

A Study on Cremated Bodies Types at Public Cremation Facilities of Metropolitan Cities that Using E-Haneul Funeral Information System

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Abstract

We studies show that ratio of corpse among cremated bodies in public cremation facilities in metropolitan cities using E-Haneul funeral information system is average 90.1%, which is high, in bigger metropolitan cities with over 2 million of population (Incheon, Busan, and Daegu), but is average 81.4%, which is relatively low, in smaller metropolitan cities with less than 2 million of population(Daejeon, Gwangju, and Ulsan). In addition, the cremated bodies ratio of opening remains is average 17.4% in smaller metropolitan cities with less than 2 million of population, but is average 8.9% in those with over 2 million of population, which is relatively low. Finally, the cremated bodies ratio of dead fetuses is average 1.2% in smaller metropolitan cities with less than 2 million of population, and average 1.0% in those with over 2 million of population, which is low.

Based on the above result, we are the following suggestions to improve the effectiveness of funeral facility use by the increase of demand for public cremation facilities in metropolitan cities. First, Busan and Daegu, where the shortage of supply is expected due to the increase of demand for cremation of corpse, need to implement supply expansion policy of public cremation facilities to build or expand cremation furnaces. Second, Daejeon, Gwangju, and Ulsan, where the cremated bodies ratio of corpse is low, need to expand supply through expanded operation from existing 4~8 cremation numbers of public cremation facilities to 11 cremation numbers, which is the level of Seoul Metropolitan City. Third, there should be cremation furnaces exclusively for opening remains to prepare the increase of demand for opening remains in the years with leap month.

Keywords: *Metropolitan City, E-Haneul Funeral Information System, Corpse, Opening Remains, Dead Fetus.*

1. Introduction

Facing the recent increase of national cremation rate and the entry to the super- aged society, due to the increase of death bodies in accordance with the increase of aged population, the users of cremation facilities using E-Haneul funeral information system have been continuously increasing. Especially, focusing on large cities with large population size and high density, the shortage of cremation facilities compared to the demand for cremation gets intensified [1]. Therefore, this study selects six metropolitan cities(Incheon, Busan, Daegu, Daejeon, Gwangju, Ulsan) with high use rate of public cremation facilities due to urbanization and population overcrowding as the subjects. The research scope is from 2013, when Ulsan Skypark, the current public cremation facility of Ulsan Metropolitan City, was completed, to 2019.

In this study, E-Haneul funeral information system means the online cremation reservation system which was established to operate all cremation facilities across the nation in the unified booking system by Ministry of Health & Welfare [2]. The cremated bodies types of the current public cremation facilities are classified into corpse, opening remains and dead fetus.

We studies show that intended to suggest a policy to improve the efficiency of public cremation facility use through research and analysis on the current situation of cremated bodies types in public cremation facilities that using E-Haneul funeral information system in each six metropolitan cities.

2. Status of public cremation facilities in each metropolitan cities

As shown in Table 1, the number of cremation furnaces in the six public cremation facilities of the six metropolitan cities is 77 sets as of February 20, 2020, and one-day processing capability of corpse is 264 person. Regarding the scale of cremation furnaces in the metropolitan cities, Incheon Metropolitan City has 20 sets, which is the biggest, followed by 15 sets of Busan Metropolitan City, 11 sets of Daegu and Gwangju Metropolitan City, and 10 sets of Daejeon and Ulsan metropolitan City. Also, each metropolitan cities the number of cremation per cremation furnace for corpse, Busan Metropolitan City has 4.2 person, which is the biggest number, followed by 4.1 person of Daegu [3]. Thus, among the six metropolitan cities, Busan and Incheon Metropolitan City have the highest demand of cremation.

