# Variation in mortality following hip fracture across the Asia Pacific region: Country/region-specific report


# Executive summary

Hip fractures are the most common, serious and costly osteoporotic fracture suffered by older people. Currently 3 out of 5 of the world's population live in the Asia Pacific region. The region as a whole is experiencing a rapidly ageing population, with the proportion of people aged 65 years and over projected to double between 2022 and 2050. Estimates suggest that by 2050, half of all hip fractures will occur in Asia.

There is wide geographic variation in the mortality associated with hip fracture globally, with disparities in 1-year mortality ranging from 2.4% in Japan to 34.8% in Hungary. Previous reviews have reported consistently lower 1-year mortality rates in Asia (range 15%-17.9%) compared to Europe (22%-23.3%), North America (21%-22%) and South America (25%-26.8%), highlighting the need for further analysis of the Asia Pacific region.

This report provides the country/region-specific estimates to support our large systematic review and meta-analysis which is the first to report on in-hospital, 30-day and 1-year mortality rates in adults aged 50 years and over, hospitalised for acute hip fracture, across the Asia Pacific Region by country/region.

Compliant with PRISMA guidelines, 5 databases MEDLINE, PUBMED, EMBASE, Web of Science and the Cochrane Library were systematically searched to identify studies that reported mortality following hospitalisation for low trauma hip fracture in adults aged ≥50 years with data from 2010 to 30 September 2021. In total 427 studies were included in the systematic review and of these, 244 studies were included in the meta-analysis.

Pooled mortality estimates and 95% Confidence Intervals (CI) for each mortality time period, for country/regions with ≥ 2 studies were calculated. As rates for in-hospital and 30-day mortality were low (<20%) individual effect size and sample variance were calculated using the logit transformation. Between study variation was estimated using DerSimonian-Laird estimator. Statistical heterogeneity of the studies was assessed using the chi-squared statistic and the $I^2$ statistic, noting that in this type of proportional meta-analysis $I^2$ is usually high and expected due to differences in time, place and population sub-groups. Both common-effect and random effects models are reported.

Our meta-analysis demonstrates substantial variation in mortality across the Asia Pacific region, a pattern that is consistent across each time point. Both in-hospital and 30-day mortality rates in Asian countries/regions, most notably Japan (1.4% and 1.2%), and Singapore (1.4% and 2.2%) are four-fold lower than for Oceania notably Australia (4.5%, 7.4%) and New Zealand (5.5% and 6.6%). This difference, although less marked, is sustained at 1-year with a two-fold lower mortality rate in Japan (12.6%) and Singapore (10.8%) compared to Australia (23.3%) and New Zealand (23.8%). Our analysis is the first to clearly delineate these differences. Understanding the reasons for these differences is the next step to optimising care and outcomes for all hip fracture patients across the largest region in the world.

# Contents

# 1. AUSTRALIA

## Forest plots, by time period

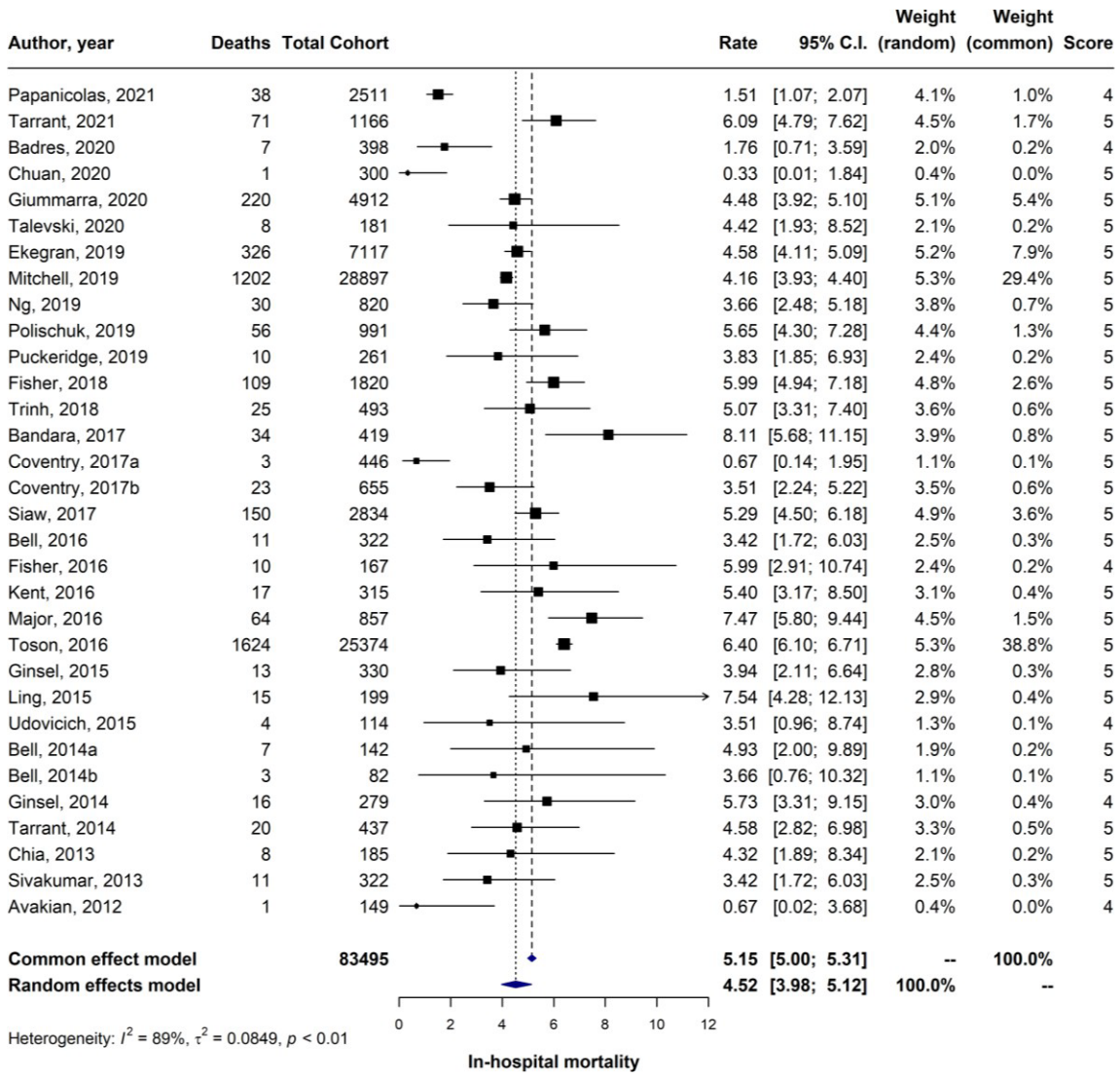


Figure 1: Forest plot of in-hospital mortality, includes 32 studies, 83,495 patients

# 1. AUSTRALIA

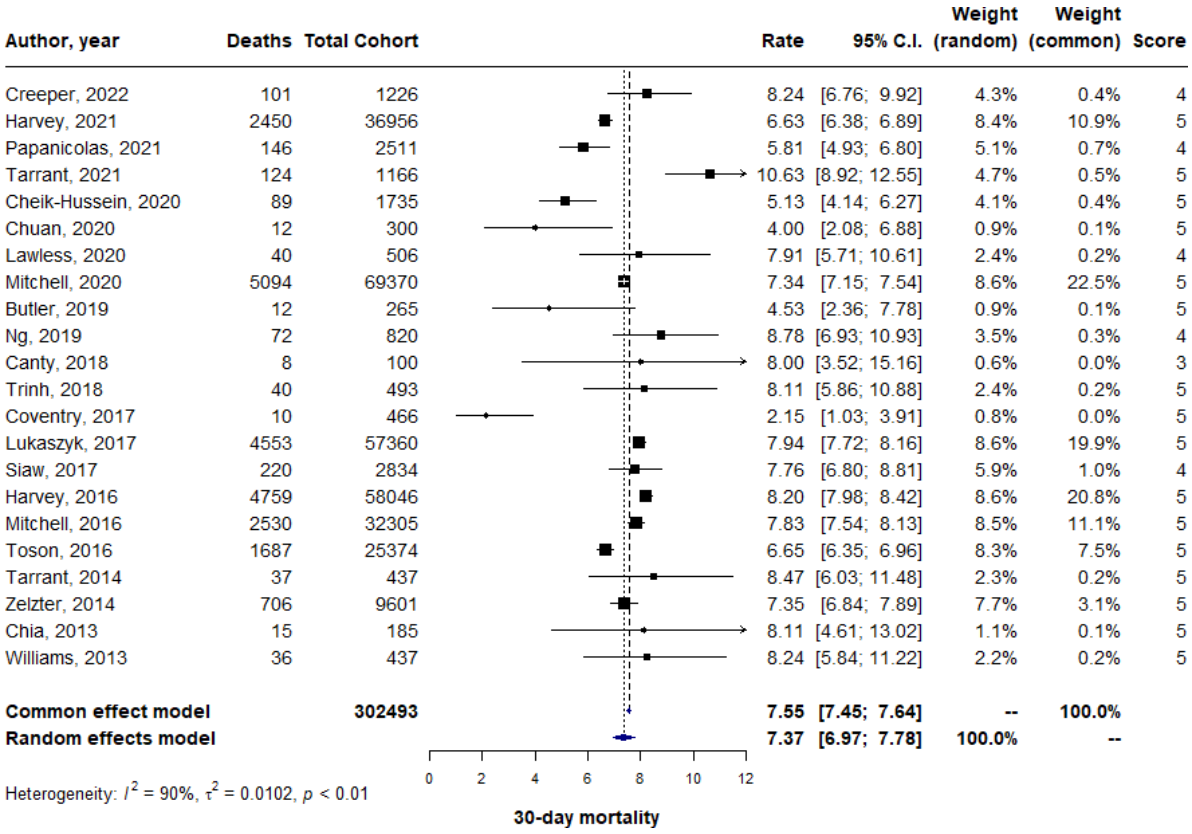


Figure 2: Forest plot of 30-day mortality, includes 22 studies, 302,493 patients

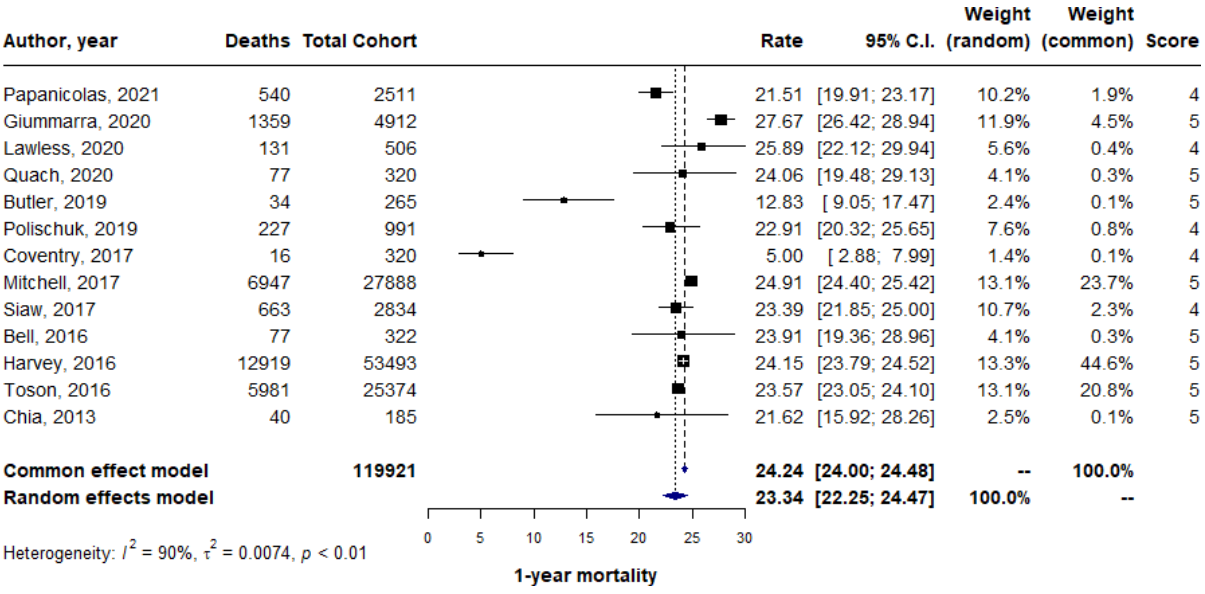


Figure 3: Forest plot of 1-year mortality, includes 13 studies, 119,921 patients

# 1. AUSTRALIA

## Studies included in meta-analysis, by time period

### In-hospital mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | In-hospital mortality | | Quality score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Papanicolas, 2021[1] | Obs | 2014-2017 | No State-wide database | 2,511 | 84.7 ± 7.7 | 63 | All | 1.5 | nr | 4 | NSW. International Collaborative on Costs, Outcomes and Needs in Care (ICCONIC) study data which used linked NSW administrative data. |
| Tarrant, 2021[2] | Obs | 2015-2017 | Yes | 1,166 | 84 ± 8 | 69 | All | 6.1 | 71/1,166 | 5 | John Hunter Hospital, NSW. Australian New Zealand Hip Fracture Registry (ANZHFR) data. |
| Badres, 2020[3] | Obs | 2016-2017 | Yes | 398 | 79.9 ± nr (34-99) | 75 | Sx only | 1.8 | 7/398 | 4 | Western Health, Victoria. |
| Chuan, 2020[4] | Obs | 2017-2018 | Yes | 300 | 82 [51,97] | 70 | Sx only | 0.3 | 1/300 | 5 | Liverpool Hospital, NSW. |
| Giummarra, 2020[5] | Obs | 2009-2016 | No State-wide database | 4,912 | 83.4 ± 7.5 (65-104) | 69 | All | 4.5 | 220/ 4,912 | 5 | Victoria. Victorian Orthopaedic Trauma Outcomes Registry (VOTOR) data. |
| Talevski, 2020[6] | Obs | 2008-2012 | Yes | 181 | 84.3 ± nr | 73 | All | 4.4 | 8/181 | 5 | Nepean Hospital, NSW. |
| Ekegren, 2019[7] | Obs | 2007-2015 | No State-wide database | 7,117 | nr | nr | All | 4.6 | 326/ 7,117 | 5 | Victoria. Victorian Orthopaedic Trauma Outcomes Registry (VOTOR) data. |
| Mitchell, 2019[8] | Obs | 2008-2013 | No State-wide database | 28,897 | nr age groups only ≥65 years | 73 | All | 4.2 | 1,202/ 28,897 | 5 | NSW. Population-based NSW hospital data (APDC), linked to death registry data. |
| Ng, 2019[9] | Obs | 2015-2016 | Yes | 820 | 81.5 ± 10.5 | 73 | All | 3.7 | 30/820 | 5 | Fiona Stanley Hospital, WA. |
| Polischuk, 2019[10] | Obs | 2007-2016 | Yes | 991 | 82 ± nr (74-88) | 74 | All | 5.7 | 56/991 | 5 | Princess Alexandra Hospital, Queensland. |
| Puckeridge, 2019[11] | Obs | 2014-2014 | Yes | 261 | 81 [range 11] | 71 | All | 3.8 | 10/261 | 5 | Sunshine Coast Hospital, Queensland. |

# 1. AUSTRALIA

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | In-hospital mortality | | Quality score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Fisher, 2018[12] | Obs | 2000-2013 | Yes | 1,820 | 82.8 ± 8.1 | 76 | All | 6.0 | 109/ 1,820 | 5 | Canberra Hospital, ACT. |
| Trinh, 2018[13] | Obs | 2014-2015 | Yes | 493 | nr age groups only ≥70 years | 67 | Sx only | 5.1 | 25/493 | 5 | Hospital not named, NSW. |
| Bandara, 2017[14] | Obs | 2012-2013 | Yes | 419 | 80 ± 10 | 72 | All | 8.1 | 34/419 | 5 | Level 1 tertiary trauma centre (not named), Queensland. |
| Coventry, 2017a[15] | Obs | 2012-2014 | Yes | 446 | 82 ± 7.6 | 72 | Sx only | 0.6 | 3/466 | 5 | Sir Charles Gairdner Hospital, WA. |
| Coventry, 2017b[16] | Obs | 2010-2013 | Yes | 655 | 84 ± 7.4 | 74 | Sx only | 3.5 | 23/655 | 5 | Sir Charles Gairdner Hospital, WA. |
| Siaw, 2017[17] | Obs | 2003-2013 | Yes | 2,834 | 84.0 ± 7.5 | 75 | All | 5.3 | 150/ 2,834 | 5 | Flinders Medical Centre, SA. |
| Bell, 2016[18] | Obs | 2010-2011 | Yes | 322 | 83 [nr] (48-103) | 71 | Sx only | 3.4 | 11/322 | 5 | Prince Charles Hospital, Queensland. |
| Fisher, 2016[19] | Obs | 2010-2011 | Yes | 167 | 78.8 ± 8.7 | nr | All | 6.0 | nr | 4 | Canberra Hospital, ACT. |
| Kent, 2016[20] | Obs | 2010-2010 | Yes | 315 | 80 ± 11.3 | 71 | Sx only | 5.4 | 17/315 | 5 | John Hunter Hospital, NSW. |
| Major, 2016[21] | Obs | 2010-2014 | Yes | 857 | 82 [nr] | 70 | All | 7.5 | nr | 5 | Princess Alexandra Hospital, Queensland. |
| Toson, 2016[22] | Obs | 2008-2012 | No State-wide database | 25,374 | nr age groups only ≥65 years | 73 | All | 6.4 | 1,624/ 25,374 | 5 | NSW. Population-based NSW hospital data (APDC), linked to death registry data. |
| Ginsel, 2015[23] | Obs | 2010-2011 | Yes | 330 | 81.6 ± 13.1 | 71 | Sx only | 3.9 | 13/330 | 5 | The Prince Charles Hospital, Queensland. |
| Ling, 2015[24] | Obs | 2010-2011 | Yes | 199 | nr ± nr (39-100) | 66 | All | 7.5 | 15/199 | 5 | Princess Alexandra Hospital, Queensland. |
| Udovicich, 2015[25] | Obs | 2006-2011 | Yes | 114 | 84 ± nr | 74 | Sx only | 3.5 | 4/114 | 4 | Hamilton Base Hospital, Victoria. |
| Bell, 2014a[26] | Obs | 2011-2012 | Yes | 142 | 83 [50-100] | 68 | Sx only | 4.9 | 7/142 | 5 | The Prince Charles Hospital, Queensland. |
| Bell, 2014b[27] | Obs | 2012-2012 | Yes | 82 | 82.3 ± nr | 70 | Sx only | 3.7 | 3/82 | 5 | Prince Charles Hospital, Queensland. |

