56
## 20 16 2007/02/08
                               51
                                        ETV
                                                     4.008333
                                                                   40
                                                                         1.3
                                                                              1.15 0.92
## 21 18 2007/02/14
                            F
                               51
                                        ETV
                                                     2.372222
                                                                         2.1
                                                                              1.43 0.60
                                             1
                                                  0
                                                                   61
  22 21 2007/02/15
                            М
                               52
                                        TDF
                                             1
                                                     4.725000
                                                                   57
                                                                         1.1
                                                                              1.11 0.80
                                                                         1.2 1.17 1.00
##
  23
      1 2007/01/05
                            M
                               54
                                        ETV
                                             1
                                                     7.641667
                                                                   67
   24 17 2007/02/09
                            F
                               62
                                        TDF
                                              1
                                                  0
                                                     3.513889
                                                                   48
                                                                         1.0 1.02 0.81
      b_plt b_alb m6_alt m6_bil m6_inr m6_cr m6_plt m6_alb m12_alt m12_bil m12_inr
##
## 1
         164
               4.2
                        24
                               1.7
                                      1.11
                                              0.9
                                                      149
                                                             4.2
                                                                        29
                                                                               1.2
                                                                                       0.98
## 2
         204
               4.4
                        26
                               2.3
                                      1.00
                                              0.9
                                                       NA
                                                             4.1
                                                                        28
                                                                               1.3
                                                                                       0.93
## 3
         292
                                      0.93
                                              0.9
                                                      264
                                                             4.4
                                                                               0.8
                                                                                       0.93
               4.1
                        50
                               1.0
                                                                        63
## 4
         202
                        23
                                      0.98
                                                      171
                                                             4.4
                                                                        19
                                                                               0.9
                                                                                       0.94
               4.1
                               1.1
                                              1.0
## 5
         170
               3.4
                        26
                               0.8
                                      0.97
                                              1.4
                                                       NA
                                                             3.4
                                                                       17
                                                                               0.6
                                                                                       0.91
## 6
         159
                NA
                        23
                               1.6
                                      0.97
                                              0.9
                                                      164
                                                             3.7
                                                                        19
                                                                               1.2
                                                                                       0.97
## 7
         181
               4.2
                        63
                               0.8
                                      1.02
                                              0.9
                                                      144
                                                             4.5
                                                                       52
                                                                               0.9
                                                                                       1.02
## 8
         187
               3.8
                                      0.97
                                              0.7
                                                      194
                                                                        18
                                                                               1.1
                                                                                       0.96
                        16
                               1.1
                                                             3.8
## 9
         159
               2.8
                        34
                               0.9
                                      0.96
                                              0.8
                                                      215
                                                             3.3
                                                                       24
                                                                               0.8
                                                                                       0.95
## 10
          NA
               4.3
                        13
                               0.8
                                        NA
                                              1.1
                                                       NA
                                                             4.3
                                                                        13
                                                                               1.1
                                                                                       1.02
## 11
         133
               3.9
                       108
                               1.8
                                      1.03
                                                      120
                                                             4.3
                                                                        27
                                                                               1.5
                                                                                       1.02
                                              0.9
## 12
         162
                NA
                        51
                               1.0
                                      1.05
                                              0.8
                                                      128
                                                             3.9
                                                                        42
                                                                               0.7
                                                                                       1.04
## 13
                                      1.02
         157
               3.9
                        25
                               1.3
                                              0.8
                                                      163
                                                             4.2
                                                                       24
                                                                               0.9
                                                                                       1.04
## 14
         153
               4.2
                        57
                               0.9
                                      1.10
                                              1.0
                                                      145
                                                             4.6
                                                                        35
                                                                               1.2
                                                                                       1.05
                                      1.04
## 15
                                              0.8
                                                                               0.9
         165
               3.5
                        24
                               1.4
                                                      184
                                                             3.7
                                                                       16
                                                                                       1.06
## 16
         166
               3.2
                        30
                               1.4
                                      1.00
                                              1.0
                                                      158
                                                             3.8
                                                                       34
                                                                               1.3
                                                                                       1.03
## 17
          66
               2.1
                        42
                               1.0
                                      1.15
                                              1.0
                                                       80
                                                             3.7
                                                                       36
                                                                               1.1
                                                                                       1.09
## 18
                                      1.19
                                              0.7
                                                       40
                                                             3.3
         163
               3.1
                        29
                               1.3
                                                                        31
                                                                               1.4
                                                                                       1.17
## 19
         186
               4.2
                        18
                               1.3
                                        NA
                                              1.1
                                                       NA
                                                             4.2
                                                                       17
                                                                               1.4
                                                                                       1.01
```