Table 1. Operation status of public cremation facilities in each metropolitan cities

Sort	Sum	Incheon	Busan	Daegu	Daejeon	Gwangju	Ulsan
Installation places(places)	6	1	1	1	1	1	1
Cremation Furnaces(Set) [A]	77	20	15	11	10	11	10
One-Day Processing Capability of Corpse (Person) [B]	264	72	63	45	28	36	20
Number of Cremation Per Cremation Furnaces (Person) [B÷A]	3.4	3.6	4.2	4.1	2.8	3.3	2.0

3. Types of cremated bodies at public cremation facilities in each metropolitan

3.1 Incheon Metropolitan City

Figure 1 shows that among cremated bodies in public cremation facilities of Incheon Metropolitan City that using E-Haneul funeral information system from 2013 to 2019, the cremation rate of corpse is continuously increasing, and it is increased by 33.4% in 2019 compared to 2013, which means the average increase rate per year is 5.6%. According to cremation demand, the cremated bodies of opening remains shows irregular increase and decrease each year. However, due to the tradition of preferring opening remains in the year with leapmonth, the years of 2014 and 2017 had big increase of cremated bodies of opening remains. In 2019, the cremated bodies was increased by 52.3% from 2013, which means the average increase per year is 8.7%. According to cremation demand, the cremated bodies of dead fetus also shows irregular increase and decrease each year, and in 2019, the cremated bodies was decreased by 22.7% from 2013 [4].

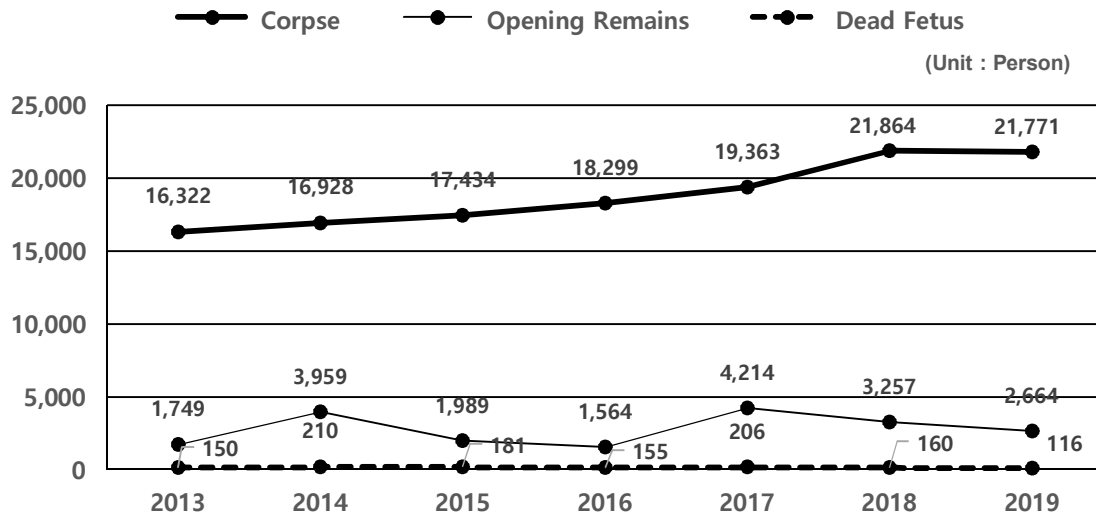


Figure 1. Current status of cremated bodies at public cremation facilities in Incheon

3.2 Busan Metropolitan City

Figure 2 shows that among cremated bodies in public cremation facilities of Busan Metropolitan City that using E-Haneul funeral information system from 2013 to 2019, the cremation rate of corpse is irregularly increasing and decreasing, and it is increased by 8.9% in 2019 compared to 2013, which means the average increase rate per year is 1.5%. The Busan Metropolitan City has the highest number of cremated corpse among the metropolitan cities. According to cremation demand, the cremated bodies of opening remains shows irregular increase and decrease each year as well, but due to the effect of leap month, the years of 2014 and 2017 had big increase cremated bodies of opening remains. In 2019, the cremated bodies was increased by 20.0% from 2013, which means the average increase per year is 3.3%. The cremated bodies of dead fetus also shows decrease each year, and in 2019, the cremated bodies was decreased by 51.8% from 2013, which means the average decrease per year is 8.6%. Busan Metropolitan City has the highest number of cremated bodies of dead fetuses among the metropolitan cities [5].

