

## **CHAPTER 7**

### **Nutritional Status on Dialysis**

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**SECTION 7.1: SERUM ALBUMIN LEVELS ON DIALYSIS**

The mean serum albumin level in HD patients in the year 2016 was 38.0 ± 4.9 g/L. Between 2007 to 2016, the percentage of patients with serum albumin <30g/L had increased from 3 to 5% while the percentage of patients with desirable serum albumin of ≥ 40 g/L had dropped significantly from 52 to 37%. But notably majority of HD patients in 2016 (42%) had serum albumin between 35-40 g/L compared to 2007 (35%).

Cumulative distribution trends of serum albumin for HD patients from 2007 to 2016 supported this observation (Figure 7.1.1).

Table 7.1.1: Distribution of serum albumin, HD patients, 2007-2016

| Year | Number of patients | Mean | SD  | Median | LQ   | UQ   | % patients <30g/L | % patients 30-<35g/L | % patients 35-<40g/L | % patients ≥40g/L |
|------|--------------------|------|-----|--------|------|------|-------------------|----------------------|----------------------|-------------------|
| 2007 | 12314              | 39.7 | 5.3 | 40.0   | 37.0 | 42.5 | 3                 | 10                   | 35                   | 52                |
| 2008 | 14550              | 39.4 | 5.1 | 40.0   | 37.0 | 42.3 | 3                 | 10                   | 36                   | 50                |
| 2009 | 16947              | 39.4 | 5.1 | 40.0   | 37.0 | 42.3 | 3                 | 11                   | 35                   | 51                |
| 2010 | 18812              | 38.9 | 4.9 | 39.3   | 36.3 | 41.8 | 4                 | 13                   | 40                   | 44                |
| 2011 | 21374              | 38.8 | 4.9 | 39.3   | 36.5 | 41.5 | 4                 | 12                   | 41                   | 43                |
| 2012 | 24530              | 38.8 | 5.0 | 39.3   | 36.3 | 41.5 | 4                 | 13                   | 41                   | 43                |
| 2013 | 27817              | 38.6 | 4.9 | 39.0   | 36.0 | 41.5 | 4                 | 13                   | 42                   | 41                |
| 2014 | 31317              | 38.5 | 4.9 | 39.0   | 36.0 | 41.5 | 4                 | 15                   | 41                   | 41                |
| 2015 | 34217              | 38.2 | 4.9 | 38.8   | 35.7 | 41.3 | 5                 | 16                   | 41                   | 38                |
| 2016 | 36776              | 38.0 | 4.9 | 38.7   | 35.5 | 41.0 | 5                 | 16                   | 42                   | 37                |

Figure 7.1.1: Cumulative distribution of serum albumin, HD patients 2007-2016

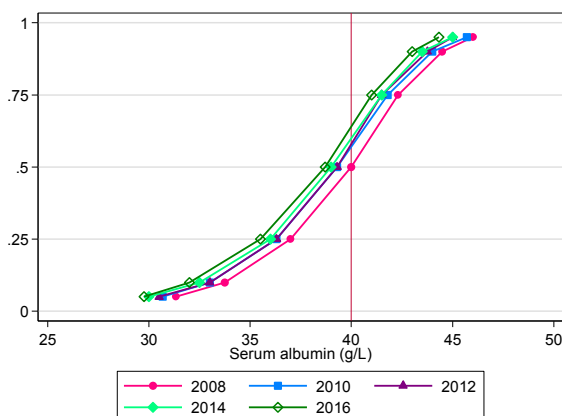
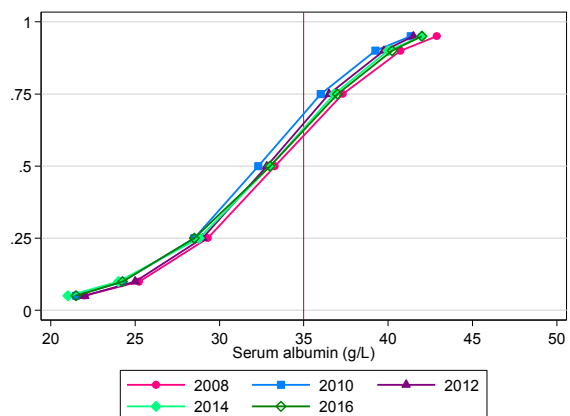


Figure 7.1.2: Cumulative distribution of serum albumin, PD patients 2007-2016



The serum albumin trend in PD patients were consistent since 2012. As we expected the percentage of patients with desirable serum albumin levels of  $\geq 40$ g/L was 12 % which was lower than HD patients. About 32% of PD patients had serum albumin of  $< 30$  g/L and 29% had serum albumin between 30- $<35$  g/L. Cumulative distribution trends for serum albumin of PD patients from 2007 to 2016 supported this observation (Figure 7.1.2).