# 1. AUSTRALIA

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | In-hospital mortality | | Quality score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Ginsel, 2014[28] | Obs | 2010-2011 | Yes | 279 | 81.3 ± nr (45-106) | 75 | Sx only | 5.7 | 16/279 | 4 | Prince Charles Hospital, Queensland. |
| Tarrant, 2014[29] | Obs | 2011-2011 | Yes | 437 | 85 ± nr (66-99) | 68 | All | 4.6 | 20/437 | 5 | John Hunter Hospital, NSW. |
| Chia, 2013[30] | Obs | 2009-2010 | Yes | 185 | 80 ± 11 | 71 | All | 4.3 | 8/185 | 5 | The Northern Hospital, Victoria. |
| Sivakumar, 2013[31] | Obs | 2010-2011 | Yes | 322 | 82.3 ± 9.9 (48-103) | 71 | Sx only | 3.4 | 11/322 | 5 | The Prince Charles Hospital, Queensland. |
| Avakian, 2012[32] | Obs | 2006-2010 | Yes | 149 | 84.0 ± 8.8 | 81 | Sx only | 0.7 | 1/149 | 4 | Sydney Adventist Hospital, NSW |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture; NSW = New South Wales; WA = Western Australia; SA = South Australia; ACT = Australian Capital Territory.

## 30-day mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 30-day mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Creeper, 2022[33] | Obs | 2017-2017 | No | 1,226 | 84 [76, 89] | 72 | Sx only | 8.2 | 101/ 1,226 | 4 | 3 tertiary hospitals in WA. Used ANZHFR data. * 30-day mortality raw data obtained from author. |
| Harvey, 2021[34] | Obs | 2011-2018 | No State-wide database | 36,956 | nr age groups only ≥65 years | 72 | Sx only | 6.7 | 2,460/ 36,956 | 5 | NSW. Population-based NSW hospital data (APDC), linked to death registry data. |
| Papanicolas, 2021[1] | Obs | 2014-2017 | No State-wide database | 2,511 | 84.7 ± 7.7 | 63 | All | 5.8 | nr | 4 | NSW. International Collaborative on Costs, Outcomes and Needs in Care (ICCONIC). Linked NSW administrative data. |
| Tarrant, 2021[2] | Obs | 2015-2017 | Yes | 1,166 | 84 ± 8 | 69 | All | 10.6 | 124/ 1,166 | 5 | John Hunter Hospital, NSW. Used ANZHF registry data. |

# 1. AUSTRALIA

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 30-day mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Cheik-Hussein, 2020[35] | Obs | 2010-2016 | Yes | 1,735 | 80.3 ± nr | nr | All | 5.1 | 89/1,735 | 5 | Liverpool Hospital, NSW. |
| Chuan, 2020[4] | Obs | 2017-2018 | Yes | 300 | 82 [51,97] | 70 | Sx only | 4.0 | 12/300 | 5 | Liverpool Hospital, NSW. |
| Lawless, 2020[36] | Obs | 2017-2018 | Yes | 506 | 82.5 ± nr (50–105) | 74 | Sx only | 7.9 | nr | 4 | Fiona Stanley Hospital, WA. |
| Mitchell, 2020[37] | Obs | 2007-2017 | No State-wide database | 69,370 | nr age groups only ≥65 years | 72 | All | 7.3 | 5,094/ 69,370 | 5 | NSW. Population-based NSW hospital data (APDC), linked to death registry data. |
| Butler, 2019[38] | Obs | 2013-2015 | Yes | 265 | 83.5 ± nr (55-99) | 76 | Sx only | 4.5 | nr | 5 | Wagga Wagga Base Hospital, NSW. Linked to death registry data. |
| Ng, 2019[9] | Obs | 2015-2016 | Yes | 820 | 81.5 ± 10.5 | 73 | All | 8.8 | nr | 4 | Fiona Stanley Hospital, WA. |
| Canty, 2018[39] | RCT | 2016-2016 | No 4 hospitals | 100 | nr ± nr (40-98) 82 [74,88] | 70 | Sx only | 8.0 | 8/100 | 3 | Multi-centre pilot trial in 4 metropolitan tertiary university hospitals (not named). |
| Trinh, 2018[13] | Obs | 2014-2015 | Yes | 493 | nr age groups only ≥70 years | 67 | Sx only | 8.1 | 40/493 | 5 | Hospital (not named), NSW. |
| Coventry, 2017[15] | Obs | 2012-2014 | Yes | 446 | 82 ± 7.6 | 72 | Sx only | 2.1 | 10/466 | 5 | Sir Charles Gairdner Hospital, WA. Linked to death registry data. |
| Lukaszyk, 2017[40] | Obs | 2003-2012 | No State-wide database | 57,360 | nr | nr | All | 7.9 | 4,553/ 57,360 | 5 | NSW. Population-based NSW hospital data (APDC), linked to death registry data. |
| Siaw, 2017[17] | Obs | 2003-2013 | Yes | 2,834 | 84 ± 7.5 | 75 | All | 7.8 | 220/ 2,834 | 4 | Flinders Medical Centre, SA. |
| Harvey, 2016[41] | Obs | 2003-2012 | No State-wide database | 58,046 | nr age groups only ≥65 years | nr | All | 8.2 | 4,759/ 58,046 | 5 | NSW. Population-based NSW hospital data (APDC), linked to death registry data. |
| Mitchell, 2016[42] | Obs | 2009-2013 | No | 32,305 | nr age groups only | 72 | All | 7.8 | 2,530/ 32,305 | 5 | NSW. |

# 1. AUSTRALIA

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 30-day mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| | | | State-wide database | | ≥65 years | | | | | | Population-based NSW hospital data (APDC), linked to death registry data. |
| Toson, 2016[22] | Obs | 2008-2012 | No State-wide database | 25,374 | nr age groups only ≥65 years | 73 | All | 6.6 | 1,687/ 25,374 | 5 | NSW. Population-based NSW hospital data (APDC), linked to death registry data. |
| Tarrant, 2014[29] | Obs | 2011-2011 | Yes | 437 | 85 ± nr (66-99) | 68 | All | 8.5 | 37/437 | 5 | John Hunter Hospital, NSW. |
| Zelzter, 2014[43] | Obs | 2009-2011 | No State-wide database | 9,601 | 84.2 ± 7.5 | 73 | Sx only | 7.4 | 706/ 9,601 | 5 | NSW. Population-based NSW hospital data (APDC), linked to death registry data. |
| Chia, 2013[30] | Obs | 2009-2010 | Yes | 185 | 80 ± 11 | 71 | All | 8.1 | 15/185 | 5 | The Northern Hospital, Victoria. Linked to death registry data. |
| Williams, 2013[44] | Obs | 2011 | Yes | 437 | 84.7 ± 7.0 | 69 | All | 8.2 | nr | 5 | John Hunter Hospital, NSW. Linked to death registry data. *Only extracted data for 2011. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture; APDC = Admitted Patient Data Collection; NSW = New South Wales; WA = Western Australia; SA = South Australia; ACT = Australian Capital Territory.

## 1-year mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 1-year mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Papanicolas, 2021[1] | Obs | 2012-2016 | No State-wide database | 2,511 | 84.7 ± 7.7 | 63 | All | 21.5 | nr | 4 | NSW. International Collaborative on Costs, Outcomes and Needs in Care (ICCONIC). Linked administrative data for NSW. |
| Giummarra, 2020[5] | Obs | 2009-2016 | No State-wide database | 4,912 | 83.4 ± 7.5 (65-104) | 69 | All | 27.7 | 1,359/ 4,912 | 5 | Victoria. Victorian Orthopaedic Trauma Outcomes Registry (VOTOR) data |

# 1. AUSTRALIA

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 1-year mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| | | | | | | | | | | | Covers major trauma centres in Victoria. Linked mortality data. |
| Lawless, 2020[36] | Obs | 2017-2018 | Yes | 506 | 82.5 ± nr (50–105) | 74 | Sx only | 25.9 | 131/506 | 4 | Fiona Stanley Hospital, WA. |
| Quach, 2020[45] | Obs | 2010-2011 | Yes | 320 | 83.4 [nr] | 71 | All | 24.1 | 77/320 | 5 | The Prince Charles Hospital, Queensland. Searched mortality registry database (not linked) for long term mortality outcome. |
| Butler, 2019[38] | Obs | 2013-2015 | Yes | 265 | 83.5 ± nr (55-99) | 76 | Sx only | 12.8 | nr | 5 | Wagga Wagga Base Hospital, NSW. Linked to death registry data. |
| Polischuk, 2019[10] | Obs | 2007-2016 | Yes | 991 | 82 ± nr (74-88) | 74 | All | 22.9 | 227/991 | 4 | Princess Alexandra Hospital, Queensland. |
| Coventry, 2017[15] | Obs | 2012-2014 | Yes | 446 | 82 ± 7.6 | 72 | Sx only | 5.0 | 16/320 | 4 | Sir Charles Gairdner Hospital, WA. Linked to death data. |
| Mitchell, 2017[46] | Obs | 2010-2014 | No State-wide database | 27,888 | Nr age groups only | 72 | All | 24.9 | 6,947/ 27,888 | 5 | NSW. Population-based NSW hospital data (APDC), linked to death registry data. |
| Siaw, 2017[17] | Obs | 2003-2013 | Yes | 2,834 | 84 ± 7.5 | 75 | All | 23.4 | 663/ 2,834 | 4 | Flinders Medical Centre, SA. |
| Bell, 2016[18] | Obs | 2010-2011 | Yes | 322 | nr ± nr (48-103) 83.4 [nr] | | Sx only | 23.9 | 77/322 | 5 | Prince Charles Hospital, Queensland. Mortality identified from death registry- not linked. |
| Harvey, 2016[47] | Obs | 2003-2012 | No State-wide database | 53,493 | nr (age gps only) | nr | All | 24.2 | 12,919/ 53,493 | 5 | NSW. Population-based NSW hospital data (APDC), linked to death registry data. |
| Toson, 2016[22] | Obs | 2008-2012 | No State-wide database | 25,374 | nr (age gps only) | 73 | All | 23.6 | 5,981/ 25,374 | 5 | NSW Population-based NSW hospital data (APDC), linked to death registry data. |

# 1. AUSTRALIA

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 1-year mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Chia, 2013[30] | Obs | 2009-2010 | Yes | 185 | 80 ± 11 | 71 | All | 21.6 | 40/185 | 5 | The Northern Hospital, Victoria. Linked to death registry data. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture; NSW = New South Wales; WA = Western Australia; SA = South Australia; ACT = Australian Capital Territory.

# 1. AUSTRALIA

## Excluded studies

| Study | Reason(s) for exclusion |
|---|---|
| Jorissen, 2021[48] | Not representative of low trauma hip fracture population- *only includes residential aged care patients.* |
| Anderson, 2020[49] | Not representative of low trauma hip fracture population- *only includes residential aged care patients.* |
| Jorissen, 2020[50] | Not representative of low trauma hip fracture population- *only includes residential aged care patients.* |
| King, 2020[51] | Not representative of low trauma hip fracture population- *only includes patients taking oral anticoagulation.* |
| Nelson, 2020[52] | Unable to determine actual date of death- linked mortality data but month and year only. |
| Tan, 2020[53] | Not representative of low trauma hip fracture population- *only includes more robust patients undergoing cemented fixation.* |
| Tarrant, 2020a[54] | Not representative of low trauma hip fracture population- *only includes patients on antiplatelet therapy.* |
| Tarrant, 2020b[55] | Not representative of low trauma hip fracture population- *only includes patients on anticoagulant therapy.* |
| Lockwood, 2019[56] | Not representative of low trauma hip fracture population-*only included pts who were medically stable and being discharged home.* |
| Lui, 2018[57] | Not representative of low trauma hip fracture population-*only included patients with upper gastrointestinal bleeding (55 out of 1,691 hip fractures).* |
| Holloway, 2017[58] | Not representative of low trauma hip fracture population-*only included females. Age included >20 years.* |
| Khow, 2017[59] | Not representative of low trauma hip fracture population- *included femoral shaft fractures. Small sample size n=40.* |
| Mak, 2016[60] | Not representative of low trauma hip fracture population- *excluded patients having a life expectancy deemed >1 month by the treating clinical staff.* |
| Marshall, 2016[61] | Numbers in Table inconsistent with text. |
| Watson, 2013[62] | Not representative of low trauma hip fracture population-*only included cognitively intact ambulatory patients.* |
| Canty, 2012[63] | Not representative of low trauma hip fracture population- *only included patients with cardiac disease and matched controls (130 out of 509 hip fractures).* |

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# 2. CHINA

## Forest plots, by time period

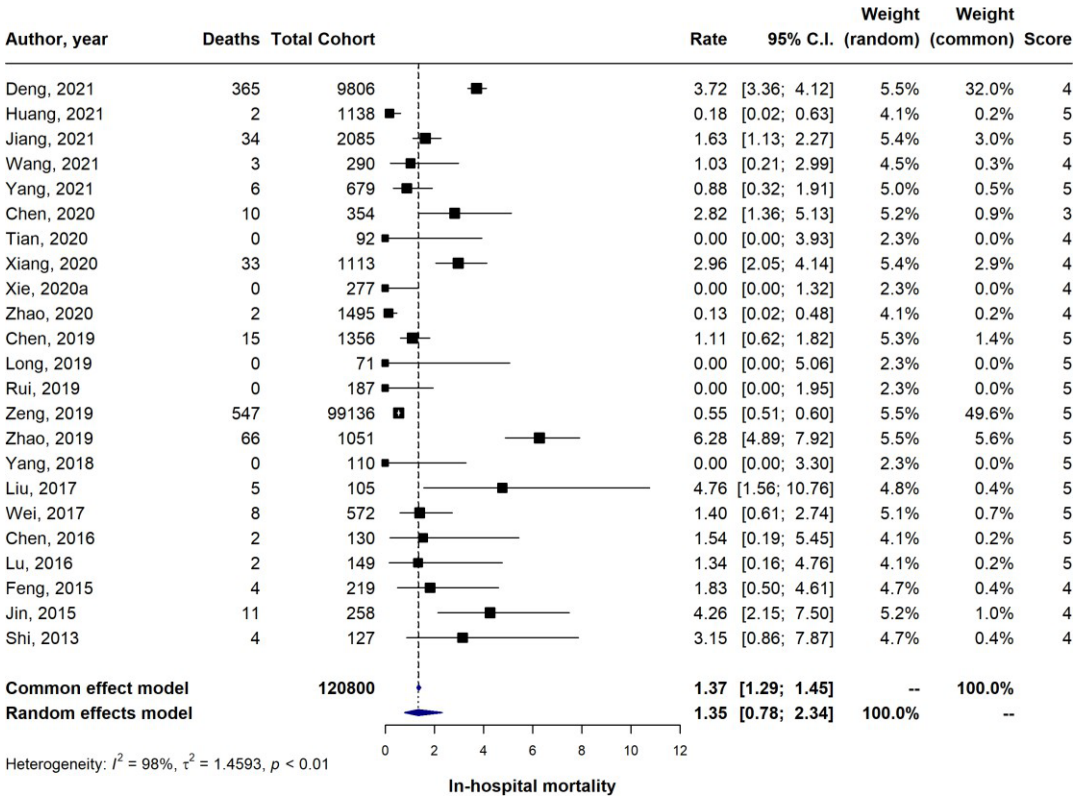


Figure 1: Forest plot of in-hospital mortality, includes 23 studies, 120,800 patients