```
## 20
        118
               3.4
                        33
                              1.1
                                    1.09
                                            1.0
                                                    129
                                                           4.0
                                                                     30
                                                                             1.1
                                                                                    0.98
## 21
         55
               2.7
                        25
                              1.2
                                    1.21
                                            0.7
                                                     67
                                                           3.5
                                                                     24
                                                                             0.7
                                                                                    1.15
                                                                                    1.04
                                     1.11
## 22
         91
               4.1
                        39
                              1.3
                                            0.8
                                                     74
                                                           4.0
                                                                     34
                                                                             1.3
## 23
        110
               3.8
                       35
                              1.0
                                     1.05
                                            0.9
                                                     96
                                                           3.6
                                                                     37
                                                                             1.2
                                                                                      NA
## 24
        105
                        28
                              0.9
                                    1.03
                                            0.7
                                                    121
                                                           3.9
                                                                     31
                                                                             0.9
                                                                                    1.06
               4.0
##
      m12_cr m12_plt m12_alb
         0.8
                  185
                           4.1
## 1
                           4.0
## 2
         0.9
                  113
## 3
                  286
                           4.5
         1.0
## 4
                           4.3
         1.1
                   NA
## 5
                           3.0
         1.9
                  179
## 6
         0.8
                  175
                           3.8
## 7
         1.0
                  136
                           4.3
## 8
                           4.0
         0.6
                  239
## 9
         0.8
                  272
                           3.4
## 10
                           4.2
         1.1
                  143
## 11
         0.9
                  120
                           4.2
                           3.9
## 12
          NA
                   NA
## 13
         0.7
                  148
                           3.9
## 14
         1.0
                  141
                           4.5
## 15
                           3.4
         0.7
                  138
## 16
         1.0
                  151
                           3.7
## 17
         1.1
                  103
                           4.2
         0.7
                           3.4
## 18
                   36
## 19
         1.1
                  143
                           4.3
## 20
          NA
                   NA
                           4.1
## 21
         0.6
                   61
                           3.5
## 22
         0.8
                   64
                           3.9
## 23
         1.0
                           4.0
                  111
## 24
          NA
                   NA
                           3.9
```

dat1 %>% arrange(desc(age))