Table 7.1.2: Distribution of serum albumin, PD patients, 2007-2016

| Year | Number of patients | Mean | SD  | Median | LQ   | UQ   | % patients $<30$ g/L | % patients 30- $<35$ g/L | % patients 35- $<40$ g/L | % patients $\geq 40$ g/L |
|------|--------------------|------|-----|--------|------|------|----------------------|--------------------------|--------------------------|--------------------------|
| 2007 | 1753               | 33.6 | 6.2 | 34.0   | 30.0 | 37.8 | 25                   | 31                       | 30                       | 14                       |
| 2008 | 2021               | 33.1 | 6.4 | 33.3   | 29.3 | 37.3 | 28                   | 32                       | 27                       | 13                       |
| 2009 | 2138               | 32.7 | 6.4 | 33.0   | 29.0 | 36.8 | 30                   | 34                       | 25                       | 11                       |
| 2010 | 2305               | 32.1 | 6.2 | 32.3   | 28.5 | 36.0 | 33                   | 35                       | 24                       | 8                        |
| 2011 | 2465               | 31.9 | 6.0 | 32.0   | 28.3 | 36.0 | 35                   | 34                       | 23                       | 8                        |
| 2012 | 2801               | 32.6 | 6.5 | 32.8   | 29.0 | 36.5 | 31                   | 33                       | 27                       | 10                       |
| 2013 | 3172               | 33.0 | 6.6 | 33.3   | 29.0 | 37.3 | 29                   | 31                       | 28                       | 12                       |
| 2014 | 3619               | 32.6 | 6.8 | 33.0   | 28.8 | 36.8 | 30                   | 32                       | 26                       | 11                       |
| 2015 | 4215               | 32.7 | 6.4 | 33.0   | 28.8 | 37.0 | 30                   | 31                       | 28                       | 12                       |
| 2016 | 4566               | 32.6 | 6.7 | 33.0   | 28.5 | 37.0 | 32                   | 29                       | 27                       | 12                       |

As expected, there was a wide variation in serum albumin levels among the 696 HD centres in 2016 (Table 7.1.3). The median percentage of HD patients with albumin level  $\geq 40$  g/L had rapidly deteriorated from 53% in 2007 to 39% in 2016. For half of the HD centres in 2016, only 39% of their patients achieved albumin level  $\geq 40$ g/L (Figure 7.1.3).

Table 7.1.3: Variation in proportion of patients with serum albumin  $\geq 40$ g/L among HD centres 2007-2016

| Year | Number of centres | Min | 5 <sup>th</sup> centile | LQ | Median | UQ   | 95 <sup>th</sup> centile | Max |
|------|-------------------|-----|-------------------------|----|--------|------|--------------------------|-----|
| 2007 | 300               | 0   | 9.5                     | 36 | 53     | 70   | 88.5                     | 100 |
| 2008 | 346               | 0   | 6                       | 33 | 50     | 67   | 84                       | 100 |
| 2009 | 389               | 0   | 4                       | 38 | 52     | 65   | 85                       | 100 |
| 2010 | 430               | 0   | 4                       | 26 | 44     | 60   | 80                       | 100 |
| 2011 | 488               | 0   | 6                       | 27 | 44     | 58   | 76                       | 100 |
| 2012 | 546               | 0   | 3                       | 26 | 42.5   | 58   | 76                       | 96  |
| 2013 | 600               | 0   | 6                       | 24 | 41     | 57.5 | 72                       | 100 |
| 2014 | 642               | 0   | 3                       | 23 | 42     | 57   | 75                       | 91  |
| 2015 | 670               | 0   | 2                       | 23 | 38     | 53   | 73                       | 90  |
| 2016 | 696               | 0   | 2                       | 21 | 39     | 52   | 74                       | 88  |

Figure 7.1.3: Variation in proportion of patients with serum albumin  $\geq 40\text{g/L}$ , HD centres 2016