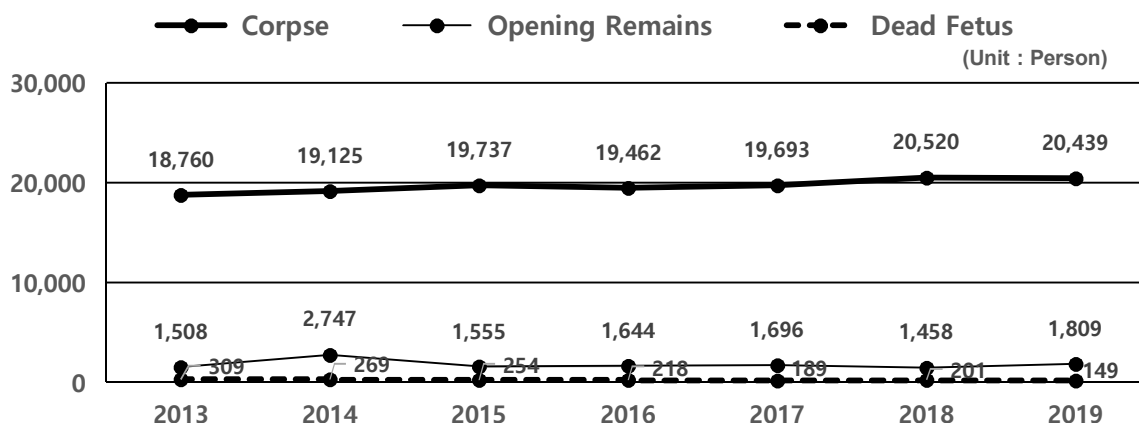


Figure 2. Current status of cremated bodies at public cremation facilities in Busan

3.3 Daegu Metropolitan City

Figure 3 shows that among cremated bodies in public cremation facilities of Daegu Metropolitan City that using E-Haneul funeral information system from 2013 to 2019, the cremation rate of corpse is continuously increasing, and it is increased by 21.4% in 2019 compared to 2013, which means the average increase rate per year is 3.6%. The cremated bodies of opening remains was increased dramatically in 2014 and 2017 due to the effect of leap month. Even the years with no leap month show the trend of increase. In 2019, the cremated bodies was increased by 24.1% from 2013, which means the average increase per year is 4.0%. The cremated bodies of dead fetus shows the trend of decrease each year from 2016, and in 2019, the cremated bodies was decreased by 33.9% from 2013, and the average decrease rate is 5.6% per year [6].

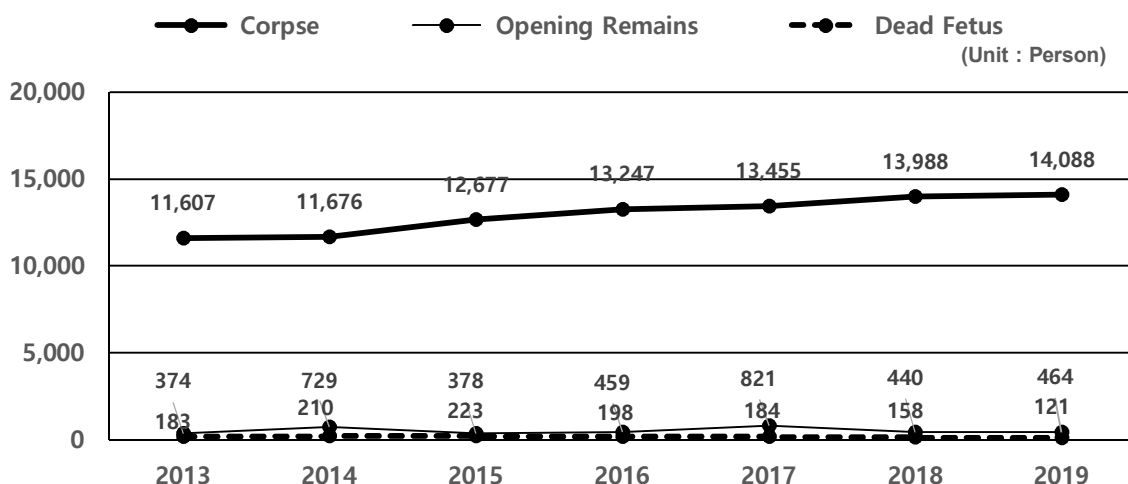


Figure 3. Current status of cremated bodies at public cremation facilities in Daegu