```
##
       id index_date gender age treat_gr lc hcc
                                                         hcc_yr b_alt b_bil b_inr b_cr
                                62
                                                                              1.02 0.81
## 1
      17 2007/02/09
                            F
                                         TDF
                                                   0
                                                      3.513889
                                                                    48
                                                                          1.0
##
  2
       1 2007/01/05
                            М
                                54
                                         ETV
                                                      7.641667
                                                                    67
                                                                          1.2
                                                                               1.17 1.00
                                              1
                                                   1
##
  3
      21 2007/02/15
                            Μ
                               52
                                         TDF
                                              1
                                                   0
                                                      4.725000
                                                                    57
                                                                          1.1
                                                                               1.11 0.80
##
   4
      13 2007/02/01
                            Μ
                               51
                                         ETV
                                              0
                                                   0
                                                     10.655556
                                                                    56
                                                                          1.3
                                                                               1.10 1.00
##
   5
      16 2007/02/08
                            М
                               51
                                         ETV
                                              1
                                                      4.008333
                                                                    40
                                                                          1.3
                                                                               1.15 0.92
      18 2007/02/14
                            F
                               51
                                         ETV
                                                      2.372222
                                                                          2.1
                                                                               1.43 0.60
##
  6
                                              1
                                                   0
                                                                    61
##
  7
       5 2007/01/18
                            Μ
                               50
                                         TDF
                                              1
                                                   0
                                                      2.355556
                                                                    94
                                                                          0.8
                                                                               1.12 0.90
                            F
                                50
                                                                          1.5
## 8
        8 2007/01/31
                                         TDF
                                              0
                                                   0 10.716667
                                                                   143
                                                                               1.10 0.70
      10 2007/02/01
                                50
                                         ETV
                                                     10.766667
                                                                   239
                                                                          1.3
                                                                               1.03 1.20
   9
                            Μ
                                              0
  10 15 2007/02/08
                               50
                                         ETV
                                                                   107
                                                                               1.57 1.00
##
                            Μ
                                              1
                                                      5.869444
                                                                          2.1
                                                   1
   11 20 2007/02/15
                            F
                                50
                                         ETV
                                              1
                                                      5.030556
                                                                    31
                                                                          0.9
                                                                               1.25 0.63
  12
##
       3 2007/01/11
                            М
                                49
                                         TDF
                                                   0 10.594444
                                                                   106
                                                                          1.8
                                                                               1.03 1.05
                                              1
       7 2007/01/26
                                49
                                                      8.069444
                                                                               1.10 0.91
## 13
                            М
                                         TDF
                                              1
                                                                   104
                                                                          1.1
## 14
       9 2007/01/31
                            F
                                49
                                        ETV
                                                   0
                                                      2.163889
                                                                    31
                                                                          1.3
                                                                                  NA 0.73
                                              1
## 15 12 2007/02/01
                                                                               1.02 0.81
                            М
                                48
                                        TDF
                                              0
                                                   1
                                                      3.269444
                                                                   486
                                                                          0.7
## 16 19 2007/02/15
                                48
                                         TDF
                                              0
                                                   0 10.677778
                                                                    34
                                                                               1.10 1.00
                            М
                                                                          1.1
## 17
       2 2007/01/10
                            F
                                45
                                         ETV
                                              0
                                                   0
                                                      9.763889
                                                                    32
                                                                          1.1
                                                                               0.90 0.60
   18 24 2007/02/20
                                                                               1.07 0.89
##
                            М
                               43
                                        ETV
                                              1
                                                   0
                                                      3.994444
                                                                    84
                                                                          1.1
##
   19 14 2007/02/02
                            Μ
                               41
                                         ETV
                                              1
                                                   0
                                                      4.488889
                                                                    34
                                                                          1.7
                                                                               1.08 0.69
  20
                                33
                                                      6.069444
                                                                    32
##
       6 2007/01/18
                            Μ
                                         ETV
                                              1
                                                   0
                                                                          0.7
                                                                               0.88 1.20
## 21 11 2007/02/01
                            Μ
                                32
                                         ETV
                                              0
                                                   0
                                                      3.713889
                                                                   359
                                                                          0.9
                                                                               0.97 1.10
## 22 22 2007/02/16
                            М
                                30
                                         ETV
                                              0
                                                   0 10.761111
                                                                    81
                                                                          1.0
                                                                               0.97 0.99
                                                   0 10.558333
  23 23 2007/02/16
                            М
                                29
                                         TDF
                                              0
                                                                    35
                                                                          1.9
                                                                               1.03 0.91
##
##
   24
       4 2007/01/12
                            M
                                26
                                         ETV
                                              0
                                                   0
                                                      6.016667
                                                                   159
                                                                          1.4
                                                                               1.04 0.93
##
      b_plt b_alb m6_alt m6_bil m6_inr m6_cr m6_plt m6_alb m12_alt m12_bil m12_inr
##
                         28
                                0.9
                                      1.03
                                              0.7
                                                      121
                                                              3.9
                                                                         31
                                                                                 0.9
                                                                                         1.06
   1
         105
                4.0
##
  2
         110
                3.8
                         35
                                1.0