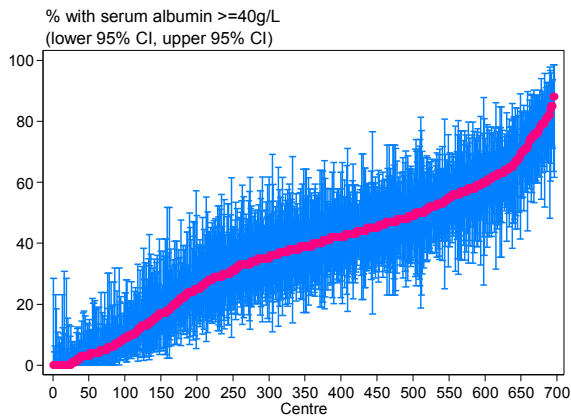
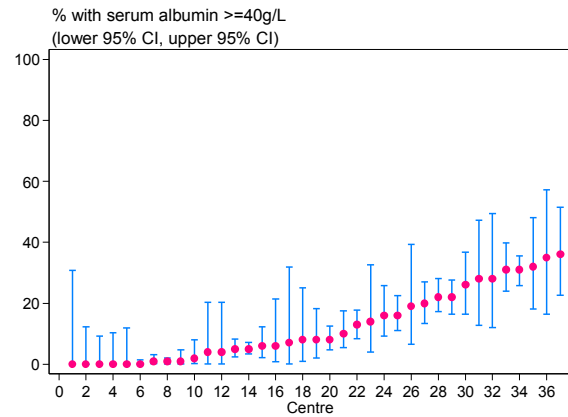


Figure 7.1.4: Variation in proportion of patients with serum albumin  $\geq 40\text{g/L}$ , PD centres 2016



The median trend for PD patients achieving serum albumin level  $\geq 40\text{g/L}$  declined from 15% in 2007 to 8% in 2016 (Table 7.1.4). There were 37 PD centres for the year 2016 and half of these centres had barely 8% of their PD patients achieving serum albumin level  $\geq 40\text{g/L}$  (Figure 7.1.4).

Table 7.1.4: Variation in proportion of patients with serum albumin  $\geq 40\text{g/L}$  among PD centres 2007-2016

| Year | Number of centers | Min | 5 <sup>th</sup> centile | LQ  | Median | UQ   | 95 <sup>th</sup> centile | Max |
|------|-------------------|-----|-------------------------|-----|--------|------|--------------------------|-----|
| 2007 | 23                | 0   | 0                       | 4   | 15     | 23   | 35                       | 64  |
| 2008 | 23                | 0   | 0                       | 2   | 15     | 25   | 43                       | 56  |
| 2009 | 23                | 0   | 0                       | 5   | 14     | 24   | 36                       | 37  |
| 2010 | 25                | 0   | 0                       | 2   | 9      | 17   | 29                       | 32  |
| 2011 | 26                | 0   | 0                       | 1   | 5.5    | 21   | 29                       | 38  |
| 2012 | 28                | 0   | 0                       | 3   | 10     | 20.5 | 33                       | 37  |
| 2013 | 28                | 0   | 0                       | 2   | 8      | 23.5 | 31                       | 40  |
| 2014 | 32                | 0   | 0                       | 3.5 | 12     | 20   | 50                       | 67  |
| 2015 | 35                | 0   | 0                       | 1   | 11     | 21   | 36                       | 42  |
| 2016 | 37                | 0   | 0                       | 2   | 8      | 22   | 35                       | 36  |

## SECTION 7.2: BODY MASS INDEX (BMI) ON DIALYSIS

The mean BMI for HD patients in 2016 was  $24.4 \pm 6.1 \text{ kg/m}^2$ . An increasing trend of BMI was observed for HD patients, with the percentage of HD patients with  $\text{BMI} \geq 25 \text{ kg/m}^2$  increasing from 30% in 2007 to 40% in 2016. The percentage of patients with  $\text{BMI} < 18.5 \text{ kg/m}^2$  reduced from 14% in 2007 to 10% in 2016 (Table 7.2.1).

Figure 7.2.1 reflects the increasing BMI trend in HD patients as the curve for 2016 continues moving to the right .