3.4 Daejeon Metropolitan City

Figure 4 shows that among cremated bodies in public cremation facilities of Daejeon Metropolitan City that using E-Haneul funeral information system from 2013 to 2019, the cremation rate of corpse is continuously increasing, and it is increased by 16.8% in 2019 from 2013, which means the average increase rate per year is 2.8%. According to cremation demand, the cremated bodies of opening remains shows irregular increase and decrease each year, but due to the effect of leap month, the years of 2014 and 2017 had big increase in the

cremated bodies of opening remains. In 2019, the cremated bodies was decreased by 32.9% from 2013, which means the average decrease per year is 5.5%. According to cremation demand, the cremated bodies of dead fetus shows the trend of irregular increase and decrease each year, and in 2019, the cremated bodies was drastically decreased by 50.0% from 2013, and the average decrease rate is 8.3% per year [7].

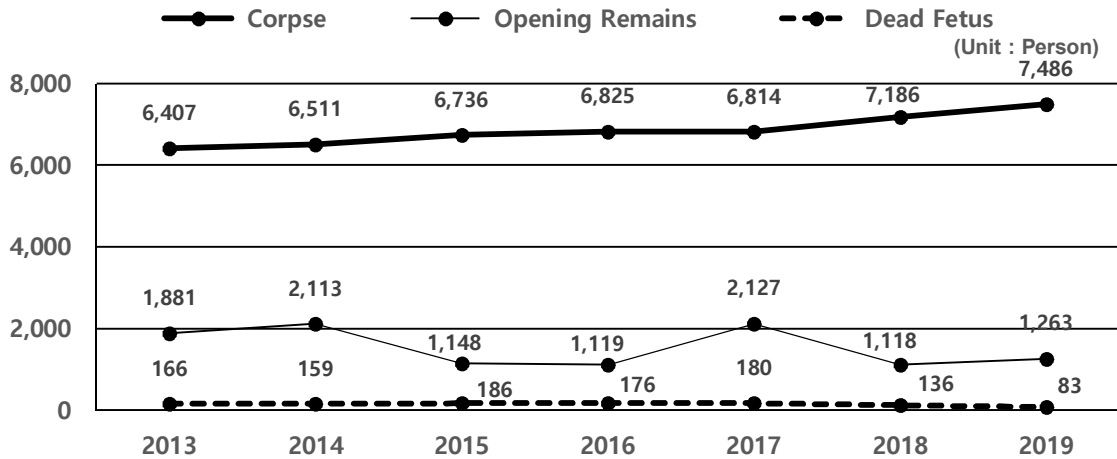


Figure 4. Current status of cremated bodies at public cremation facilities in Daejeon

3.5 Gwangju Metropolitan City

Figure 5 shows that among cremated bodies in public cremation facilities of Gwangju Metropolitan City that using E-Haneul funeral information system from 2013 to 2019, the cremation rate of corpse is irregularly increasing and decreasing, and it is increased by 17.4% in 2019 from 2013, which means the average increase rate per year is 2.9%. According to cremation demand, the cremation of opening remains shows irregular increase and decrease each year, but was increased dramatically in 2014(September of lunar calendar) and 2017(May of lunar calendar) due to the effect of leap month. In 2019, the cremation was increased by 20.3% from 2013, which means the average increase per year is 3.4%. According to cremation demand, the cremation of dead fetus shows the trend of irregular increase and decrease each year, and in 2019, the cremation was drastically decreased by 8.0% from 2013, and the average decrease rate is 1.3% per year [8].