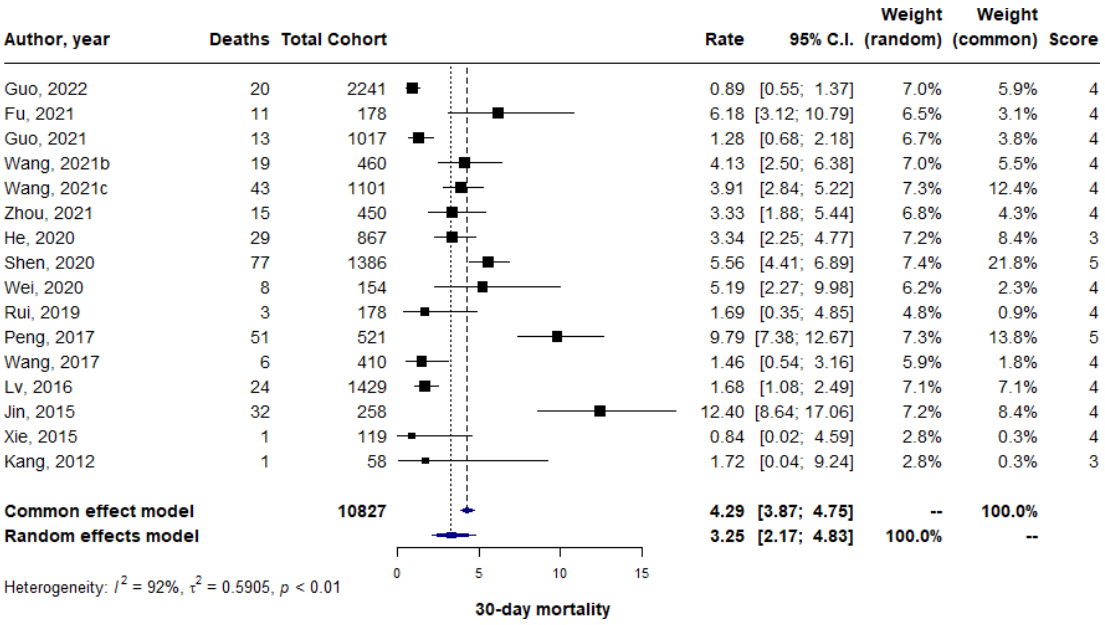


Figure 2: Forest plot of 30-day mortality, includes 16 studies, 10,827 patients

# 2. CHINA

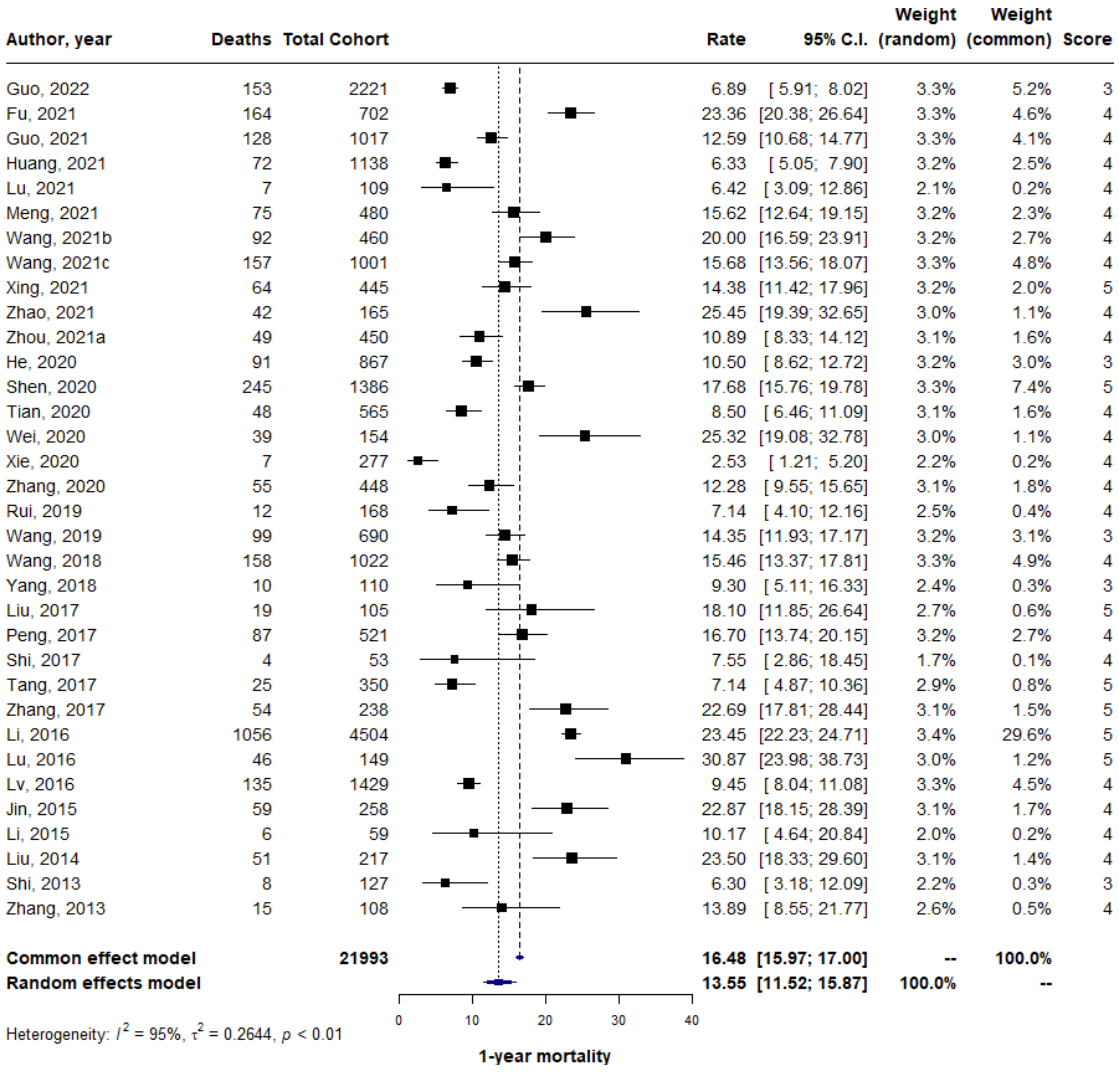


Figure 3: Forest plot of 1-year mortality, includes 34 studies, 21,993 patients

# 2. CHINA

## Studies included in meta-analysis, by time period

### In-hospital mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | In-hospital mortality | | Quality Index Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Deng, 2021[1] | Obs | 2006-2017 | No<br>194 hospitals | 9,806 | nr<br>age groups only ≥60 years | 60 | All | 3.7 | 365/ 9,806 | 4 | Included 194 hospitals. |
| Huang, 2021[2] | Obs | 2015-2019 | Yes | 1,138 | 74.9 ± 8.8 | 77 | Sx only | 0.2 | 2/1,138 | 5 | Ningbo No. 6 Hospital, Zhejiang. |
| Jiang, 2021[3] | Obs | 1991-2019 | Yes | 2,805 | 79.1 ± 7.3 | 69 | Sx only | 1.6 | 34/2,085 | 5 | Chinese People's Liberation Army General Hospital, Beijing. |
| Wang, 2021a[4] | Obs | 2014-2018 | Yes | 290 | 77.6 ± 8.6 | 65 | Sx only | 1.0 | 3/290 | 4 | People's Hospital of Deyang City, Sichuan. |
| Yang, 2021[5] | Obs | 2009-2018 | Yes | 679 | 81.4 ± nr (60-102) | 65 | Sx only | 0.4 | 3/679 | 5 | Guangzhou First People's Hospital, Guangzhou. |
| Chen, 2020[6] | Obs | 2014-2019 | Yes | 354 | 81.9 ± 6.5 | 76 | Sx only | 2.8 | 10/354 | 3 | Guangdong Provincial People's Hospital, Guangdong. |
| Tian, 2020[7] [Chinese] | Obs | 2018-2018 | Yes | 92 | 75 ± 6 | 66 | Sx only | 0 | 0/92 | 4 | Beijing Jishuitan Hospital, Beijing. |
| Xiang, 2020[8] | Obs | 2014-2019 | Yes | 1,113 | 79.9 ± 7.5 | 66 | Sx only | 3.0 | 33/1,113 | 4 | The Second Affiliated Hospital of Wenzhou Medical University, Zhejiang. |
| Xie, 2020[9] | Obs | 2009-2017 | Yes | 277 | 75.4 ± 1.8 | 81 | Sx only | 0 | 0/277 | 4 | The Second Affiliated Hospital of Soochow University, Jiangsu. |
| Zhao, 2020[10] | Obs | 2014-2018 | Yes | 1,495 | 78.9 ± 7.5 | 63 | Sx only | 0.1 | 2/1,495 | 4 | Third Hospital of Hebei Medical University, Shijiazhuang. |
| Chen, 2019[11] | Obs | 2010-2015 | Yes | 1,356 | 82.2 ± 6.8 | 74 | All | 1.1 | 15/1,356 | 5 | Huadong Hospital of Fudan University, Shanghai. |
| Long, 2019[12] [Chinese] | Obs | 2016-2017 | Yes | 71 | 82.6 ± nr | 62 | Sx only | 0 | 0 / 71 | 5 | West China Hospital, Sichuan University, Chengdu Sichuan. |
| Rui, 2019[13] [Chinese] | Obs | 2014-2018 | Yes | 178 | 78.7 ± nr | 76 | Sx only | 0 | 0 / 178 | 5 | Zhongda Hospital Southeast University, Jiangsu. |
| Zeng, 2019[14] | Obs | 2013-2016 | No | 99,136 | nr<br>age groups only | 67 | Sx only | 0.6 | 547/ 99,136 | 5 | Hospital Quality Monitoring System (HQMS) data, includes |

# 2. CHINA

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | In-hospital mortality | | Quality Index Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| | | | National database | | ≥ 60 years | | | | | | 982 tertiary hospitals across all 31 administrative regions. *reported in-hospital mortality up to 30 days. |
| Zhao, 2019[15] | Obs | 2005-2015 | Yes | 1,051 | 84.7 ± 19.3 (65-104) | 51 | All | 6.3 | 66/1,051 | 5 | Beijing Luhe Hospital Affiliated to Capital Medical University, Beijing. |
| Yang , 2018[16] | Obs | 2003-2013 | Yes | 110 | 79.1 ± 7.3 (60-99) | 64 | Sx only | 0 | 0/110 | 5 | First Affiliated Hospital, Sun Yat-sen University, Guangzhou. |
| Liu , 2017[17] | Obs | 2008-2016 | Yes | 105 | 78.3 ± 5.1 | 62 | Sx only | 4.8 | 5/ 05 | 5 | Luoyang Orthopedic Hospital of Henan Province, Zhengzhou. Included femoral neck fractures. |
| Wei, 2017[18] [Chinese] | Obs | 2005-2014 | Yes | 572 | 78.4 ± 7.1 | 64 | Sx only | 1.4 | 8/572 | 5 | Peking University Third Hospital, Bejing. |
| Chen, 2016[19] [Chinese] | Obs | 2012-2014 | Yes | 130 | 80.1 ± 6.7 | 65 | Sx only | 1.5 | 2/130 | 5 | General Hospital of the Land Force PLA, Beijing. |
| Lu, 2016[20] | Obs | 2009-2010 | Yes | 174 | 80.9 ± 7.5 (65-97) | 67 | Sx only | 1.3 | 2/149 | 5 | Zhongda Hospital, Southeast University, Jiangsu province. |
| Feng, 2015[21] [Chinese] | Obs | 2009-2014 | Yes | 219 | 85.1 ± 4.0 | 55 | Sx only | 1.8 | 4/219 | 4 | First People's Hospital of Huizhou, Guangdong Province. |
| Jin, 2015[22] | Obs | 2008-2012 | Yes | 258 | 79.7 ± 6.8 | 72 | Sx only | 4.3 | 11/258 | 4 | The Chinese People's Liberation Army General Hospital, Beijing |
| Shi, 2013[23] [Chinese] | Obs | 2006-2012 | Yes | 127 | 79.6 ± 11.5 | 70 | Sx only | 3.1 | 4/127 | 4 | Mianyang Central Hospital, Sichuan. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

# 2. CHINA

## 30-day mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 30-day mortality | | Quality Index Score | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Guo, 2022[24] | Obs | 2013-2018 | Yes | 2,241 | 79.4 ± 7.4 (65-106) | 68 | Sx only | 0.9 | 20/2,241 | 4 | Third Hospital of Hebei Medical University, Shijiazhuang. |
| Fu, 2021a[25] | Obs | 2014-2019 | Yes | 178 | 78.6 ± 1.7 | 82 | Sx only | 6.2 | 11/178 | 4 | Guangdong Provincial People's Hospital, Guangdong Province. |
| Guo, 2021[26] | Obs | 2013-2018 | Yes | 1,017 | 78.4 ± 8.4 | 66 | All | 1.3 | 13/1,017 | 4 | Third Hospital of Hebei Medical University, Shijiazhuang. *30-day mortality data provided by Dr Hou |
| Wang, 2021b[27] | Obs | 2014-2018 | Yes | 460 | 79.3 ± 8.4 | 67 8.38 | All | 4.1 | 19/460 | 4 | Orthopedic Center of Deyang City, Sichuan. |
| Wang, 2021c[28] [Chinese] | Obs | 2012-2016 | Yes | 1,001 | 81 [75-85] | 67 | Sx only | 3.9 | 43/1,001 | 4 | Seventh Medical Center of Peoples Liberation Army General Hospital, Beijing. |
| Zhou, 2021[29] [Chinese] | Obs | 2017-2018 | Yes | 450 | nr | 69 | Sx only | 3.3 | 15/450 | 4 | Second Affiliated Hospital of Wenzhou Medical University. Zhejiang. |
| He, 2020[30] | Obs | 2014-2017 | Yes | 867 | 81.2 ± 8 | 75 | Sx only | 3.3 | 29/867 | 3 | Second Affiliated Hospital of Zhejiang University School of Medicine. |
| Shen, 2020[31] | Obs | 2008-2018 | Yes | 1,386 | nr age groups only ≥60 years | 65 | Sx only | 5.6 | 77/1,386 | 5 | Peking University People's Hospital, Beijing. |
| Wei, 2020[32] | RCT | 2010-2016 | Yes | 154 | 82.0 ± 8.9 | 73 | All | 5.2 | 8/154 | 4 | Nanjing First Hospital, Jiangsu. |
| Rui, 2019[13] [Chinese] | Obs | 2014-2018 | Yes | 178 | 78.7 ± nr | 76 | Sx only | 1.7 | 3 / 178 | 4 | Zhongda Hospital Southeast University, Jiangsu. |
| Peng , 2017[33] [Chinese] | Obs | 2012-2014 | Yes | 521 | 79.82 ± 9.33 | 67 | Sx only | 9.8 | 51 / 521 | 5 | General Hospital of PLA Army, Beijing. |
| Wang , 2017[34] | Obs | 2014-2016 | Yes | 410 | 80 ± 7.5 (60-100) | 68 | Sx only | 1.5 | 6/410 | 4 | Beijing Shijitan Hospital, Beijing. |
| Lv, 2016[35] | Obs | 2000-2012 | Yes | 1,429 | 75 [65-82] | 58 | Sx only | 2.4 | 24/1,429 | 4 | Hospital not identified. |

# 2. CHINA

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 30-day mortality | | Quality Index Score | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Jin, 2015[22] | Obs | 2008-2012 | Yes | 258 | 79.7 ± 6.8 | 72 | Sx only | 12.4 | 32/258 | 4 | The Chinese People's Liberation Army General Hospital, Beijing |
| Xie, 2015[36] [Chinese] | Obs | 2011-2013 | Yes | 119 | nr | 77 | Sx only | 0.8 | 1 / 119 | 4 | Shenyang Military Region General Hospital, Liaoning, |
| Kang, 2012[37] [Chinese] | Obs | 2006-2010 | Yes | 58 | 79 ± nr (65-93) | 59 | Sx only | 1.7 | 1 / 58 | 3 | Affiliated Hospital of Shaoxing College, Zhejiang. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