Table 7.2.1: Distribution of BMI, HD patients, 2007-2016

| Year | Number of patients | Mean | SD  | Median | LQ   | UQ   | % patients <18.5 kg/m <sup>2</sup> | % patients 18.5-25 kg/m <sup>2</sup> | % patients ≥25 kg/m <sup>2</sup> |
|------|--------------------|------|-----|--------|------|------|------------------------------------|--------------------------------------|----------------------------------|
| 2007 | 10509              | 23.2 | 5.4 | 22.7   | 19.9 | 25.8 | 14                                 | 56                                   | 30                               |
| 2008 | 12234              | 23.3 | 5.1 | 22.8   | 20.1 | 26.0 | 14                                 | 55                                   | 31                               |
| 2009 | 13751              | 23.5 | 5.2 | 23.0   | 20.1 | 26.2 | 13                                 | 54                                   | 33                               |
| 2010 | 14775              | 23.7 | 5.3 | 23.2   | 20.3 | 26.4 | 12                                 | 53                                   | 35                               |
| 2011 | 16495              | 23.8 | 5.7 | 23.2   | 20.4 | 26.5 | 12                                 | 53                                   | 35                               |
| 2012 | 18362              | 24.0 | 5.4 | 23.4   | 20.5 | 26.7 | 11                                 | 52                                   | 37                               |
| 2013 | 20336              | 24.1 | 5.6 | 23.5   | 20.6 | 26.9 | 11                                 | 51                                   | 38                               |
| 2014 | 22110              | 24.3 | 5.9 | 23.7   | 20.7 | 27.0 | 10                                 | 51                                   | 39                               |
| 2015 | 23761              | 24.4 | 5.9 | 23.7   | 20.8 | 27.1 | 10                                 | 51                                   | 39                               |
| 2016 | 25875              | 24.4 | 6.1 | 23.8   | 20.9 | 27.2 | 10                                 | 50                                   | 40                               |

Figure 7.2.1: Cumulative distribution of BMI, HD patients 2007-2016

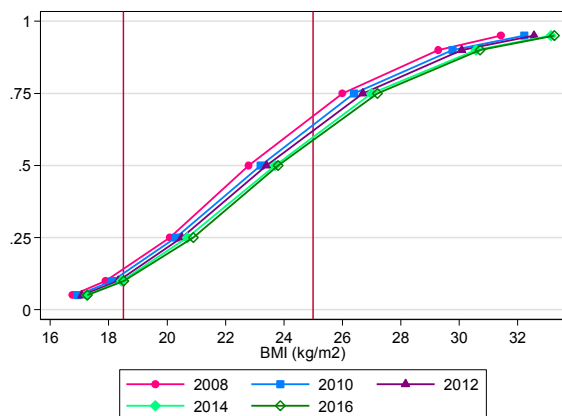
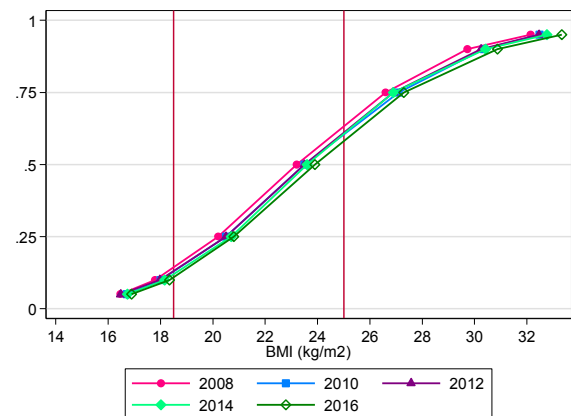


Figure 7.2.2: Cumulative distribution of BMI, PD patients 2007-2016



The mean BMI for PD patients in 2016 was  $24.4 \pm 6.0$  kg/m<sup>2</sup>. Similar to HD patients, the percentage of PD patients with BMI  $\geq 25$  kg/m<sup>2</sup> increased from 34% in 2007 to 41% in 2016. The percentage of patients with BMI  $< 18.5$  kg/m<sup>2</sup> reduced from 15% in 2007 to 11% in 2016 (Table 7.2.2). The shifting of the cumulative distribution curve for 2016 was to the right (Figure 7.2.2).

Table 7.2.2: Distribution of BMI, PD patients 2007-2016

| Year | Number of patients | Mean | SD  | Median | LQ   | UQ   | % patients <18.5 kg/m <sup>2</sup> | % patients 18.5-25 kg/m <sup>2</sup> | % patients >=25 kg/m <sup>2</sup> |
|------|--------------------|------|-----|--------|------|------|------------------------------------|--------------------------------------|-----------------------------------|
| 2007 | 1617               | 23.4 | 5.9 | 22.9   | 19.9 | 26.3 | 15                                 | 51                                   | 34                                |
| 2008 | 1876               | 23.7 | 5.9 | 23.2   | 20.2 | 26.6 | 14                                 | 50                                   | 36                                |
| 2009 | 1947               | 23.9 | 5.8 | 23.4   | 20.4 | 26.8 | 13                                 | 50                                   | 37                                |
| 2010 | 2054               | 24.0 | 5.5 | 23.5   | 20.5 | 27.1 | 13                                 | 49                                   | 39                                |
| 2011 | 2181               | 24.0 | 6.1 | 23.6   | 20.3 | 27.0 | 13                                 | 49                                   | 38                                |
| 2012 | 2214               | 24.0 | 5.8 | 23.5   | 20.5 | 26.9 | 13                                 | 49                                   | 38                                |
| 2013 | 2026               | 24.0 | 5.1 | 23.5   | 20.4 | 26.9 | 14                                 | 48                                   | 39                                |
| 2014 | 2430               | 24.1 | 5.5 | 23.6   | 20.7 | 26.9 | 12                                 | 49                                   | 39                                |
| 2015 | 3002               | 24.3 | 5.0 | 24.0   | 20.9 | 27.1 | 11                                 | 49                                   | 41                                |
| 2016 | 3306               | 24.4 | 6.0 | 23.9   | 20.8 | 27.3 | 11                                 | 48                                   | 41                                |