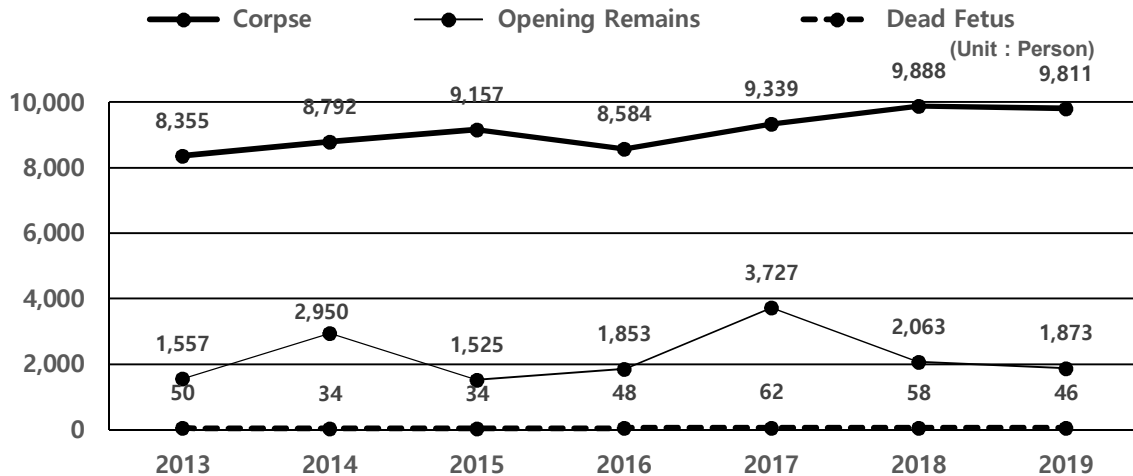


Figure 5. Current status of cremated bodies at public cremation facilities in Gwangju

3.6 Ulsan Metropolitan City

Figure 6 shows that among cremated bodies in public cremation facilities of Ulsan Metropolitan City that using E-Haneul funeral information system from 2013 to 2019, the cremation rate of corpse is continuously increasing(except the year of 2019), and it is increased by 77.1% in 2019 from 2013, which means the average increase rate per year is 12.9%. According to cremation demand, the cremated bodies of opening remains shows irregular increase and decrease each year, but was increased dramatically in 2014 and 2017 due to the effect of leap month. In 2019, the cremated bodies was increased by 96.6% from 2013, which means the average increase per year is 16.1%. According to cremation demand, the cremated bodies of dead fetus shows the trend of irregular increase and decrease each year, and in 2019, the cremated bodies was drastically decreased by 39.1% from 2013, and the average decrease rate is 6.5% per year [9].

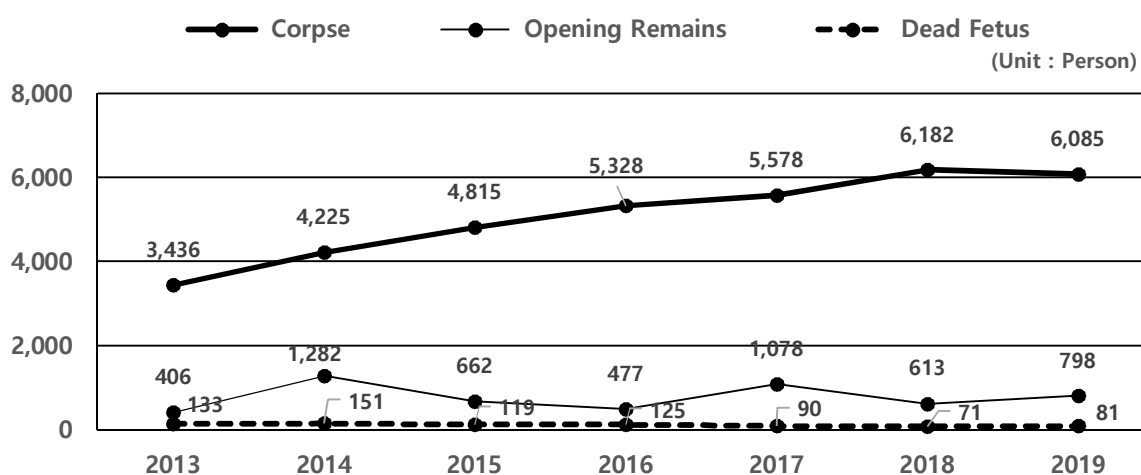


Figure 6. Current status of cremated bodies at public cremation facilities in Ulsan

4. Comprehensive Analysis Results

4.1 Comparison and analysis of cremated bodies at public cremation facilities

In the result of this study’s research and analysis, as shown in Figure 7, Incheon Metropolitan City has the highest cremated bodies at public cremation facilities among metropolitan cities that using E-Haneul funeral information system. The number is 152,555 person, and Ulsan Metropolitan City has the lowest number, 41,735 person. The difference between the two metropolitan cities is 110,820 person(approximately 2.7 times). Therefore, as the dimension of cremation furnaces is bigger, the number of cremated bodies is bigger, and vice versa.