## 1-year mortality

| Author, year | Study Design | Date Range | Single centre study | N | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 1-year mortality | | Quality Index Score | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Guo, 2022[24] | Obs | 2013-2018 | Yes | 2,241 | 79.4 ± 7.4 (65-106) | 68 | Sx only | 6.8 | 153/ 2,221 | 3 | Third Hospital of Hebei Medical University, Shijiazhuang. |
| Fu, 2021b[38] | Obs | 2012-2019 | Yes | 702 | 77.9 ± 8.2 | 77 | Sx only | 23.4 | 164 / 702 | 4 | Guangdong Provincial People's Hospital, Guangzhou. |
| Guo, 2021[26] | Obs | 2013-2018 | Yes | 1,017 | 78.4 ± 8.4 | 66 | Sx only | 12.6 | 128 / 1,017 | 4 | Third Hospital of Hebei Medical University, Shijiazhuang. *1-year mortality data provided by Dr Hou. |
| Huang, 2021[2] | Obs | 2015-2019 | Yes | 1,138 | 74.9 ± 8.8 | 77 | Sx only | 6.3 | 72/1,138 | 4 | Ningbo No. 6 Hospital, Zhejiang. |
| Lu, 2021[39] [Chinese] | Obs | 2011-2015 | Yes | 109 | nr | 71 | Sx only | 6.4 | 7/109 | 4 | Zhongda Hospital Southeast University, Jiangsu |
| Meng, 2021[40] | Obs | 2016-2017 | Yes | 480 | 78.3 ± 7.4 | nr | Sx only | 15.6 | 75/480 | 4 | 3rd Hospital of Hebei Medical University, Shijiazhuang. |
| Wang, 2021b[27] | Obs | 2014-2018 | Yes | 460 | 79.31 ± 8.38 | 67 | All | 20.0 | 92/460 | 4 | People's Hospital of Deyang City, Sichuan. *Overlapping population with Wang, 2021a[4] but larger sample size. |

# 2. CHINA

| Author, year | Study Design | Date Range | Single centre study | N | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 1-year mortality | | Quality Index Score | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Wang, 2021c[28] [Chinese] | Obs | 2012-2016 | Yes | 1,001 | 81 [75-85] | 67 | nr | 14.3 | 157 / 1,001 | 4 | Seventh Medical Center of Peoples Liberation Army General Hospital, Beijing. |
| Xing, 2021[41] | Obs | 2012-2016 | Yes | 445 | 79.36 ± 7.21 | 62 | Sx only | 14.4 | 64 / 445 | 5 | West China Hospital, Sichuan. |
| Zhao, 2021[42] | Obs | 2017-2018 | Yes | 165 | 78.3 ± 13.5 | 69 | Sx only | 25.5 | 42 / 165 | 4 | Beijing Luhe Hospital, Beijing. |
| Zhou, 2021[29] [Chinese] | Obs | 2017-2018 | Yes | 450 | nr | 69 | Sx only | 10.9 | 49 / 450 | 4 | Second Affiliated Hospital of Wenzhou Medical University, Zhejiang. |
| He, 2020[30] | Obs | 2014-2017 | Yes | 867 | 81.2 ± 8 | 75 | Sx only | 10.5 | 91 / 867 | 3 | Second Affiliated Hospital of Zhejiang University School of Medicine, Zhejiang. |
| Shen, 2020[31] | Obs | 2008-2018 | Yes | 1,386 | nr<br>Age groups only (≥60 yrs) | 65 | Sx only | 17.8 | 245 / 1,386 | 5 | Peking University People's Hospital, Beijing. |
| Tian, 2020[43] | Obs | 2013-2016 | Yes | 644 | 77.9 ± 8.4 | 67 | Sx only | 8.5 | 48 / 565 | 4 | First Affiliated Hospital of Chongqing Medical University, Chongqing. |
| Wei, 2020[32] | RCT | 2010-2016 | Yes | 154 | 82.0 ± 8.9 | 73 | All | 25.3 | 39 / 154 | 4 | Nanjing First Hospital, Jiangsu. |
| Xie, 2020[9] | Obs | 2009-2017 | Yes | 277 | 75.4 ± 1.8<br>(60 to 97) | 81 | Sx only | 2.5 | 7/ 277 | 4 | The Second Affiliated Hospital of Soochow University, Jiangsu. |
| Zhang, 2020[44] | Obs | 2013-2018 | Yes | 448 | nr<br>(grouped by <80 and ≥80 yrs) | 57 | Sx only | 12.3 | 55 / 448 | 4 | First Affiliated Hospital of Nanjing Medical University, Jiangsu. |
| Rui, 2019[13] [Chinese] | Obs | 2014-2018 | Yes | 178 | 78.7 ± nr | 76 | Sx only | 7.1 | 12 / 168 | 4 | Zhongda Hospital Southeast University, Jiangsu. |
| Wang, 2019[45] | Obs | 2010-2015 | Yes | 690 | 78 ± 9.7<br>(50-103) | 66 | Sx only | 14.3 | 99 / 690 | 3 | Second Affiliated Hospital of Fujian Medical University, Fujian. |
| Wang, 2018[46] | Obs | 2007-2017 | Yes | 1,022 | 83 ± 4.7 | 67 | Sx only | 15.5 | 158 / 1,022 | 4 | Traditional Chinese Medicine Hospital of Puning City, Guangzhou. |
| Yang, 2018[16] | Obs | 2003-2013 | Yes | 110 | 79.1 ± 7.3<br>(60-99) | 64 | Sx only | 9.3 | nr | 3 | First Affiliated Hospital, Sun Yat-sen University, Guangzhou. |

# 2. CHINA

| Author, year | Study Design | Date Range | Single centre study | N | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 1-year mortality | | Quality Index Score | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Liu , 2017[17] | Obs | 2008-2016 | Yes | 105 | 78.3 ± 5.1 | 62 | Sx only | 18.1 | 19 / 105 | 5 | Luoyang Orthopedic Hospital of Henan Province, Zhengzhou. |
| Peng , 2017[33] [Chinese] | Obs | 2012-2014 | Yes | 521 | 79.82 ± 9.33 | 67 | Sx only | 16.7 | 87 / 521 | 4 | General Hospital of PLA Army, Beijing |
| Shi, 2017[47] [Chinese] | Obs | 2009-2016 | Yes | 53 | 84.7 ± nr | 60 | Sx only | 7.5 | 4 / 53 | 4 | Mianyang Central Hospital, Sichuan. |
| Tang, 2017[48] [Chinese] | Obs | 2012-2014 | Yes | 350 | 78.6 ± 7.7 | 66 | Sx only | 7.1 | 25 / 350 | 5 | 8th People's Hospital of Shanghai, Shanghai. |
| Zhang, 2017[49] | Obs | 2012-2013 | Yes | 238 | 76.9 ± 8 | 70 | Sx only | 22.7 | 54 / 238 | 5 | Beijing Army General Hospital, Beijing. |
| Li, 2016[50] | Obs | 2013-2013 | No Population-based database | 4,504 | 77.3 ± 7.5 | 59 | All | 23.4 | 1,056 / 4,504 | 5 | Municipal health insurance database of the Beijing Human Resources and Social Security Bureau. |
| Lu, 2016[20] | Obs | 2009-2010 | Yes | 149 | 80.9 ± 7.5 (65-97) | 67 | Sx only | 30.9 | 46 / 149 | 5 | Zhongda Hospital, Southeast University, Jiangsu. |
| Lv, 2016[35] | Obs | 2000-2012 | Yes | 1,429 | 75 [65-82] | 58 | Sx only | 9.4 | 135 / 1,429 | 4 | Hospital not named. |
| Jin, 2015[22] | Obs | 2008-2012 | Yes | 258 | 79.7 ± 6.8 | 72 | Sx only | 22.9 | 59 / 258 | 4 | The Chinese People's Liberation Army General Hospital. |
| Li, 2015[51] | RCT | 2013-2014 | Yes | 70 | 78 ± 7.0 (65-93) | 70 | Sx only | 10.1 | 6 / 59 | 4 | Third Hospital of Hebei Medical University, Shijiazhuang |
| Liu, 2014[52] | Obs | 2008-2012 | Yes | 217 | 79.8 ± nr (65-103) | 70 | Sx only | 23.5 | 51 / 217 | 4 | Chinese People's Liberation Army General Hospital. *Some overlap with cohort reported in Jin, 2015[22] |
| Shi, 2013[23] [Chinese] | Obs | 2006-2012 | Yes | 127 | 79.6 ± 11.5 | 70 | Sx only | 6.3 | 8 / 127 | 3 | Mianyang Central Hospital, Sichuan. |
| Zhang, 2013[53] | RCT | 2009-2010 | Yes | 113 | 72.4 ± 8.7 | 63 | Sx only | 13.9 | 15 / 108 | 4 | Hospital not named |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

# 2. CHINA

## Excluded studies

| Author, year | Reason for exclusion |
|---|---|
| Hou, 2020[54] [Chinese] | Not representative of low trauma hip fracture population - *only included those who had cerebral infarct.* |
| Shigao, 2021[55] | Not representative of low trauma hip fracture population - *selected subgroup, only included patients with comminuted intertrochanteric femoral Jensen V fractures undergoing bone cement artificial half hip arthroplasty.* |
| Teng, 2021[56] | Not representative of low trauma hip fracture population - *selected subgroup, only includes 16 patients.* |
| Wang, 2021d[57] | Reports the same cohort as Wang, 2021b[27] |
| Yang, 2021[58] | Not representative of low trauma hip fracture population - *excluded sickest patients i.e. those with coagulopathy, thrombocytopenia, or bleeding disorders; taking antiplatelet or anticoagulant drugs and chronic peptic ulcer, chronic liver disease, or end-stage renal disease*. |
| Yuan, 2021[59] | Not representative of low trauma hip fracture population - *selected subgroup, only included those with lower respiratory tract infection.* |
| Zhang, 2021[60] | Not representative of low trauma hip fracture population - *selected subgroup, excluded patients < 75 years; non ambulatory patients; frail patients* |
| Zhou, 2021[61] | Not representative of low trauma hip fracture population - *selected subgroup, includes 90 selected patients out of 795 possible. Excluded patients who did not require more careful preoperative evaluation and optimization, whose operations were performed within 48 h after admission.* |
| Zhou, 2021[62] [Chinese] | Not representative of low trauma hip fracture population – *only included patients aged between 68-80 years.* |
| Zhu, 2021[63] | Not representative of low trauma hip fracture population – *excluded patients with cognitive impairment (failure to understand or sign informed consent).* |
| Fu, 2020[64] | Not representative of low trauma hip fracture population - *excluded sickest patients i.e. patients with femoral neck fractures with delayed treatment, serious medical problems that make surgery intolerable, and poor compliance.* |
| Huang, 2020[65] | Not representative of low trauma hip fracture population - *only included those aged ≥80 years.* |
| Liu, 2020[66] | Not representative of low trauma hip fracture population - *only included those aged ≥90 years.* |
| Lv, 2020[67] | Not representative of low trauma hip fracture population - *included all age groups and grouped fractures as 'femur fractures', i.e. may include distal femur fractures.* |
| Tan, 2020[68] | Not representative of low trauma hip fracture population - *only included those aged ≥85 years.* |
| Wu, 2020[69] | Not representative of low trauma hip fracture population – *only included patients operated on by junior orthopaedic trauma surgeons.* |
| Xie, 2020[70] [Chinese] | Subset of cohort reported by Rui, 2019[13] |
| Zhang, 2020[71] | Not representative of low trauma hip fracture population - *only included women.* |
| Xie, 2019[72] | Subset of cohort reported by Xie, 2020[9] |

# 2. CHINA

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|---|---|
| Xiong, 2019[73] | Not representative of low trauma hip fracture population - *only included patients with chronic renal insufficiency.* |
| Bai, 2018[74] [Chinese] | Not representative of low trauma hip fracture population - *only included those aged ≥80 years.* |
| Liu, 2018[75] | Not representative of low trauma hip fracture population - *only included those aged ≥80 years.* |
| Ma, 2018[76] | Not representative of low trauma hip fracture population - *only included those aged ≥80 years.* |
| Tian, 2018[77] | Not representative of low trauma hip fracture population - *selected subgroup, small sample- includes 56 patients.* |
| Zhang, 2018[78] [Chinese] | Not representative of low trauma hip fracture population - *only included those aged ≥80 years.* |
| Zhang, 2018[79] | Not representative of low trauma hip fracture population - *only include patients with osteoporosis in sample. Then excluded patients with less than 24 months of follow-up; co-occurring mental illness; interruption of follow-up; life expectancy < 1 year; and an ASA score of IV or V.* |
| Cao, 2017[80] | Not representative of low trauma hip fracture population - *only included those aged ≥80 years.* |
| Cao, 2017[81] [Chinese] | Not representative of low trauma hip fracture population - *only included those aged ≥80 years.* |
| Hu, 2017[82] | Not representative of low trauma hip fracture population - *only included patients with normal mobility and function pre hip fracture.* |
| Jiang, 2017[83] [Chinese] | Not representative of low trauma hip fracture population - *only included those aged ≥85 years.* |
| Ren, 2017[84] | Not representative of low trauma hip fracture population - *only included those aged ≥80 years (mean age 86 ± 5 years)* |
| Shi, 2017[47] [Chinese] | Not representative of low trauma hip fracture population - *only included those aged ≥80 years.* |
| Tang, 2017[85] | Only reported the VTE-related deaths, not all-cause mortality. |
| Wei, 2017[86] [Chinese] | Not representative of low trauma hip fracture population - *selected subgroup, includes 30 patients.* |
| Zhang, 2017a[87] | Not representative of low trauma hip fracture population – *excluded patients most likely to die (ASA score of IV or V).* |
| Zhang, 2017b[88] | Not representative of low trauma hip fracture population - *only included patients who were taking antiplatelet drugs.* |
| Dong, 2016[89] | Not representative of low trauma hip fracture population - *only included patients with chronic renal failure*. |
| Li, 2016[90] | Not representative of low trauma hip fracture population **-** *only included patients with post-stroke hemiplegia.* |
| Liu, 2015[91] | Not representative of low trauma hip fracture population - *only included those aged ≥90 years.* |
| Wang, 2015[92] | Not representative of low trauma hip fracture population - *only included those aged ≥90 years.* |
| Wang, 2015[93] | Not representative of low trauma hip fracture population - *only included women.* |
| Zhao, 2015[94] | Not representative of low trauma hip fracture population - *only included those with complete follow up i.e. 491 out of possible 1,236 (40%).* |
| Zhu, 2015[95] | Not representative of low trauma hip fracture population – *included patients aged <65 years. Mean age 51 years (range 18-83).* |
| Li, 2014[96] | Not representative of low trauma hip fracture population – *only follow up data available for 198 of possible 705 (28%) patients.* |

# 2. CHINA

| | |
|---|---|
| Wang, 2014[97] | Not representative of low trauma hip fracture population - *only included patients with diabetes.* |
| Xin, 2014[98] | Not representative of low trauma hip fracture population – *mean age of cohort 46 years.* |
| Gu, 2013[99] | Not representative of low trauma hip fracture population - *selected subgroup, only includes 15 patients.* |
| Guo , 2013[100] | Not representative of low trauma hip fracture population – *excluded frail patients from the RCT.* |
| Chen, 2012[101] | Not representative of low trauma hip fracture population - *selected subgroup, only includes patients who survive. Comparison between surgical techniques.* |

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# 3. HONG KONG SAR

## Forest plots, by time period

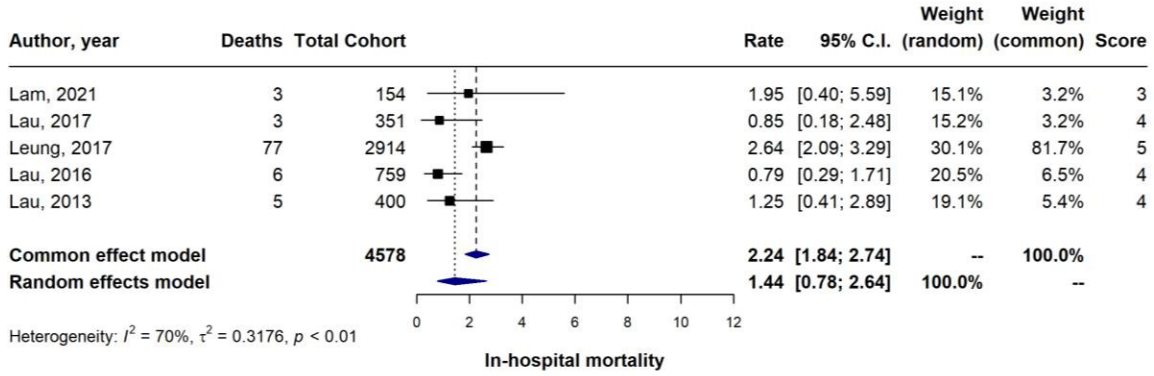


Figure 1: Forest plot of in-hospital mortality, includes 5 studies, 4,578 patients