The variation in HD centres with proportion of patients achieving the target BMI  $\geq 18.5$  kg/m<sup>2</sup> is given in Table 7.2.3. Half of the HD centers had 91% of their patients achieving target BMI  $\geq 18.5$  kg/m<sup>2</sup> in 2016 compared to 87% in 2007. Most centres in 2016 showed positive trends in their HD patients achieving the target BMI  $\geq 18.5$  kg/m<sup>2</sup> (Figure 7.2.3).

Table 7.2.3: Variation in proportion of patients with BMI  $\geq 18.5$  kg/m<sup>2</sup> among HD centres 2007-2016

| Year | Number of centers | Min | 5 <sup>th</sup> centile | LQ   | Median | UQ | 95 <sup>th</sup> centile | Max |
|------|-------------------|-----|-------------------------|------|--------|----|--------------------------|-----|
| 2007 | 284               | 56  | 69                      | 82   | 87     | 92 | 100                      | 100 |
| 2008 | 326               | 60  | 69                      | 82   | 88     | 92 | 100                      | 100 |
| 2009 | 351               | 61  | 72                      | 81   | 87     | 93 | 100                      | 100 |
| 2010 | 383               | 33  | 73                      | 84   | 89     | 94 | 100                      | 100 |
| 2011 | 427               | 46  | 75                      | 84   | 90     | 93 | 100                      | 100 |
| 2012 | 472               | 60  | 76                      | 85.5 | 90     | 94 | 100                      | 100 |
| 2013 | 534               | 54  | 76                      | 86   | 91     | 94 | 100                      | 100 |
| 2014 | 571               | 50  | 77                      | 86   | 90     | 95 | 100                      | 100 |
| 2015 | 592               | 64  | 79                      | 87   | 91     | 95 | 100                      | 100 |
| 2016 | 634               | 27  | 79                      | 87   | 91     | 94 | 100                      | 100 |

Figure 7.2.3: Variation in proportion of patients with BMI  $\geq 18.5$  kg/m<sup>2</sup> among HD centres 2016

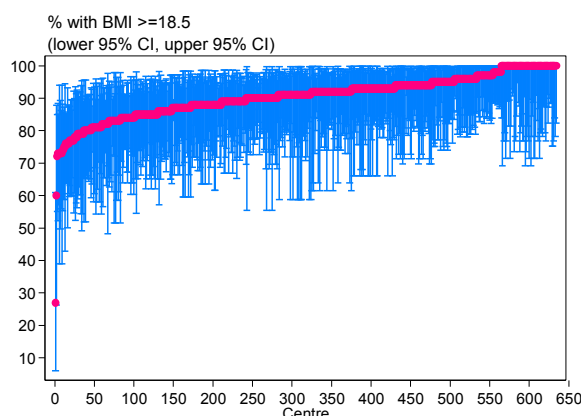
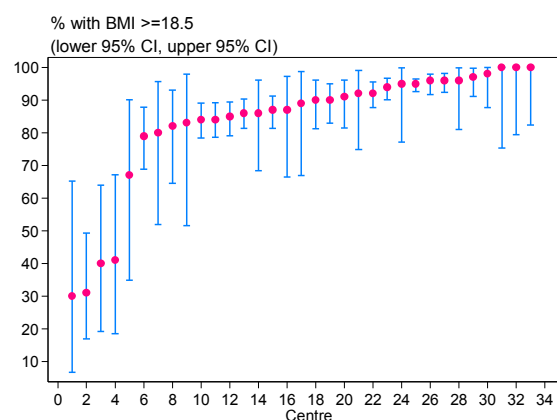


Figure 7.2.4: Variation in proportion of patients with BMI  $\geq 18.5$  kg/m<sup>2</sup> among PD centres 2016



The variation in PD centres with proportion of patients with BMI  $\geq 18.5$  kg/m<sup>2</sup> showed improving trend from 87.5% in 2007 to 89.0% for 2016 (Table 7.2.4) with half of the PD centers achieving this target. The median percentage of PD patients with BMI  $\geq 18.5$  kg/m<sup>2</sup> indicated positive trends for most centres in 2016 (Figure 7.2.4).