The population of Busan Metropolitan City, which has the highest of cremated bodies of corpse is 3,411,819 person as of January 31, 2020, which means it has big population size while Ulsan Metropolitan City, which has the lowest cremated bodies of corpse, is 1,147,037 person as of January 31, 2020 [10], which indicates it has the smallest population among the metropolitan cities. Therefore, the size of population has the greatest effect on the cremated bodies of corpse. In addition, as Korea officially entered the aging society at the end of August, 2017, the number of the deceased is expected to increase due to the increase of an elderly population [11]. Thus, the number of cremated bodies public cremation facilities in the metropolitan cities that using E-Haneul funeral information system will continue to increase.

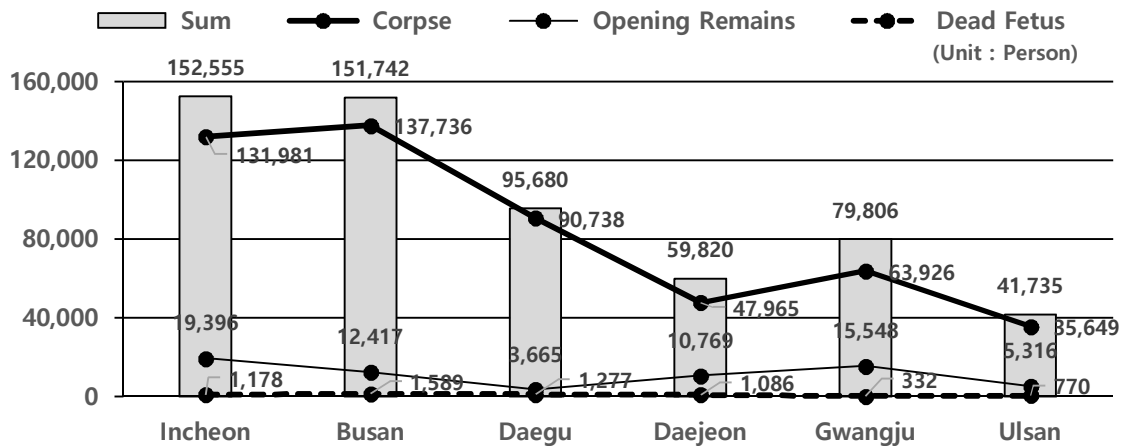


Figure 7. Current status of cremated bodies at public cremation facilities(2013~2019)

4.2 Increase and decrease status of cremated bodies at public cremation facilities

In the result of this study’s research and analysis, as shown at Figure 8, Daegu Metropolitan City has the highest ratio of corpse among the metropolitan cities from 2013 to 2019. The ratio is 94.9%, followed by 90.8% of Busan Metropolitan City and 86.5% of Incheon Metropolitan City. According to the demand projection data announced by the Ministry of Health & Welfare, Busan Metropolitan City will lack 4 sets of cremation furnaces in public cremation facilities, and Daegu Metropolitan City will lack 1 set in 2022 [12]. Therefore, the cremated bodies ratio of corpse is high in bigger metropolitan cities with over 2 million of population, but is relatively low in smaller metropolitan cities with less than 2 million of population.

The cremated bodies ratio of opening remains is the highest in Gwangju Metropolitan City(19.5%) followed by 18.0% of Daejeon Metropolitan City and 12.7% of Ulsan Metropolitan City. Therefore, the cremated bodies ratio of opening remains is higher in metropolitan cities with less than 2 million of population, but is low in big metropolitan cities with over 2 million population.