                                      1.05
                                              0.9
                                                        96
                                                              3.6
                                                                         37
                                                                                 1.2
                                                                                           NA
## 3
          91
                4.1
                         39
                                1.3
                                      1.11
                                              0.8
                                                        74
                                                              4.0
                                                                         34
                                                                                 1.3
                                                                                         1.04
## 4
         186
                4.2
                                        NA
                                                              4.2
                                                                         17
                                                                                 1.4
                                                                                         1.01
                         18
                                1.3
                                              1.1
                                                       NA
## 5
         118
                3.4
                         33
                               1.1
                                      1.09
                                              1.0
                                                      129
                                                              4.0
                                                                         30
                                                                                 1.1
                                                                                         0.98
                               1.2
                                      1.21
                                                              3.5
## 6
          55
                2.7
                         25
                                              0.7
                                                        67
                                                                         24
                                                                                 0.7
                                                                                         1.15
                                                              4.6
## 7
         153
                4.2
                         57
                                0.9
                                      1.10
                                              1.0
                                                      145
                                                                         35
                                                                                 1.2
                                                                                         1.05
## 8
         165
                3.5
                         24
                                      1.04
                                                      184
                                                              3.7
                                                                                 0.9
                                1.4
                                              0.8
                                                                         16
                                                                                         1.06
## 9
         166
                3.2
                         30
                                1.4
                                      1.00
                                              1.0
                                                      158
                                                              3.8
                                                                         34
                                                                                 1.3
                                                                                         1.03
## 10
          66
                2.1
                         42
                                1.0
                                      1.15
                                              1.0
                                                       80
                                                              3.7
                                                                         36
                                                                                 1.1
                                                                                         1.09
## 11
         163
                3.1
                         29
                                1.3
                                      1.19
                                              0.7
                                                        40
                                                              3.3
                                                                         31
                                                                                 1.4
                                                                                         1.17
## 12
                                      1.03
                                              0.9
                                                      120
                                                              4.3
                                                                         27
                                                                                 1.5
         133
                3.9
                        108
                                1.8
                                                                                         1.02
##
  13
         162
                         51
                                1.0
                                      1.05
                                              0.8
                                                      128
                                                              3.9
                                                                         42
                                                                                 0.7
                                                                                         1.04
                NA
##
   14
         157
                3.9
                         25
                                1.3
                                      1.02
                                              0.8
                                                      163
                                                              4.2
                                                                         24
                                                                                 0.9
                                                                                         1.04
##
  15
         159
                2.8
                                      0.96
                                                      215
                                                              3.3
                                                                         24
                                                                                 0.8
                                                                                         0.95
                         34
                                0.9
                                              0.8
##
   16
         NA
                4.3
                         13
                                0.8
                                        NA
                                              1.1
                                                       NA
                                                              4.3
                                                                         13
                                                                                 1.1
                                                                                         1.02
##
   17
         187
                         16
                                1.1
                                      0.97
                                              0.7
                                                      194
                                                              3.8
                                                                         18
                                                                                 1.1
                                                                                         0.96
                3.8
## 18
                         63
                                0.8
                                      1.02
                                              0.9
                                                      144
                                                              4.5
                                                                         52
                                                                                 0.9
                                                                                         1.02
         181
                4.2
## 19
                                      0.97
                                                      164
                                                                                 1.2
         159
                NA
                         23
                                1.6
                                              0.9
                                                              3.7
                                                                         19
                                                                                         0.97
## 20
         170
                3.4
                         26
                               0.8
                                      0.97
                                              1.4
                                                       NA
                                                              3.4
                                                                         17
                                                                                 0.6
                                                                                         0.91
## 21
         202
                4.1
                         23
                               1.1
                                      0.98
                                              1.0
                                                      171
                                                              4.4
                                                                         19
                                                                                 0.9
                                                                                         0.94
## 22
                                      0.93
                                              0.9
                                                      264
                                                                                 0.8
                                                                                         0.93
         292
                4.1
                         50
                                1.0
                                                              4.4
                                                                         63
         204
                                              0.9
                                                              4.1
## 23
                4.4
                         26
                                2.3
                                      1.00
                                                       NA
                                                                         28
                                                                                 1.3
                                                                                         0.93
```

##	24	164	4.2	24	1.7	1.11	0.9	149	4.2	29	1.2	0.98
##		${\tt m12_cr}$	$m12_plt$	m12_all	b							
##	1	NA	NA	3.9	9							
##	2	1.0	111	4.0	0							
##	3	0.8	64	3.9	9							
##	4	1.1	143	4.3	3							
##	5	NA	NA	4.	1							
##	6	0.6	61	3.	5							
##	7	1.0	141	4.	5							
##	8	0.7	138	3.4	4							
##	9	1.0	151	3.	7							
	10	1.1	103	4.5	2							
##	11	0.7	36	3.4	4							
##	12	0.9	120	4.5	2							
##	13	NA	NA	3.9	9							
##	14	0.7	148	3.9	9							
##	15	0.8	272	3.4	4							
##	16	1.1	143	4.5	2							
##	17	0.6	239	4.0	0							
##	18	1.0	136	4.3	3							
##	19	0.8	175	3.8								
	20	1.9	179	3.0	0							
	21	1.1	NA	4.3	3							
##	22	1.0	286	4.	5							
##	23	0.9	113	4.0	0							
##	24	0.8	185	4.	1							

여러 개 변수를 오름차순