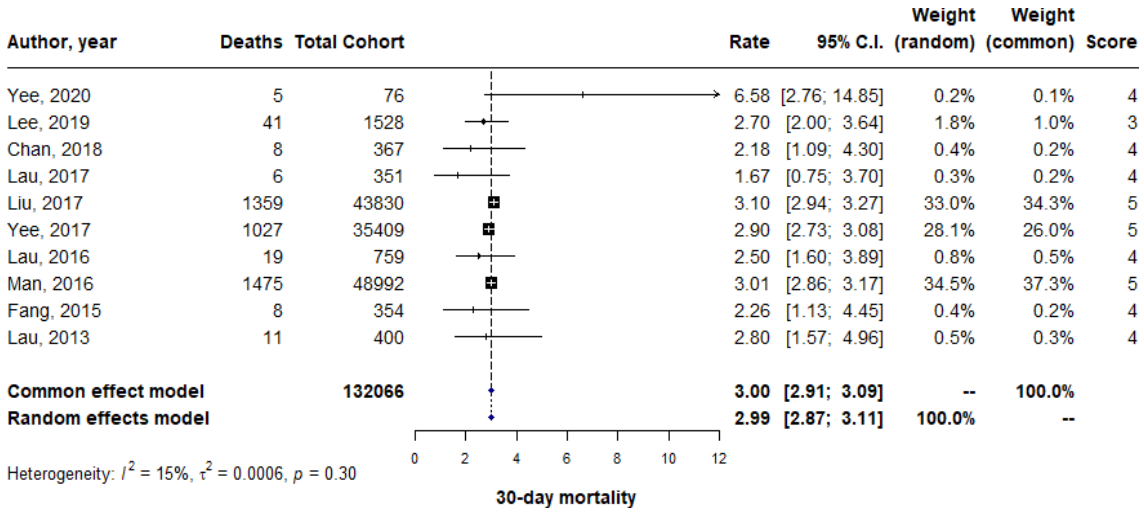


Figure 2: Forest plot of 30-day mortality, includes 10 studies, 132,066 patients

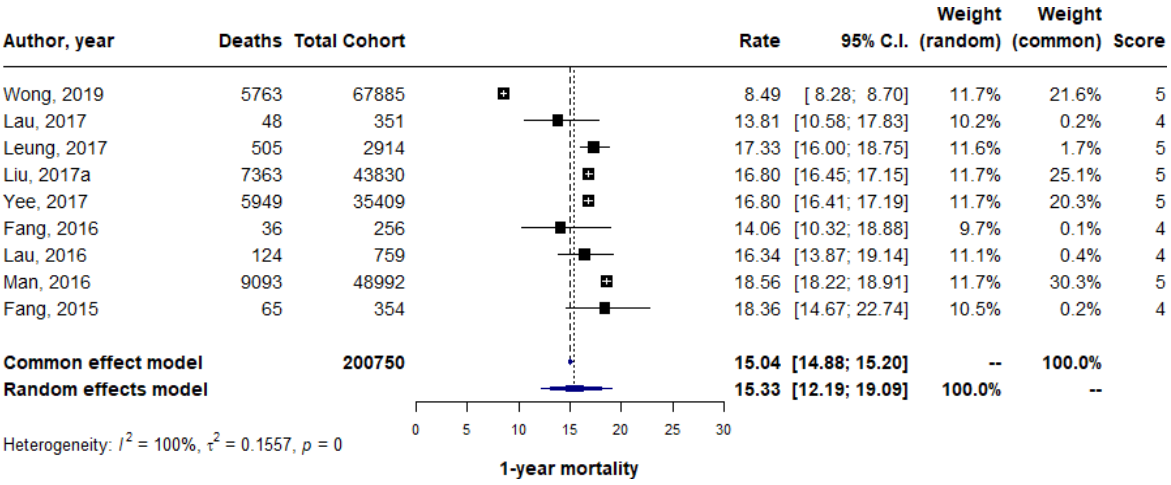


Figure 3: Forest plot of 1-year mortality, includes 9 studies, 200,750 patients

# 3. HONG KONG SAR

## Studies included in meta-analysis, by time period

### In-hospital mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | In-hospital mortality | | Quality score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Lam, 2021[1] | Obs | 2019-2020 | Yes | 154 | 85.3 ± 7.9 | 69 | Sx only | 1.9 | 3/154 | 3 | Queen Mary Hospital, Hong Kong Island. |
| Lau, 2017[2] | Obs | 2011 | Yes | 351 | 83.8 ± nr | 66 | All | 1.0 | nr | 4 | Queen Mary Hospital, Hong Kong Island.<br>Only extracted data from 2011 for this review. |
| Leung, 2017[3] | Obs | 2012 | 6 hospitals | 2,914 | 82.1 ± 8.6 (50-104) | 68 | All | 2.6 | 77/2,914 | 5 | Hong Kong registry data- includes data from 6 hospitals. |
| Lau, 2016[4] | Obs | 2009-2010 | Yes | 759 | 84 ± nr (65-102) | 72 | Sx only | 0.8 | 6/759 | 4 | Queen Mary Hospital, Hong Kong Island. |
| Lau, 2013[5] | Obs | 2010 | Yes | 400 | 84 ± nr (65-102) | 71 | All | 1.25 | nr | 4 | Queen Mary Hospital, Hong Kong Island.<br>Only extracted data from 2010 for this review. Overlapping cohort with Lau, 2016[4] but includes all hip fractures not only patients undergoing surgery. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

### 30-day mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 30-day mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Yee, 2020[6] | Obs | 2015-2019 | 2 hospitals | 76 | 85.5 ± nr | 81 | Sx only | 6.6 | 5/76 | 4 | Queen Mary & Queen Elizabeth Hospitals. |

# 3. HONG KONG SAR

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 30-day mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Lee, 2019[7] | Obs | 2014-2016 | Yes | 1,528 | 83.7 ± 7.2 | 71 | Sx only | 2.7 | nr | 3 | Queen Elizabeth Hospital, Kowloon. |
| Chan, 2018[8] | Obs | 2014 | Yes | 367 | 83.2 ± 7.4 (66-108) | 71 | Sx only | 2.2 | 8/367 | 4 | Prince of Wales Hospital, New Territories. |
| Lau, 2017[2] | Obs | 2011 | Yes | 351 | 83.8 ± nr | 66 | All | 1.7 | nr | 4 | Queen Mary Hospital, Hong Kong Island. Only extracted data from 2011 for this review. |
| Liu, 2017[9] | Obs | 2000-2011 | No | 43,830 | 82 ± nr (65-112) | 71 | Sx only | 3.1 | nr | 5 | Linked hospital and death registry data for all HK hospitals *Overlap with cohort reported in Yee, 2017[10]. |
| Yee, 2017[10] | Obs | 2005-2013 | No | 35,409 | 82.7 ± nr (65-112) | 70 | Sx only | 2.9 | nr | 5 | Linked hospital and death registry data for all Hong Kong hospitals. |
| Lau, 2016[4] | Obs | 2009-2010 | Yes | 759 | 84 ± nr (65-102) | 72 | Sx only | 2.5 | 19/759 | 4 | Queen Mary Hospital, Hong Kong Island. |
| Man, 2016[11] | Obs | 2000-2011 | No | 48,992 | 82 [65, 112] | 71 | Sx only | 3.0 | nr | 5 | Linked hospital and death registry data for all Hong Kong hospitals. Overlap with cohort from Yee, 2017[10] and Liu, 2017[9]. |
| Fang, 2015[12] | Case control | 2007-2012 | Yes | 354 | 83.6 ± 7.6 (52-101) | 63 | Sx only | 2.3 | 8/354 | 4 | Queen Mary Hospital, Hong Kong Island. Overlapping cohort with Lau, 2016[4]. |
| Lau, 2013[5] | Obs | 2010 | Yes | 400 | 84 ± nr (65-102) | 71 | All | 2.8 | nr | 4 | Queen Mary Hospital, Hong Kong Island. Only extracted data from 2011 for this review. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

# 3. HONG KONG SAR

## 1-year mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 1-year mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Wong, 2019[13] | Obs | 2004-2013 | No | 67,885 | 81.4 ± 9.0 | 66 | All | 8.5 | nr | 5 | Hospital administrative data for all Hong Kong. |
| Lau, 2017[2] | Obs | 2011 | Yes | 351 | 83.8 ± nr | 66 | All | 13.8 | nr | 4 | Queen Mary Hospital, Hong Kong Island.<br>Just extracted data from 2011 in this analysis. |
| Leung, 2017[3] | Obs | 2012 | No | 2,914 | 82.1 ± 8.6 (50-104) | 68 | All | 17.3 | 505/2,914 | 5 | HK registry- includes data from 6 hospitals |
| Liu, 2017[9] | Obs | 2000-2011 | No | 43,830 | 82 ± nr (65-112) | 71 | Sx only | 16.8 | nr | 5 | Linked hospital and death registry data for all Hong Kong hospitals.<br>Overlap with cohort from Yee, 2017[10]. |
| Yee, 2017[10] | Obs | 2005-2013 | No | 35,409 | 82.7 ± nr (65-112) | 70 | Sx only | 16.8 | nr | 5 | Linked hospital and death registry data for all HK hospitals. |
| Fang, 2016a[14] | Case Control | 2010-2014 | Yes | 256 | nr ± nr (54-98) | 71 | Sx only | 14.1 | 36/256 | 4 | Queen Mary Hospital, Hong Kong Island. |
| Lau, 2016[4] | Obs | 2009-2010 | Yes | 759 | 84 ± nr (65-102) | 72 | Sx only | 16.3 | 124/759 | 4 | Queen Mary Hospital, Hong Kong Island. |
| Man, 2016[11] | Obs | 2000-2011 | No | 48,992 | 82 [65, 112] | 71 | Sx only | 18.6 | nr | 5 | Linked hospital and death registry data for all HK hospitals.<br>Overlap with cohort from Liu, 2017[9]. |
| Fang, 2015[12] | Case control | 2007-2012 | Yes | 354 | 83.6 ± 7.6 (52-101) | 63 | Sx only | 18.4 | 65/354 | 4 | Queen Mary Hospital, Hong Kong Island.<br>Overlap with Lau, 2016[4]. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

# 3. HONG KONG SAR

## Excluded studies

| **Author, year** | **Reason(s) for exclusion** |
|---|---|
| Cheung, 2021[15] | Not representative of low trauma hip fracture population- o*nly included hip fracture patients with diabetes from Hong Kong diabetes register*. |
| Chow, 2018[16] | Subset of cohort reported in Leung, 2017[3] |
| Leung, 2018[17] | Reports same cohort as Lau, 2017[2] |
| Hsu, 2018[18] | Not representative of low trauma hip fracture population- *rehabilitation cohort. Patients without rehabilitation potentials, i.e. premorbid chair- or bed-bound patients, were excluded. In total only included 280 (71%) of possible 395 patients.* |
| Sing, 2018[19] | Not representative of low trauma hip fracture population- *only patients who survived and were discharged were included in the study cohort, excluded in-hospital deaths.* |
| Cheung, 2017[20] | Not representative of low trauma hip fracture population- *only included centenarians who underwent surgery.* |
| Miu, 2017[21] | Not representative of low trauma hip fracture population- *only included patients admitted to rehabilitation unit.* |
| Wang, 2017[22] | Not representative of low trauma hip fracture population- *rehabilitation cohort.* |
| Fang, 2016b[23] | Not representative of low trauma hip fracture population- *patients who have died or were lost to follow-up before 3 months were excluded.* |

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# 4. INDIA

## Forest plots, by time period

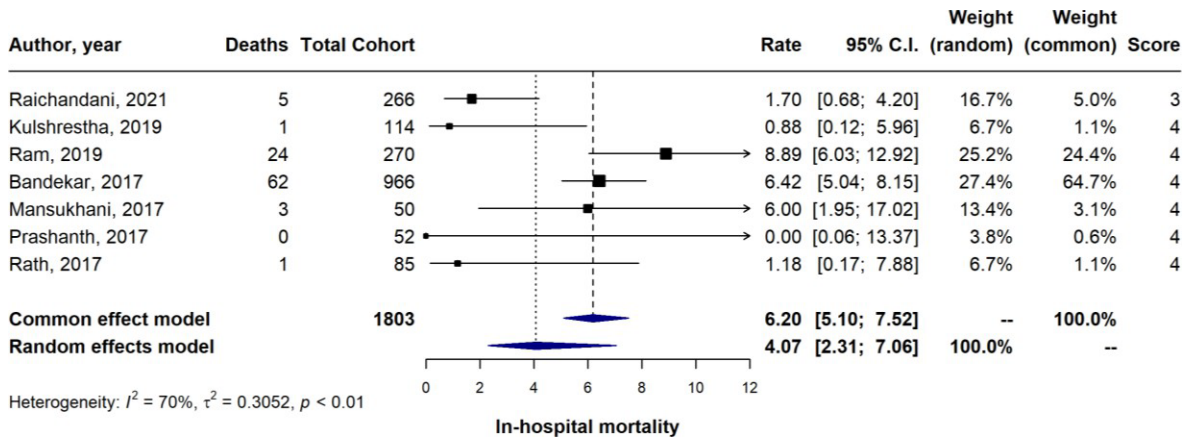


Figure 1: Forest plot of in-hospital mortality, includes 7 studies, 1,803 patients

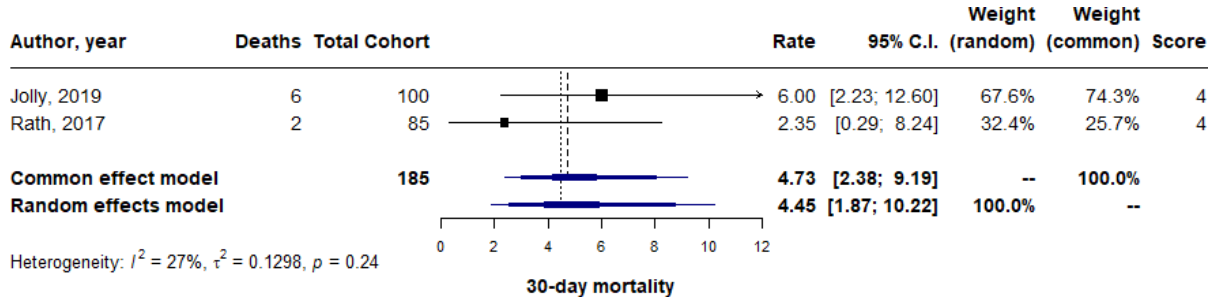


Figure 2: Forest plot of 30-day mortality, includes 2 studies, 185 patients

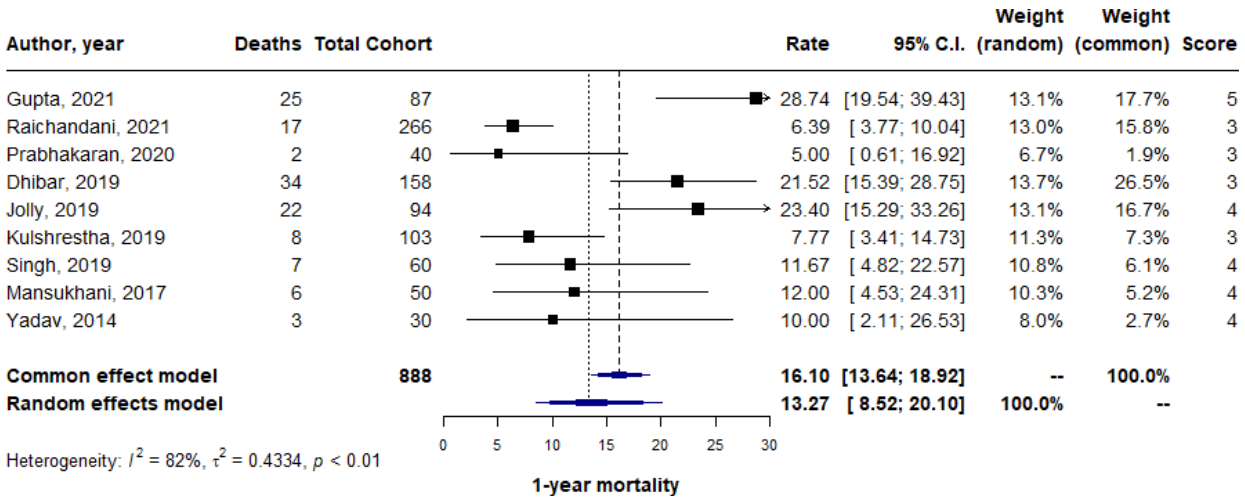


Figure 3: Forest plot of 1-year mortality, includes 9 studies, 888 patients

# 4. INDIA

## Studies included in meta-analysis, by time period

### In-hospital mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD, (range) median, [IQR] | % F | All / Sx only | In-hospital mortality | | Quality score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Raichandani, 2021[1] | Obs | 2017-2018 | Yes | 266 | 74.7 ± nr | 59 | Sx only | 1.7 | nr | 3 | Dr SN Medical College, Jodhpur. |
| Kulshrestha, 2019[2] | Obs | 2016 | Yes | 114 | 77 ± nr | 49 | Sx only | 0.9 | 1/114 | 4 | Air Force Hospital, Kanpur. |
| Ram, 2019[3] | Obs | 2015-2018 | Yes | 270 | nr ± nr | 56 | Sx only | 8.9 | 24/270 | 4 | Sri Ramachandra Medical Centre, Chennai.<br>* Mortality rate extracted from data from Table 1. |
| Bandekar, 2017[4] | Obs | 2011-2015 | Yes | 966 | 73.1 ± 8.4 (60-108) | 64 | Sx only | 6.4 | 62/966 | 4 | Goa Medical College Hospital, Goa. |
| Mansukhani, 2017[5] | RCT | 2010-2013 | Yes | 50 | 75.1 ± nr (60-92) | 42 | Sx only | 6.0 | 3/50 | 4 | Medical College in Mumbai, Maharashtra. |
| Prashanth, 2017[6] | Obs | 2006-2014 | Yes | 52 | 70 ± 2.2 (50-100) | 58 | Sx only | 0 | 0/52 | 4 | Bangalore Baptist Hospital, Karnataka. |
| Rath, 2017[7] | Obs | 2014-2015 | No<br>3 hospitals | 85 | 66.5 ± 11.9 | 46 | All | 1.2 | 1/85 | 4 | Three major public tertiary care hospitals, Delhi. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