The cremated bodies ratio of dead fetus is overall irregular distribution in all the metropolitan cities. According to the data announced by Statistics Korea, the number of babies born in 2018 is 326 thousand person, which is decreased by 29.9% from 2008’s 465 thousand person [13]. Due to low birthrate and decrease of marriages, the number of cremated bodies of dead fetuses is expected to decrease continuously each year.

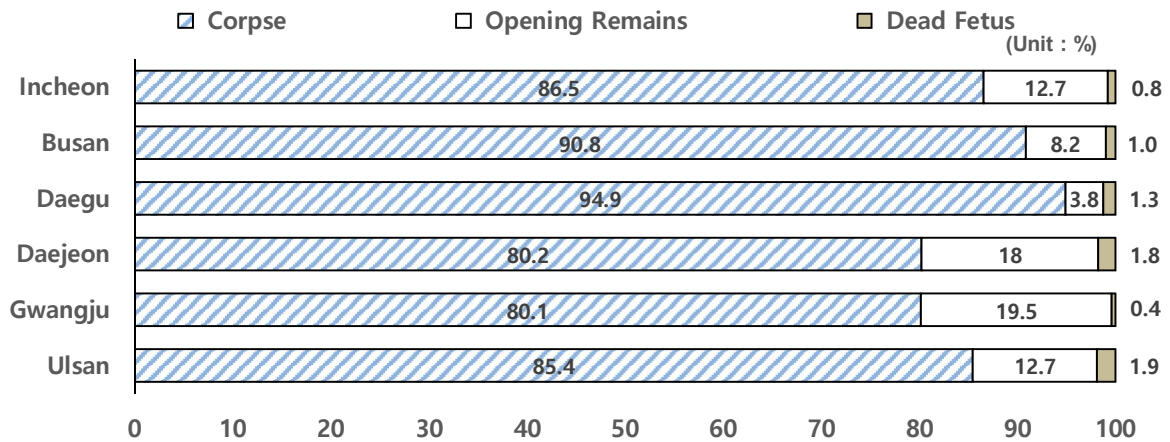


Figure 8. Ratios by type of cremated bodies at public cremation facilities(2013~2019)

4.3 Increase rate of cremated bodies at public cremation facilities

In the result of this study's research and analysis, as shown at Figure 9, the increasing rate of cremated bodies at public cremation facilities of metropolitan cities using E-Haneul funeral information system in Ulsan Metropolitan City from 3,975 person in 2013 to 6,964 person in 2019, and the average increasing rate per year is 12.5%, which is the highest among the metropolitan cities. On the other hand, the increase rate in Daejeon Metropolitan City is 0.7%, which is the lowest. Therefore, the difference of increase rate between the highest and lowest cities is 17.9 times, which is big.

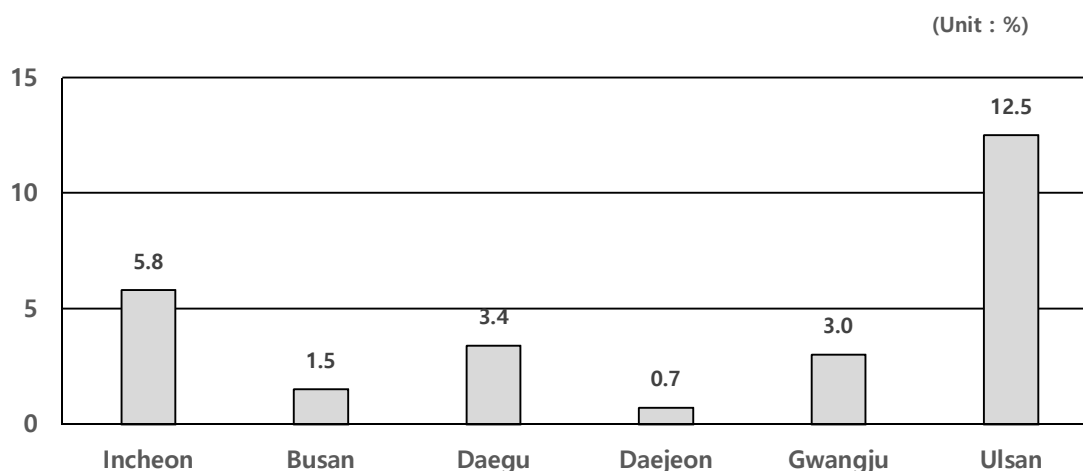


Figure 9. Average increasing rate per year of cremated bodies at public cremation facilities (2013~2019)

5. Conclusion

We are the following suggestions through this study in order to improve the effectiveness of funeral facilities according to the cremation demand at public cremation facilities in the metropolitan cities.