Table 7.2.4: Variation in proportion of patients with BMI  $\geq 18.5$  kg/m<sup>2</sup> among PD centres 2007-2016

| Year | Number of centers | Min | 5 <sup>th</sup> centile | LQ   | Median | UQ | 95 <sup>th</sup> centile | Max |
|------|-------------------|-----|-------------------------|------|--------|----|--------------------------|-----|
| 2007 | 22                | 20  | 23                      | 76   | 87.5   | 91 | 97                       | 100 |
| 2008 | 22                | 24  | 33                      | 77   | 88     | 91 | 95                       | 100 |
| 2009 | 21                | 29  | 41                      | 80   | 89     | 93 | 95                       | 97  |
| 2010 | 23                | 37  | 44                      | 76   | 89     | 93 | 98                       | 98  |
| 2011 | 25                | 33  | 35                      | 80   | 88     | 93 | 96                       | 98  |
| 2012 | 25                | 32  | 33                      | 79   | 86     | 92 | 97                       | 100 |
| 2013 | 25                | 18  | 35                      | 70   | 90     | 93 | 97                       | 100 |
| 2014 | 28                | 15  | 36                      | 83.5 | 89.5   | 92 | 94                       | 94  |
| 2015 | 30                | 23  | 31                      | 83   | 89.5   | 92 | 97                       | 98  |
| 2016 | 33                | 30  | 31                      | 83   | 89     | 95 | 100                      | 100 |

Table 7.2.5 indicates the continuing trend of lower nutritional status in patients from 631 HD centres. Half of the centres achieved the combined nutritional status targets (serum albumin  $\geq 40$  g/L and BMI  $\geq 18.5$  kg/m<sup>2</sup>) only in 37% of their patients in 2016 compared to 48% in 2007. The wide variation in nutritional status in most centres was also observed for 2016 (Figure 7.2.5).

Table 7.2.5: Variation in proportion of patients with BMI  $\geq 18.5$  kg/m<sup>2</sup> and serum albumin  $\geq 40$  g/L among HD centres 2007-2016

| Year | Number of centers | Min | 5 <sup>th</sup> centile | LQ | Median | UQ | 95 <sup>th</sup> centile | Max |
|------|-------------------|-----|-------------------------|----|--------|----|--------------------------|-----|
| 2007 | 277               | 0   | 6                       | 34 | 48     | 62 | 76                       | 93  |
| 2008 | 314               | 0   | 4                       | 31 | 45.5   | 60 | 76                       | 88  |
| 2009 | 341               | 0   | 4                       | 33 | 47     | 62 | 76                       | 94  |
| 2010 | 378               | 0   | 3                       | 23 | 41     | 57 | 73                       | 83  |
| 2011 | 417               | 0   | 2                       | 25 | 40     | 54 | 73                       | 100 |
| 2012 | 458               | 0   | 1                       | 23 | 40     | 56 | 73                       | 90  |
| 2013 | 519               | 0   | 4                       | 23 | 38     | 52 | 70                       | 95  |
| 2014 | 560               | 0   | 2.5                     | 20 | 39     | 55 | 72                       | 88  |
| 2015 | 589               | 0   | 0                       | 21 | 35     | 52 | 69                       | 94  |
| 2016 | 631               | 0   | 0                       | 19 | 37     | 50 | 68                       | 88  |

Figure 7.2.5: Variation in proportion of patients with BMI  $\geq 18.5$  kg/m<sup>2</sup> and serum albumin  $\geq 40$  g/L among HD centres 2016

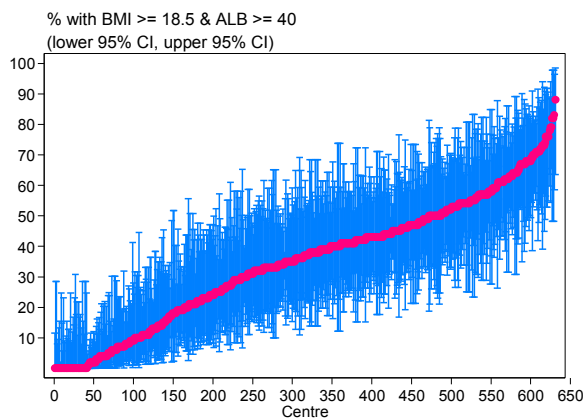


Figure 7.2.6: Variation in proportion of patients with BMI  $\geq 18.5$  kg/m<sup>2</sup> and serum albumin  $\geq 40$  g/L among PD centres 2016