### 30-day mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age Mean ± SD (range) median, [IQR] | % F | All / Sx only | 30-day mortality | | Quality score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Jolly, 2019[8] | RCT | 2012-2016 | Yes | 100 | 78.7 ± 8.3 (75-85) | nr | Sx only | 6.0 | 6/100 | 4 | K.R Hospital, Mysore Medical College and Research Institute, Mysuru. |

# 4. INDIA

| Author, year | Study design | Date range | Single centre study | Number of patients | Age Mean ± SD (range) median, [IQR] | % F | All / Sx only | 30-day mortality | | Quality score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Rath, 2017[7] | Obs | 2014-2015 | No | 85 | 66.5 ± 11.9 | 46 | All | 2.4 | 2/85 | 4 | Three major public tertiary care hospitals, Delhi. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

## 1-year mortality

| Author, year | Study design | Date Range | Single centre study | Number of patients | Age Mean ± SD (range) median, [IQR] | % F | All / Sx only | 1-year mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Gupta, 2021[9] | Obs | 2018 | Yes | 90 | 71.9 ± 10.7 (50-92) | 48 | Sx only | 28.7 | 25/87 | 5 | Government Medical College and Hospital, Sector 32, Chandigarh. |
| Raichandani, 2021[1] | Obs | 2017-2018 | Yes | 266 | 74.7 ± nr | 59 | Sx only | 6.4 | 17/266 | 3 | Department of Orthopaedics, Dr SN Medical College, Jodhpur. |
| Prabhakaran, 2020[10] | Obs | 2017-2020 | Yes | 40 | 63.8 ± nr | 48 | Sx only | 5.0 | 2/40 | 3 | Mahatma Gandhi Medical College and Research Institute, Pondicherry. |
| Dhibar, 2019[11] | Obs | 2011-2012 | No Multiple hospitals | 264 | 65.9 ± 12.6 (32-90) | 54 | All | 21.5 | 34/158 | 3 | Hospitals of Chandigarh, North India (number not stated). |
| Jolly, 2019[8] | RCT | 2012-2016 | Yes | 100 | 78.7 ± 8.3 (75-85) | nr | Sx only | 23.4 | 22/94 | 4 | K.R Hospital, Mysore Medical College and Research Institute, Mysuru. |
| Kulshrestha, 2019[2] | Obs | 2016 | Yes | 144 | 77 ± nr | 49 | Sx only | 7.8 | 8/103 | 3 | Air Force Hospital, Kanpur. |
| Singh, 2019[12] | RCT | 2014-2016 | Yes | 60 | 69.3 ± 5.7 | 58 | Sx only | 11.7 | 7/60 | 4 | All India Institute of Medical Sciences, New Delhi. |
| Mansukhani, 2017[5] | RCT | 2010-2013 | Yes | 50 | 75.1 ± nr (60-92) | 42 | Sx only | 12.0 | 6/50 | 4 | Medical College in Mumbai, Maharashtra, hospital not stated. |
| Yadav, 2014[13] | RCT | 2011-2013 | Yes | 30 | 68.3 ± 9.8 (50-87) | 33 | Sx only | 10.0 | 3/30 | 4 | NKPSIMS & Lata Mangeshkar Hospital, Nagpur. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

# 4. INDIA

## Excluded studies

| Author, year | Reason(s) for exclusion |
|---|---|
| Swaroop, 2020[14] | Not representative of low trauma hip fracture population – *only included patients who were ambulatory prior to fracture, mentally sound and asymptomatic contra-lateral lower limb.* |
| Razoki, 2019[15] | Not representative of low trauma hip fracture population – *only included patients with displaced intracapsular femoral neck fracture treated by bipolar hemiarthroplasty who had complete follow-up data for 12 months.* |
| Ibrahim, 2017[16] | Not representative of low trauma hip fracture population – *included patients who sustained fractures following road traffic accident (7/21, 33%), so younger patient group. Only patients with complex proximal femur fractures were included. Small sample size (n=21).* |
| Kulkarni, 2017[17] | Not representative of low trauma hip fracture population – *excluded patients who were unable to walk before the fracture, or with other fractures interfering with rehabilitation.* |
| Rai, 2017[18] | Not representative of low trauma hip fracture population – *select cohort of 84 patients with known outcomes at 24 months. Patients lost to follow-up were excluded - % lost to follow up not reported.* |
| Jain, 2015[19] | Not representative of low trauma hip fracture population – *only included cemented bipolar hemiarthroplasty, excluded patients with cognitive impairment.* |

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# 5. JAPAN

## Forest plots, by time period

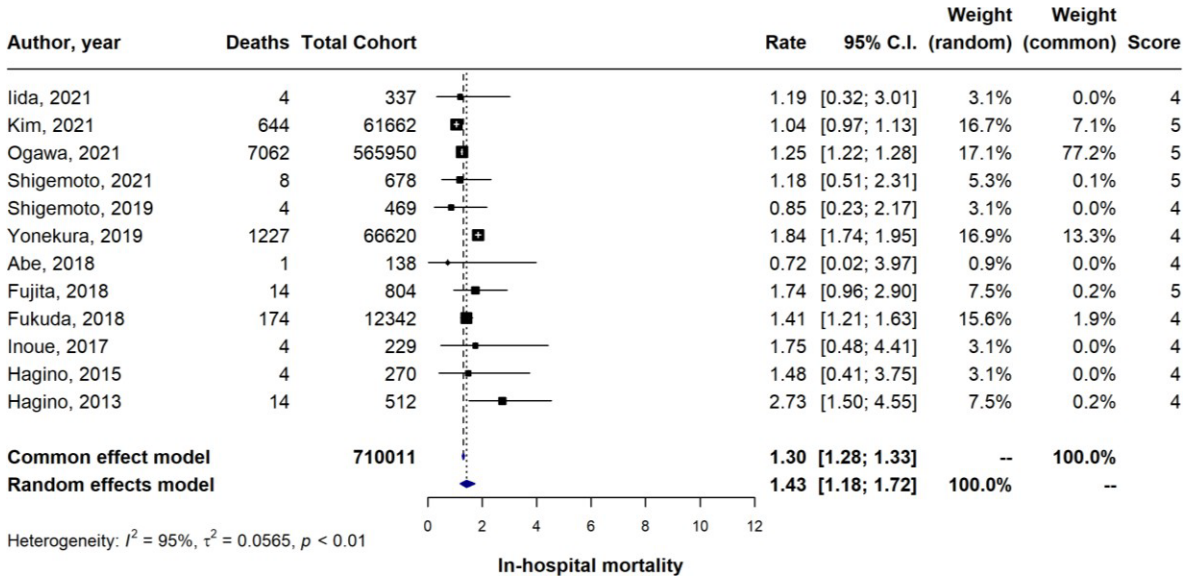


Figure 1: Forest plot of in-hospital mortality, includes 12 studies, 710,011 patients

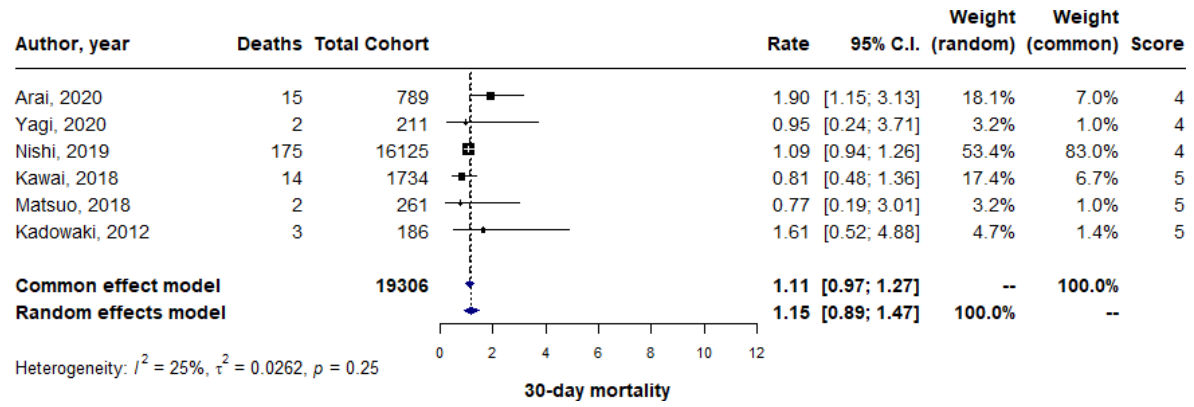


Figure 2: Forest plot of 30-day mortality, includes 6 studies, 19,306 patients

# 5. JAPAN

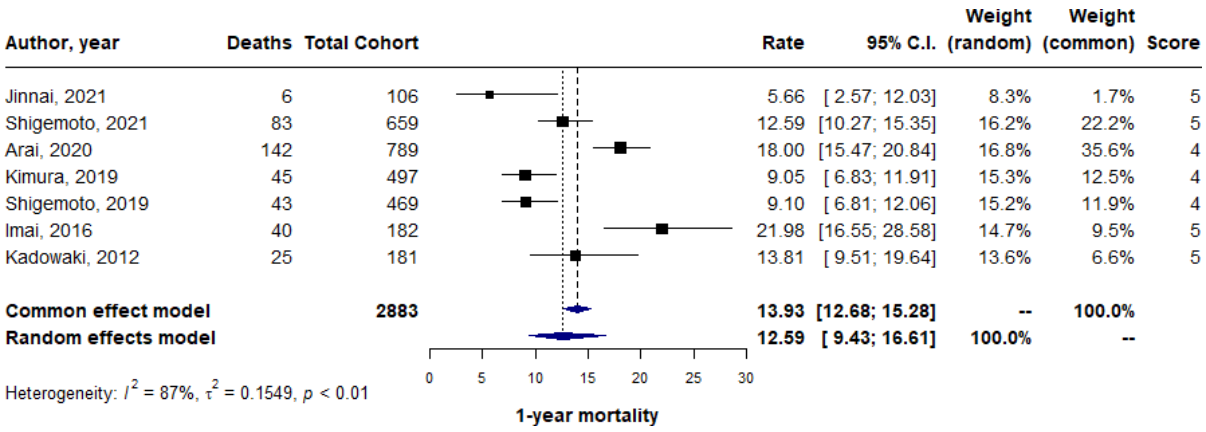


Figure 3: Forest plot of 1-year mortality, includes 7 studies, 2,883 patients

# 5. 5. JAPAN

## Studies included in meta-analysis, by time period

### In-hospital mortality

| Author, year | Study Design | Date Range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | In-hospital mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Iida, 2021[1] | Case control | 2013-2019 | Yes | 337 | 84.1 ± 7.1 (65-102) | 80 | Sx only | 1.2 | 4/337 | 4 | Nagoya University Graduate School of Medicine, Nagoya, Aichi. |
| Kim, 2021[2] | Obs | 2016 | No National database | 61,662 | 82.8 ± 9.2 | 78 | Sx only | 1.0 | 644/ 61,662 | 5 | Diagnosis Procedure Combination (DPC) database- nationwide inpatient database of approximately 1000 participating DPC hospitals. Covers ~50% of all acute-care admissions in Japan |
| Ogawa, 2021[3] | Obs | 2010-2018 | No National database | 565,950 | 83.4 ± 8.2 | 79 | All | 1.2 | 7,062/ 565,950 | 5 | Diagnosis Procedure Combination (DPC) database. *Data sourced from supplementary material reports in-hospital mortality 1.2%. |
| Shigemoto, 2021[4] | Obs | 2014-2018 | Yes | 678 | 84.6 ± 7.5 | 79 | Sx only | 1.2 | 8/678 | 5 | Toyama City Hospital, Toyama. |
| Shigemoto, 2019[5] | Obs | 2012-2016 | Yes | 469 | 84.5 ± 7.4 | 81 | nr | 0.9 | 4/469 | 4 | Toyama City Hospital, Toyama. Noted: Overlaps population with Shigemoto, 2021[4] |
| Yonekura, 2019[6] | Obs | 2008-2016 | No National database | 66,620 | nr | 81 | Sx only | 1.8 | 1,227/ 66,620 | 4 | Nationwide hospital admissions database, provided by Medical Data Vision. Includes DPC data for 20 million patients admitted to >270 acute care hospitals, representing approximately 16% of DPC hospitals in Japan. |
| Abe, 2018[7] | Obs | 2011-2013 | Yes | 138 | 80.2 ± nr (75-102) | 85 | Sx only | 0.7 | 1/138 | 4 | JCHO Funabashi Central Hospital, Funabashi, Chiba. |
| Fujita, 2018[8] | Obs | 2010-2016 | Yes | 804 | nr | 83 | Sx only | 1.7 | 14/804 | 5 | Iwaki Kyoritsu General Hospital, Fukushima. |

# 5. 5. JAPAN

| Author, year | Study Design | Date Range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | In-hospital mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| | | | | | | | | | | | |
| Fukuda, 2018[9] | Obs | 2012-2016 | No National database | 12,342 | nr | 78 | Sx only | 1.4 | 174/ 12,342 | 4 | Diagnosis Procedure Combination (DPC) database. |
| Inoue, 2017[10] | Obs | 2013-2014 | No 3 hospital | 229 | 82.7 ± 9.2 | 81 | All | 1.7 | 4/229 | 4 | NishiKobe Medical Center, Kobe City Medical Center General, and Saiseikai Hyogoken Hospital in Kobe. |
| Hagino, 2015[11] | Obs | 2006-2012 | Yes | 270 | 84.1 ± nr (60-101) | 80 | Sx only | 1.5 | 4/270 | 4 | Kofu National Hospital, Yamanashi. |
| Hagino, 2013[12] | Obs | 1997-2010 | Yes | 512 | 82.6 ± (nr) | 79 | All | 2.7 | 14/512 | 4 | Kofu National Hospital, Yamanashi. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

## 30-day mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 30-day mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Arai, 2020[13] | Obs | 2012-2015 | Yes | 789 | 84 ± 8.0 (76-92) | 79 | All | 1.9 | 789 | 4 | Niigata Prefectural Central Hospital, Joetsu, Niigata Prefecture. |
| Yagi, 2020[14] | Obs | 2013-2018 | Yes | 211 | 86 [80-90] | 80 | Sx only | 1.0 | nr | 4 | Hospital not named. |
| Nishi, 2019[15] | Obs | 2012-2016 | No | 16,125 | nr | 83 | Sx only | 1.1 | 175/ 16,125 | 4 | Fukuoka Prefecture Regional Association for Late-Stage Healthcare for Older People database. |
| Kawai, 2018[16] | Obs | 2007-2017 | Yes | 1,734 | 82 [75-88] | 75 | Sx only | 0.8 | 14/1,734 | 5 | Ashikaga Red Cross Hospital, Tochigi. |

# 5. 5. JAPAN

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 30-day mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Matsuo, 2018[17] | Obs | 2014-2017 | Yes | 261 | 86.2 ± 6.8 | 87 | Sx only | 0.8 | 2/261 | 5 | Itoigawa General Hospital, Itoigawa, Niigata. |
| Kadowaki, 2012[18] | Obs | 2003-2010 | Yes | 186 | 85 ± nr (65-105) | 81 | Sx only | 1.6 | 3/186 | 5 | Oki Hospital, Okinoshima-cho, Shimane. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

## 1-year mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 1-year mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Jinnai, 2021[19] | Obs | 2013-2019 | Yes | 106 | 80 ± 13.0 | 70 | Sx only | 5.7 | 6/106 | 5 | Juntendo University School of Medicine, Tokyo. |
| Shigemoto, 2021[4] | Obs | 2014-2018 | Yes | 678 | 84.6 ± 7.5 | 79 | Sx only | 12.6 | 83/659 | 5 | Toyama City Hospital, Toyama. |
| Arai, 2020[13] | Obs | 2012-2015 | Yes | 789 | 84 ± 8.0 (76-92) | 79 | All | 18.0 | nr | 4 | Niigata Prefectural Central Hospital, Joetsu, Niigata Prefecture. |
| Kimura, 2019[20] | Obs | 2013-2016 | No 17 hospitals | 497 | 82.1 ± 7.1 | 78 | All | 9.1 | 45/497 | 4 | 17 hospitals in northern Kyushu District. |
| Shigemoto, 2019[5] | Obs | 2012-2016 | Yes | 469 | 84.5 ± 7.4 | 81 | nr | 9.1% (2014) | nr | 4 | Toyama City Hospital, Toyama. Overlaps population with Shigemoto, 2021[4] |
| Imai, 2016[21] | Obs | 2009-2011 | Y | 182 | 84.9 ± 7 (66-99) | 74 | Sx only | 22.0 | 40/182 | 5 | Ojiya General Hospital, Niigata. |
| Kadowaki, 2012[18] | Obs | 2003-2010 | Y | 186 | 84 ± nr (65-105) | 81 | Sx only | 13.8 | 25/181 | 5 | Oki Hospital, Okinoshima-cho, Shimane. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