First, among the six metropolitan cities, the cremated bodies ratio of corpse is the highest in Daegu Metropolitan City(94.9%) and Busan Metropolitan City(90.8%). Like this, the lack of supply is expected due to the increase of cremation demand for corpse, so it is urgent to implement such policies as building or expanding cremation furnaces and expanding the supply of cremation facilities.

Second, there should be supply expansion from existing 4~8 cremation numbers of public cremation facilities in Gwangju Metropolitan City(80.1%), Daejeon Metropolitan City(80.2%), and Ulsan Metropolitan City(85.4%), where the cremated bodies ratio of corpse is low, to 11 cremation numbers, which is the level of Seoul Metropolitan City at public cremation facilities by considering the fact that the supply expansion is difficult due to the conflict with local residents who recognize cremation facilities as unpleasant facilities.

Third, due to dramatic increase of cremation demand of opening remains in the years with leap month, the number of cremated bodies of opening remains was increased by 215.8% compared to the previous year in Ulsan Metropolitan City. It is necessary to build and operate cremation furnaces exclusively for opening remains in order to satisfy the demand of opening remains cremation.

References

- [1] J.S. Choi and J.L. Kim, "A Study on the Using State of Cremation Facilities in Each Jurisdiction Area and Outside of the Jurisdiction Area Targeting Users of Online Cremation Reservation Service in Funeral Information System in the Capital Area", *The Journal of the Institute of Internet, Broadcasting and Communication(IJASC)*, Vol. 8, No. 2, pp. 191-198, June 2019.
DOI: <https://doi.org/10.7236/IJASC.2019.8.2.191>.
- [2] J.S. Choi and J.L. Kim, "Statistical Analysis of the Usage Type of Online Cremation Reservation Service in Funeral Information System: Focused on the Public Cremation Facilities of Incheon Metropolitan City," *International Journal of Internet, Broadcasting and Communication(IJIBC)*, Vol. 10, No. 4, pp. 12-18, November 2018.
DOI: <http://dx.doi.org/10.7236/IJIBC.2018.10.4.12>.
- [3] Ministry of Health & Welfare, <http://www.ehaneul.go.kr>, 2020. 2. 20.
- [4] Incheon Metropolitan City Facilities Management Corporation, Data of Request to Information Disclosure, 2020.2.17.
- [5] Busan Metropolitan City Facilities Management Corporation, Data of Request to Information Disclosure, 2020.2.12.
- [6] Daegu Metropolitan City Facilities Management Corporation, Data of Request to Information Disclosure, 2020.2.13.
- [7] Daejeon Metropolitan City Facilities Management Corporation, Data of Request to Information Disclosure, 2020.2.18.
- [8] Gwangju Metropolitan City Corporation, Data of Request to Information Disclosure, 2020.2.20.
- [9] Ulsan Metropolitan City Corporation, Data of Request to Information Disclosure, 2020.2.19.
- [10] Ministry of the Interior and Safety, Resident Registration Demographics, 2020.1.15.
- [11] J.S. Choi and J.L. Kim, "Analysis the Usage Type of Online Cremation Reservation Service in Ehanul Funeral Information System: Focused on the Public Cremation Facilities of Seoul Metropolitan City," *The Journal of the Institute of Internet, Broadcasting and Communication(JIIBC)*, Vol. 18, No. 2, pp. 133-139, April 2018.
DOI: <https://doi.org/10.7236/JIIBC.2018.18.2.133>.
- [12] Ministry of Health & Welfare, The Second Funeral Facilities Supply and Demand Master Plan(2018-2022), p. 11, 2018.
- [13] Statistics Korea, 2018 Population Trend Survey, p. 25, 2019.