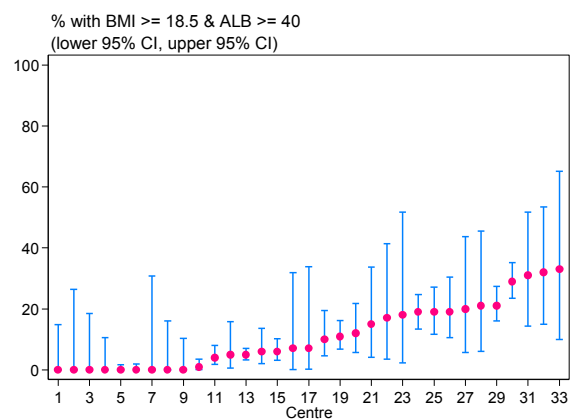


Table 7.2.6 indicates consistently low nutritional status of patients in 33 PD centers as assessed by the combined nutritional status targets of BMI  $\geq 18.5$  kg/m<sup>2</sup> and serum albumin  $\geq 40$  g/L. Half of these centres achieved the combined nutritional status targets in only 7% of their patients. For 2016, none of the 33 PD centres had 50% of their patients achieving the combined nutritional status targets (Figure 7.2.6).



Table 7.2.6: Variation in proportion of patients with BMI  $\geq 18.5$  kg/m<sup>2</sup> and serum albumin  $\geq 40$  g/L among PD centres 2007-2016

| Year | Number of centers | Min | 5 <sup>th</sup> centile | LQ | Median | UQ | 95 <sup>th</sup> centile | Max |
|------|-------------------|-----|-------------------------|----|--------|----|--------------------------|-----|
| 2007 | 22                | 0   | 1                       | 8  | 12     | 19 | 36                       | 60  |
| 2008 | 22                | 0   | 0                       | 3  | 9.5    | 19 | 26                       | 48  |
| 2009 | 21                | 0   | 0                       | 4  | 10     | 19 | 28                       | 35  |
| 2010 | 23                | 0   | 0                       | 1  | 8      | 13 | 24                       | 25  |
| 2011 | 25                | 0   | 0                       | 0  | 6      | 17 | 26                       | 35  |
| 2012 | 25                | 0   | 0                       | 2  | 7      | 14 | 26                       | 38  |
| 2013 | 25                | 0   | 0                       | 1  | 8      | 22 | 29                       | 38  |
| 2014 | 28                | 0   | 0                       | 0  | 8.5    | 18 | 45                       | 64  |
| 2015 | 30                | 0   | 0                       | 4  | 9.5    | 19 | 32                       | 34  |
| 2016 | 33                | 0   | 0                       | 0  | 7      | 19 | 32                       | 33  |

### SECTION 7.3: Nutritional parameters

HD patients were older and had better serum albumin compared to PD patients. On the other hand, serum total cholesterol and serum creatinine were higher in PD patients. Both groups were equal in terms of their hemoglobin levels and BMI.

Table 7.3.1: Nutritional parameters between HD and PD patients, 2016

|                            | HD       |        | PD      |        | P-Value              |
|----------------------------|----------|--------|---------|--------|----------------------|
|                            | n= 38082 |        | n= 4702 |        |                      |
|                            | Mean     | SD     | Mean    | SD     |                      |
| Age                        | 56.54    | 13.54  | 51.49   | 16.73  | <0.0001 <sup>b</sup> |
| Albumin (g/L)              | 38.04    | 4.94   | 32.58   | 6.66   | <0.0001 <sup>b</sup> |
| BMI (kg/m <sup>2</sup> )   | 24.44    | 6.13   | 24.41   | 6.00   | 0.7672 <sup>b</sup>  |
| Total Cholesterol (mmol/L) | 4.39     | 1.08   | 4.89    | 1.29   | <0.0001 <sup>b</sup> |
| Creatinine ( $\mu$ mol/L)  | 816.14   | 240.16 | 857.49  | 314.43 | <0.0001 <sup>b</sup> |
| Hemoglobin (g/dL)          | 10.37    | 1.57   | 10.37   | 1.55   | 0.9958 <sup>b</sup>  |

a Independent t-test

b Mann Whitney test

In the HD population, the diabetic patients were younger with lower BMI compared to the non-diabetic patients. Serum creatinine, total cholesterol, hemoglobin levels and serum albumin were significantly higher in the diabetic group.

Diabetic PD patients were younger and had significantly lower BMI compared to non-diabetic PD patients. Diabetic PD patients also had better serum albumin, higher serum creatinine and total cholesterol compared to non-diabetic PD patients. Haemoglobin levels were comparable in between both groups.