# 5. 5. JAPAN

## Excluded studies

| Author, year | Reason(s) for exclusion |
|---|---|
| Ogawa, 2021[22] | Only includes selected sample of hip fracture patients 1,396/6,309 (22%). Subset of cohort reported in Ogawa, 2021[3]. |
| Ogawa, 2021[23] | Subsample of cohort reported in Ogawa, 2021[3], shorter year range, and includes patients undergoing surgery only. |
| Ogawa, 2021[24] | Same cohort as reported in Ogawa, 2021[3]. |
| Ogawa, 2021[25] | Subsample of cohort reported in Ogawa, 2021[3]. |
| Komorita, 2020[26] | Not representative of low trauma hip fracture population – *only included patients with diabetes.* |
| Nishioka, 2020[27] | Not representative of low trauma hip fracture population – *patients had to be discharged alive to be included in cohort, i.e. excludes in-hospital deaths.* |
| Ogawa, 2020[28] | Subsample of cohort reported in Ogawa, 2021[3]. |
| Wakasugi, 2020[29] | Not representative of low trauma hip fracture population – *only included patients undergoing dialysis.* |
| Ueoka, 2019[30] | Subset of cohort in Shigemoto, 2019[5]. Only included those who had Sx within 48 hours. |
| Sasabuchi, 2018[31] | Reported 30-day in-hospital mortality, not reporting either in-hospital mortality or 30-day mortality. |
| Ochi, 2017[32] | Not representative of low trauma hip fracture population – *only included patients who were independently living on admission.* |
| Wada, 2017[33] | Not representative of low trauma hip fracture population – *only included 44 very elderly patients with unstable intertrochanteric fracture. Mean age 90 years.* |
| Yamauchi, 2016[34] | Not representative of low trauma hip fracture population – *only included patients with COPD.* |
| Tsukutani, 2015[35] | Regional study of medical visits for fractures in Sakaiminato, which included hip fractures. Excluded because only 49.2% of hip fracture patients returned the one-year follow-up survey. |
| Sawaguchi, 2014[36] | Not representative of low trauma hip fracture population- *frailest patients excluded. Only followed up 125 /176 (71%) of patients at 1 year.* |
| Endo, 2013[37] | Not representative of low trauma hip fracture population- *excluded patients with cognitive impairment, in total excluded 56 /137 (41%).* |

# 5. 5. JAPAN

| | |
|---|---|
| Yuasa, 2013[38] | Not representative of low trauma hip fracture population- *patients who were followed up for less than 1 year were excluded. Total numbers not reported.* |

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# 6. MALAYSIA

## Forest plots, by time period

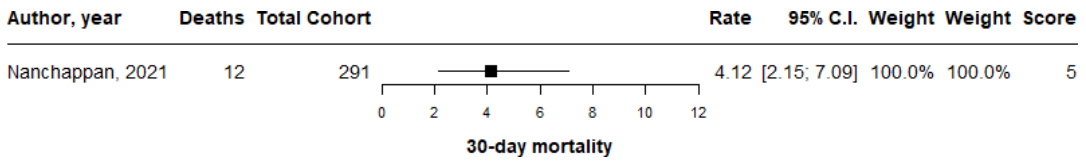


Figure 1: Forest plot of 30-day mortality, includes 1 study, 291 patients

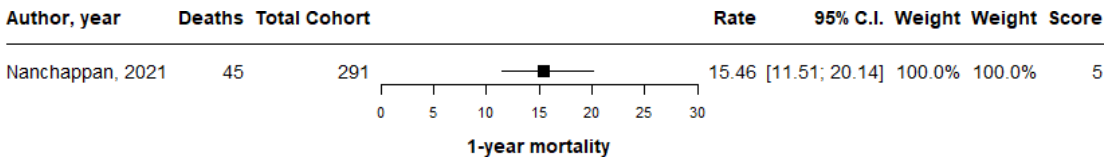


Figure 2: Forest plot of 1-year mortality, includes 1 study, 291 patients

# 6. MALAYSIA

## Studies included in meta-analysis, by time period

### In-hospital mortality

No studies identified.

### 30-day mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All /Sx only | 30-day mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Nanchappan, 2021[1] | Obs | 2008-2018 | Yes | 291 | nr (60-98) | 80 | Sx only | 4.1 | 12 /291 | 5 | Hospital Sultanah Bahiyah, Kedah. Death determined by death register data. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

### 1-year mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All /Sx only | 1-year mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Nanchappan, 2021[1] | Obs | 2008-2018 | Yes | 291 | nr (60-98) | 80 | Sx only | 15.5 | 45/291 | 5 | Hospital Sultanah Bahiyah, Kedah. Death determined by death register data. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

## Excluded studies

No excluded studies.

## References

1. Nanchappan NS, Chopra S, Samuel A, Therumurtei L, Ganapathy SS (2021) Mortality rate and ten-year survival of elderly patients treated with total hip arthroplasty for femoral neck fractures. Malays Orthop J 15:136-142. https://doi.org/10.5704/moj.2107.020

# 7. NEPAL

## Forest plots, by time period

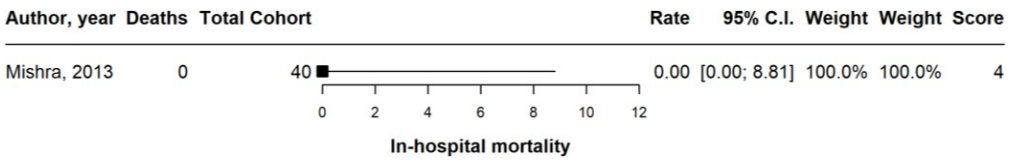


Figure 1: Forest plot of in-hospital mortality, includes 1 study, 40 patients

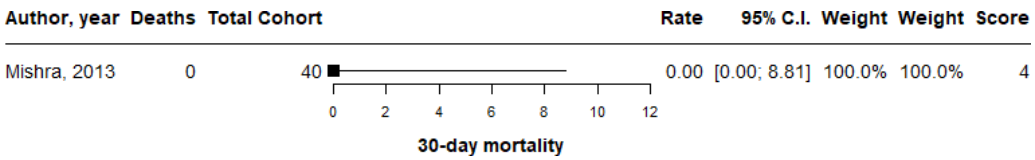


Figure 2: Forest plot of 30-day mortality, includes 1 study, 40 patients

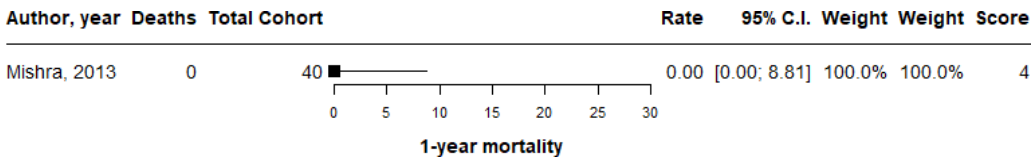


Figure 3: Forest plot of 1-year mortality, includes 1 study, 40 patients

# 7. NEPAL

## Studies included in meta-analysis, by time period

### In-hospital mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | In-hospital mortality | | Quality score | Hospital / Data source |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Mishra, 2013[1] | Obs | 2010-2012 | Yes | 40 | 67 ± nr (55-88) | 58 | Sx only | 0 | 0 / 40 | 4 | Nepal Medical College Teaching Hospital, Kathmandu. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

### 30-day mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 30-day mortality | | Quality score | Hospital / Data source |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Mishra, 2013[1] | Obs | 2010-2012 | Yes | 40 | 67 ± nr (55-88) | 58 | Sx only | 0 | 0 / 40 | 4 | Nepal Medical College Teaching Hospital, Kathmandu. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

### 1-year mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 1-year mortality | | Quality score | Hospital / Data source |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Mishra, 2013[1] | Obs | 2010-2012 | Yes | 40 | 67 ± nr (55-88) | 58 | Sx only | 0 | 0 / 40 | 4 | Nepal Medical College Teaching Hospital, Kathmandu. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

# 7. NEPAL

## Excluded studies

| Author, year | Reason(s) for exclusion |
|---|---|
| Chalise, 2012[2] | Not representative of low trauma hip fracture population – *includes high trauma fractures, age range 23-88, mean age 57 years.* |

# 7. NEPAL

## References

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# 8. NEW ZEALAND

## Forest plots, by time period

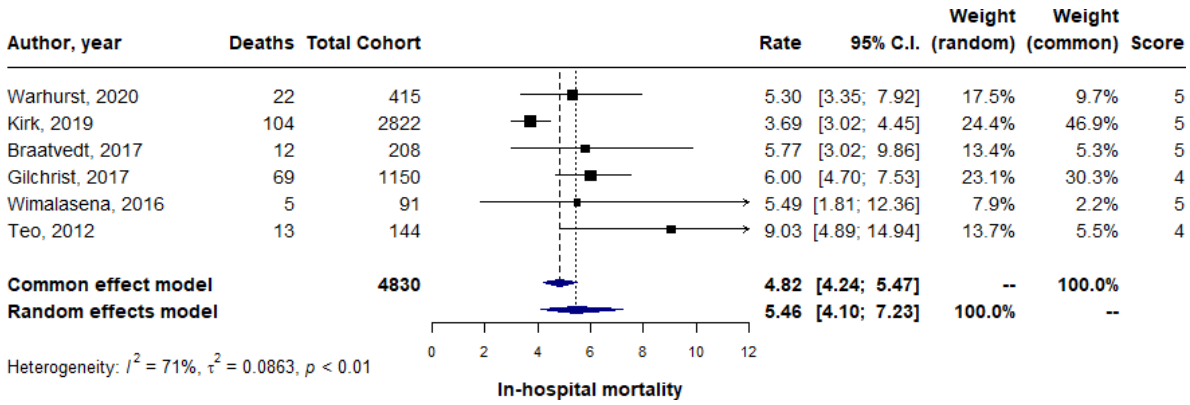


Figure 1: Forest plot of in-hospital mortality, includes 6 studies, 4,830 patients

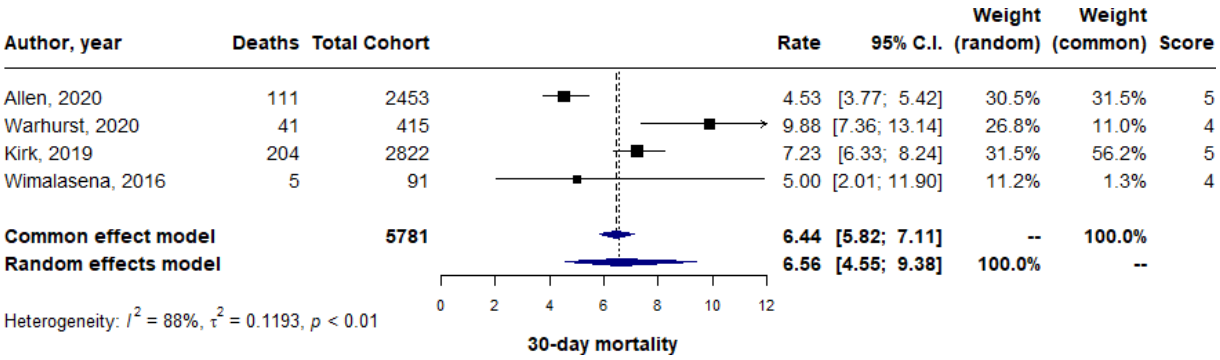


Figure 2: Forest plot of 30-day mortality, includes 4 studies, 5,781 patients

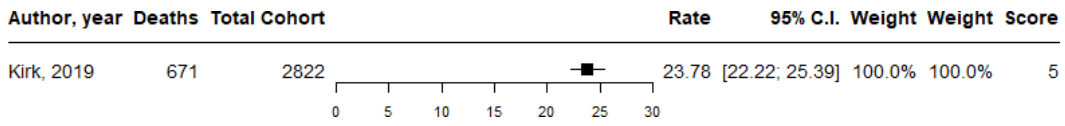


Figure 3: Forest plot of 1-year mortality, includes 1 study, 671 patients

# 8. NEW ZEALAND

## Studies included in meta-analysis, by time period

### In-hospital mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | In-hospital mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Warhurst, 2020[1] | Obs | 2017-2018 | Yes | 415 | 78 [72-84] | 71 | All | 5.3 | 22/415 | 5 | Christchurch Hospital, South Island.<br>Used administrative datasets to determine mortality. |
| Kirk, 2019[2] | Obs | 2009-2016 | No<br>2 hospitals | 2,822 | 81.9 ± nr | 70 | Sx only | 3.7 | 104/2,822 | 5 | North Shore and Waitakere Hospitals, North Island.<br>Used administrative datasets to determine mortality. |
| Braatvedt, 2017[3] | Obs | 2011-2012 | Yes | 208 | 80 ± 12.8 | 76 | All | 5.8 | 12/208 | 5 | Auckland Hospital, North Island. |
| Gilchrist, 2017[4] | Obs | 2014-2015 | Yes | 1,150 | 84.5 ± 7.6 | 73 | Sx only | 6.0 | nr | 4 | Canterbury District Health Board, Christchurch. Hospital not named. South Island. |
| Wimalasena, 2016[5] | Obs | 2013 | Yes | 91 | 85 [65-97] | 68 | All | 5.5 | 5/91 | 5 | Auckland Hospital, North Island. |
| Teo, 2012[6] | Obs | 2010 | Yes | 144 | 86 [65-101] | 70 | All | 9.0 | 13/144 | 4 | Dunedin Hospital, South Island. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

### 30-day mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 30-day mortality | | Quality Score | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Allen, 2020[7] | Obs | 2015-2018 | Yes | 2,453 | 78 ± nr<br>(60, 105) | 64 | All | 4.5 | 111/2,453 | 4 | Waitemata District Health Board, Hospital not named. North Island. |

# 8. NEW ZEALAND

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 30-day mortality | | Quality Score | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| | | | | | | | | | | | Used administrative datasets to determine mortality. |
| Warhurst, 2020[1] | Obs | 2017-2018 | Yes | 415 | 78 [72-84] | 71 | All | 9.9 | 41/415 | 5 | Christchurch Hospital, South Island.<br>Used administrative datasets to determine mortality. |
| Kirk, 2019[2] | Obs | 2009-2016 | No<br>2 hospitals | 2,822 | 81.9 ± nr | 70 | Sx only | 7.2 | 204/2,822 | 5 | North Shore and Waitakere Hospitals, North Island.<br>Used administrative datasets to determine mortality. |
| Wimalasena, 2016[5] | Obs | 2013 | Yes | 91 | 85 [65-97] | 68 | All | 5.0 | nr | 4 | Auckland Hospital, North Island. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

## 1-year mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 1-year mortality | | Quality score | Hospital / Data source |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Kirk, 2019[2] | Obs | 2009-2016 | No<br>2 hospitals | 2,822 | 81.9 ± nr | 70 | Sx only | 23.8 | 671/2,822 | 5 | North Shore and Waitakere Hospitals, North Island.<br>Used administrative datasets to determine mortality. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

# 8. NEW ZEALAND

## Excluded studies

| Author, year | Reason(s) for exclusion |
|---|---|
| Klasan, 2021[8] | Not representative of low trauma hip fracture population- *Included periprosthetic femoral fractures.* |
| Kluger, 2021[9] | Not representative of low trauma hip fracture population- *excluded cases with delirium, cognitive impairment, diabetes, systemic infection and Non-English speaking. Only included 79/527 (15%) of possible hip fracture cases.* |

# 8. NEW ZEALAND

## References


1. Warhurst S, Labbe-Hubbard S, Yi M, Vella-Brincat J, Sammon T, Webb J, McCullough C, Hooper G, Gilchrist N (2020) Patient characteristics, treatment outcomes and rehabilitation practices for patients admitted with hip fractures using multiple data set analysis. N Z Med J 133:31-44.
2. Kirk RJ, Lawes CM, Farrington W, Misur P, Walker ML, Kluger M, Seow MY, Andrew P (2019) Post-operative mortality rates for neck of femur fracture at Waitemata District Health Board. N Z Med J 132:17-25.
3. Braatvedt G, Wilkinson S, Scott M, Mitchell P, Harris R (2017) Fragility fractures at Auckland City Hospital: we can do better. Arch Osteoporos 12:64. https://doi.org/10.1007/s11657-017-0353-0
4. Gilchrist N, Dalzell K, Pearson S, et al. (2017) Enhanced hip fracture management: use of statistical methods and dataset to evaluate a fractured neck of femur fast track pathway-pilot study. N Z Med J 130:91-101.
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8. Klasan A, Millar J, Quayle J, Farrington B, Misur PN (2022) Comparable outcomes of in-cement revision and uncemented modular stem revision for Vancouver B2 periprosthetic femoral fracture at 5 years. Arch Orthop Trauma Surg 142:1039-1046. https://doi.org/10.1007/s00402-021-03776-5
9. Kluger MT, Skarin M, Collier J, Rice DA, McNair PJ, Seow MY, Connolly MJ (2021) Steroids to reduce the impact on delirium (STRIDE): a double-blind, randomised, placebo-controlled feasibility trial of pre-operative dexamethasone in people with hip fracture. Anaesthesia 76:1031-1041. https://doi.org/10.1111/anae.15465