```
dat1 %>%
  arrange(age, b_alt) %>%
  select(age, b_alt)
```

```
##
     age b_alt
## 1
      26
          159
## 2
      29
            35
## 3
      30
           81
## 4
      32
           359
## 5
      33
           32
## 6
      41
           34
## 7
      43
           84
## 8
      45
            32
## 9
      48
           34
## 10 48
           486
## 11
      49
           31
## 12
      49
           104
## 13 49
           106
## 14 50
           31
## 15 50
           94
## 16 50
           107
## 17 50
           143
## 18 50
           239
## 19 51
            40
## 20 51
            56
## 21 51
            61
## 22 52
            57
## 23 54
            67
## 24 62
            48
```

6. Summarise

원하는 변수의 평균 구하기

```
dat1 %>%
   summarise(mean_age = mean(age))

## mean_age
## 1 45.54167
```

여러 개의 요약정보 동시에 구하기

고유값 개수 확인

발생률 구하기

7. Group_by

원하는 변수로 나누어 각각 값 계산

해당 조건을 만족하는 환자의 숫자를 변수로 만들기

```
dat1 %>%
 group_by(gender, lc) %>%
 summarise(patient_no = n(),
          mean_age = mean(age))
## `summarise()` has grouped output by 'gender'. You can override using the
## `.groups` argument.
## # A tibble: 4 x 4
## # Groups: gender [2]
    gender lc patient_no mean_age
## <chr> <int> <int> <dbl>
         0
                    2
## 1 F
                             47.5
## 2 F
            1
                      4
                             53
                      8
## 3 M
            0
                             39.2
## 4 M
                      10
                             47.2
dat1 %>%
 group_by(gender, lc) %>%
 summarise(patient_no = n(),
          mean_inr = mean(b_inr))
## `summarise()` has grouped output by 'gender'. You can override using the
## `.groups` argument.
## # A tibble: 4 x 4
## # Groups: gender [2]
    gender lc patient_no mean_inr
## <chr> <int>
                   <int>
                             <dbl>
## 1 F
                             1
## 2 F
                      4
                            NA
            1
## 3 M
                       8 1.03
             1
                      10
## 4 M
                            1.13
```

```
dat1 %>%
 group_by(gender, lc) %>%
 summarise(patient_no = n(),
          mean_inr = mean(b_inr, na.rm=T))
## `summarise()` has grouped output by 'gender'. You can override using the
## `.groups` argument.
## # A tibble: 4 x 4
## # Groups: gender [2]
    gender lc patient_no mean_inr
   <chr> <int> <int> <dbl>
        0
                   2
## 1 F
                            1
## 2 F
            1
                      4
                           1.23
## 3 M
            0
                      8
                           1.03
## 4 M
            1
                     10
                            1.13
```

summary table 만들기

```
dat1 %>%
 group_by(gender, lc) %>%
 summarise( N_alt = sum(!is.na(b_alt)),
           MEAN_alt = mean(b_alt, na.rm=T),
           MEDIAN_alt = median(b_alt, na.rm=T),
           MIN_alt = min(b_alt, na.rm=T),
            MAX_alt = max(b_alt, na.rm=T))
## `summarise()` has grouped output by 'gender'. You can override using the
## `.groups` argument.
## # A tibble: 4 x 7
## # Groups: gender [2]
## gender lc N_alt MEAN_alt MEDIAN_alt MIN_alt MAX_alt
   <chr> <int> <int> <dbl> <dbl> <int> <int>
                        87.5 87.5 32 143
42.8 39.5 31 61
## 1 F
           0 2
## 2 F
             1
                  4
                  8 181. 120 34
10 72.5 75.5 32
## 3 M
             0
                                                   486
## 4 M
            1 10
                                                   107
```