Table 7.3.2(a): Nutritional parameters between diabetic and non-diabetic HD patients, 2016

|                            | Diabetes |        | Non-Diabetes |        | P-Value              |
|----------------------------|----------|--------|--------------|--------|----------------------|
|                            | n= 17551 |        | n= 20531     |        |                      |
|                            | Mean     | SD     | Mean         | SD     |                      |
| Age                        | 53.46    | 14.78  | 60.14        | 10.86  | <0.0001 <sup>b</sup> |
| Albumin (g/L)              | 38.57    | 4.79   | 37.42        | 5.04   | <0.0001 <sup>b</sup> |
| BMI (kg/m <sup>2</sup> )   | 23.71    | 5.99   | 25.29        | 6.17   | <0.0001 <sup>b</sup> |
| Total Cholesterol (mmol/L) | 4.44     | 1.04   | 4.34         | 1.12   | <0.0001 <sup>b</sup> |
| Creatinine (µmol/L)        | 865.18   | 248.36 | 758.39       | 216.33 | <0.0001 <sup>b</sup> |
| Hemoglobin (g/dL)          | 10.41    | 1.59   | 10.31        | 1.54   | <0.0001 <sup>b</sup> |

a Independent t-test  
b Mann Whitney test

Table 7.3.2(b): Nutritional parameters between diabetic and non-diabetic PD patients, 2016

|                            | Diabetes |        | Non-Diabetes |        | P-Value              |
|----------------------------|----------|--------|--------------|--------|----------------------|
|                            | n= 1398  |        | n= 3304      |        |                      |
|                            | Mean     | SD     | Mean         | SD     |                      |
| Age                        | 48.31    | 17.65  | 59.00        | 11.21  | <0.0001 <sup>b</sup> |
| Albumin (g/L)              | 33.03    | 6.62   | 31.51        | 6.63   | <0.0001 <sup>b</sup> |
| BMI (kg/m <sup>2</sup> )   | 23.82    | 5.89   | 25.67        | 6.04   | <0.0001 <sup>b</sup> |
| Total Cholesterol (mmol/L) | 4.93     | 1.27   | 4.79         | 1.35   | 0.0007 <sup>b</sup>  |
| Creatinine (µmol/L)        | 898.64   | 324.42 | 760.27       | 265.32 | <0.0001 <sup>b</sup> |
| Hemoglobin (g/dL)          | 10.34    | 1.58   | 10.43        | 1.45   | 0.0835 <sup>b</sup>  |

a Independent t-test  
b Mann Whitney test

In HD patients, the longer they were on treatment, the higher their serum albumin and lower their BMI (Table 7.3.3a).

Similar findings were noted in PD patients. The longer they were on PD treatment, the higher their serum albumin and lower their BMI (Table 7.3.3b) and both these trends were significant.

Table 7.3.3(a): Distribution of serum albumin and BMI by duration of dialysis among HD patients, 2007-2016

| Years                    | <1    |      | 1-<5  |      | 5-<10 |      | ≥10   |      | P-Value             |
|--------------------------|-------|------|-------|------|-------|------|-------|------|---------------------|
|                          | Mean  | SD   | Mean  | SD   | Mean  | SD   | Mean  | SD   |                     |
| Albumin (g/L)            | 35.23 | 5.87 | 38.32 | 3.84 | 39.57 | 3.04 | 39.98 | 2.99 | 0.0001 <sup>d</sup> |
| BMI (kg/m <sup>2</sup> ) | 24.36 | 6.77 | 24.98 | 6.13 | 24.50 | 5.57 | 22.92 | 5.21 | 0.0001 <sup>d</sup> |

c ANOVA  
d Kruskal Wallis rank test

Table 7.3.3(b): Distribution of serum albumin and BMI by duration of dialysis among PD patients, 2007-2016

| Years                    | <1    |      | 1-<5  |      | 5-<10 |      | ≥10   |      | P-Value             |
|--------------------------|-------|------|-------|------|-------|------|-------|------|---------------------|
|                          | Mean  | SD   | Mean  | SD   | Mean  | SD   | Mean  | SD   |                     |
| Albumin (g/L)            | 32.13 | 6.85 | 33.28 | 5.48 | 34.19 | 4.69 | 34.85 | 3.61 | 0.0001 <sup>d</sup> |
| BMI (kg/m <sup>2</sup> ) | 24.51 | 6.45 | 24.62 | 5.70 | 23.21 | 4.77 | 21.57 | 3.58 | 0.0001 <sup>d</sup> |

c ANOVA  
d Kruskal Wallis rank test