# 9. PAKISTAN

## Forest plots, by time period

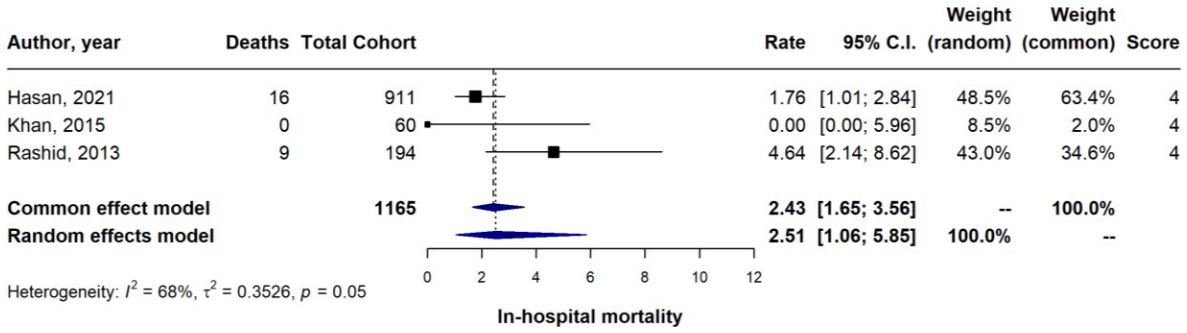


Figure 1: Forest plot of in-hospital mortality, includes 3 studies, 1,165 patients

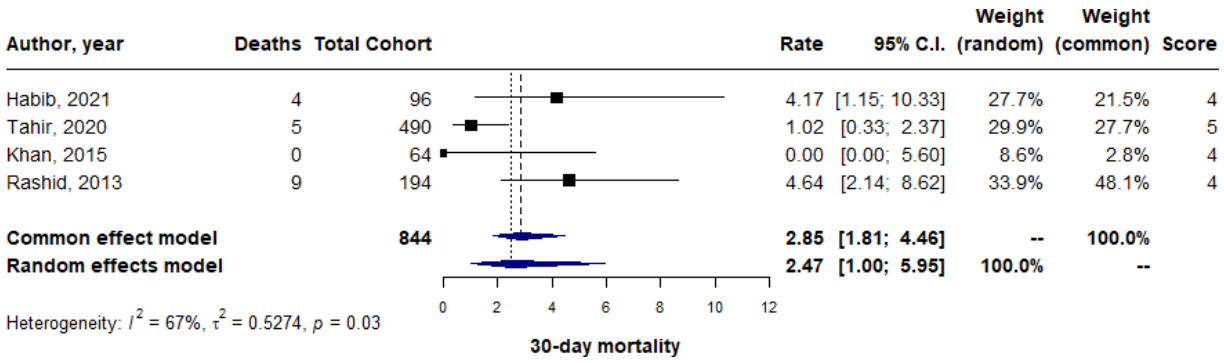


Figure 2: Forest plot of 30-day mortality, includes 4 studies, 844 patients

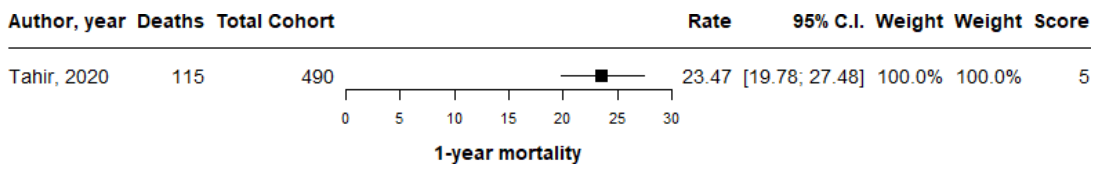


Figure 3: Forest plot of 1-year mortality, includes 1 study, 490 patients

# 9. PAKISTAN

## Studies included in meta-analysis, by time period

### In-hospital mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All /Sx only | In-hospital mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Hasan, 2021[1] | Case control | 2010-2018 | Yes | 911 | nr | 61 | Sx only | 1.8 | 16/911 | 4 | Aga Khan University Hospital, Karachi. |
| Khan, 2015[2] | Obs | 2013-2014 | Yes | 60 | 77.2 ± 6.3 | 64 | Sx only | 0 | 0/60 | 4 | Combined Military Hospital, Rawalpindi. |
| Rashid, 2013[3] | Case Control | 2005-2010 | Yes | 194 | 68 ± 14 | 49 | Sx only | 4.6 | 9/194 | 4 | Aga Khan University Hospital, Karachi. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

### 30-day mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All /Sx only | 30-day mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Habib, 2021[4] | Obs | 2013-2016 | Yes | 96 | 73.8 ± 6.3 | 51 | Sx only | 4.2 | 4/96 | 4 | Aga Khan University Hospital, Karachi. |
| Tahir, 2020[5] | Obs | 2016-2018 | Yes | 490 | 62.9 ± 9.9 | 68 | Sx only | 1.0 | 5/490 | 5 | Jinnah Postgraduate Medical Centre, Karachi. |
| Khan, 2015[2] | Obs | 2013-2014 | Yes | 60 | 77.2 ± 6.3 | 64 | Sx only | 0 | 0/64 | 4 | Combined Military Hospital, Rawalpindi. |
| Rashid, 2013[3] | Case Control | 2005-2010 | Yes | 194 | 68 ± 14 | 49 | Sx only | 4.6 | 9/194 | 4 | Aga Khan University Hospital, Karachi. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

# 9. PAKISTAN

## 1-year mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All /Sx only | 1-year mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Tahir, 2020[5] | Obs | 2016-2018 | Yes | 490 | 62.9 ± 9.9 | 68 | Sx only | 23.5 | 115/490 | 5 | Jinnah Postgraduate Medical Centre, Karachi. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

## Excluded studies

| Author, Year | Reason(s) for exclusion |
|---|---|
| Haroon, 2021[6] | Not representative of low trauma hip fracture population- *includes patients >18 years.* |
| Butt, 2020a[7] | Not representative of low trauma hip fracture population- *includes high trauma hip fractures, only 75% are fall-related.* |
| Butt, 2020b[8] | Same cohort as reported in Butt, 2020a[7], but smaller sample size. |
| Ahmad, 2019[9] | Not representative of low trauma hip fracture population- *includes patients involved in road traffic accidents (6.5%) and assaults (1.5%).* |
| Fahad, 2019[10] | Not representative of low trauma hip fracture population- *only included patients undergoing proximal femur replacement who were ambulatory before trauma and had complete follow up for one year. Small sample (n=21). Subset of Hasan, 2021[1]* |
| Fahad, 2019[11] | Not representative of low trauma hip fracture population- *only included patients with a complete follow up for one year. No indication of % lost to follow-up.* |
| Azhar, 2015[12] | Not representative of low trauma hip fracture population- *excluded older frail patients.* |
| Noordin, 2015[13] | Not representative of low trauma hip fracture population- *included patients aged ≥80 years.* |
| Shah, 2015[14] | Subset of cohort reported by Rashid, 2013[3], but smaller sample size. |

# 9. PAKISTAN

## References


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# 10. SINGAPORE

## Forest plots, by time period

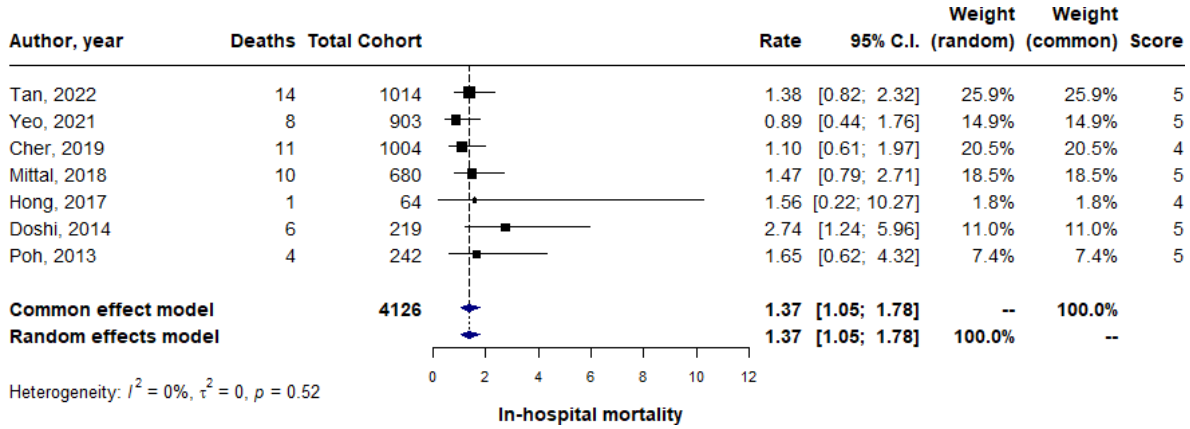


Figure 1: Forest plot of in-hospital mortality, includes 7 studies, 4,126 patients

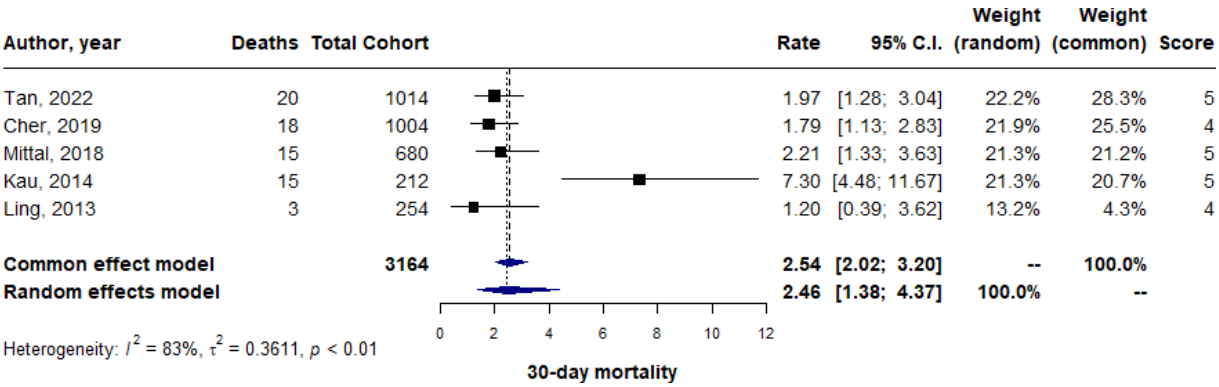


Figure 2: Forest plot of 30-day mortality, includes 5 studies, 3,164 patients

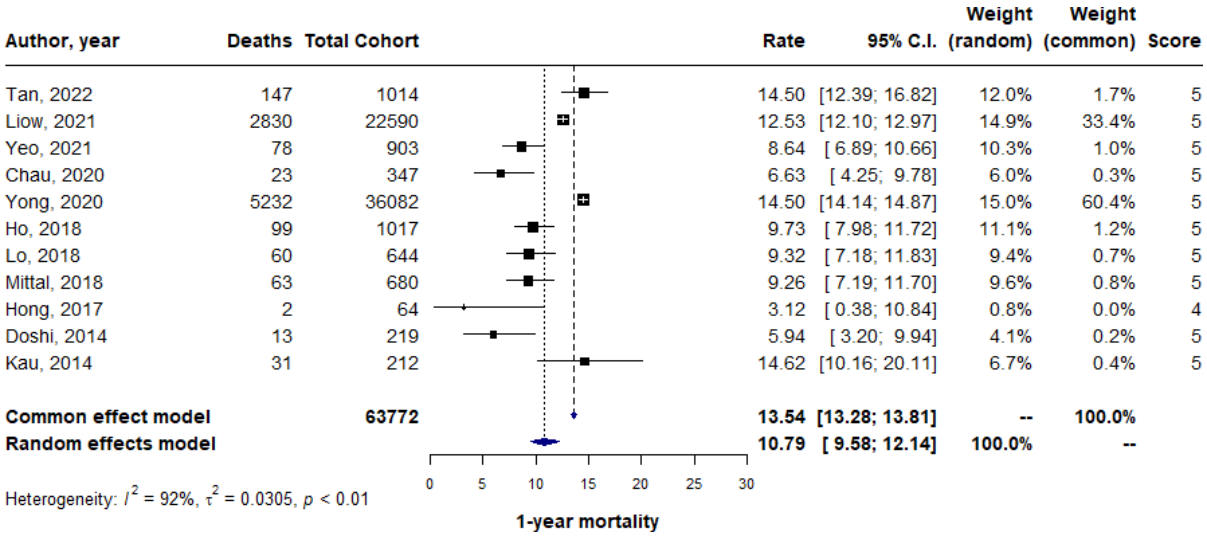


Figure 3: Forest plot of 1-year mortality, includes 11 studies, 63,772 patients

# 10. SINGAPORE

## Studies included in meta-analysis, by time period

### In-hospital mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | In-hospital mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Tan, 2022[1] | Obs | 2015-2017 | Yes | 1,014 | 79.2 ± nr | 69 | All | 1.4 | 14/1,014 | 5 | Khoo Teck Puat Hospital, Yishun, Central Region. |
| Yeo, 2021[2] | Obs | 2011-2013 | Yes | 903 | 80.8 ± 8.6 | 73 | Sx only | 0.9 | 8/903 | 5 | Tan Tock Seng Hospital, Novena Central Region. |
| Cher, 2019[3] | Obs | 2013-2015 | Yes | 1,004 | 77.9 ± 8.1 | 71 | Sx only | 1.1 | 11/1,004 | 4 | Singapore General Hospital, Central Region. |
| Mittal, 2018[4] | Obs | 2013-2014 | Yes | 680 | 80.4 ± 7.4 (65-102) | 69 | Sx only | 1.5 | 10/680 | 5 | Changi General Hospital, Eastern and Northeastern Region. |
| Hong , 2017[5] | Obs | 2009-2012 | Yes | 64 | 79.8 ± nr (56-97) | 70 | Sx only | 1.6 | 1/64 | 4 | National University Hospital, Central Region. |
| Doshi, 2014[6] | Obs | 2011-2011 | Yes | 219 | 82.1 ± nr | 75 | All | 2.7 | 6/219 | 5 | Tan Tock Seng Hospital, Novena Central Region. *less years than Yeo, 2021[2], but included conservatively treated patients. |
| Poh, 2013[7] | Obs | 2010-2010 | Yes | 242 | 78.1 ± 10.2 | 86 | All | 1.7 | 4/242 | 5 | National University Hospital, Central Region. Subset (2010 only) included in the cohort reported in Hong, 2017[5] |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

# 10. SINGAPORE

## 30-day mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 30-day mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Tan, 2022[1] | Obs | 2015-2017 | Yes | 1,014 | 79.2 ± nr | 69 | All | 2.0 | 20/1,014 | 5 | Khoo Teck Puat Hospital, Yishun, Central Region |
| Cher, 2019[3] | Obs | 2013-2015 | Yes | 1,004 | 77.9 ± 8.1 | 71 | Sx only | 1.8 | 18/1,004 | 4 | Singapore General Hospital, Central Region. |
| Mittal, 2018[4] | Obs | 2013-2014 | Yes | 680 | 80.4 ± 7.4 (65-102) | 69 | Sx only | 2.2 | 15/680 | 5 | Changi General Hospital, Eastern and Northeastern Region |
| Kau, 2014[8] | Obs | 2009-2010 | Yes | 197 | 78.8 ± 9.0 | 52 | All | 7.3 | nr | 5 | Tan Tock Seng Hospital, Novena Central Region. |
| Ling, 2013[9] | Obs | 2009-2010 | Yes | 254 | 77.8 ± nr (60-100) | 75 | Sx only | 1.2 | nr | 4 | Singapore General Hospital, Central Region. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

## 1-year mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 1-year mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Tan, 2022[1] | Obs | 2015-2017 | Yes | 1,014 | 79.2 ± nr | 69 | All | 14.5 | 147/1,014 | 5 | Khoo Teck Puat Hospital, Yishun, Central Region. |
| Liow, 2021[10] | Obs | 2008-2017 | No National database | 22,590 | 78.3 ± nr | 69 | All | 12.5 | 2,830/ 22,590 | 5 | Population based administrative datasets from the Ministry of Health. Mortality data obtained from the National Death Registry |
| Yeo, 2021[2] | Obs | 2011-2013 | Yes | 903 | 80.8 ± 8.6 | 73 | Sx only | 8.6 | 78/903 | 5 | Tan Tock Seng Hospital, Novena Central Region. |
| Chau, 2020[11] | Obs | 2014-2016 | Yes | 347 | 77 ± 9.3 | 72 | Sx only | 6.6 | 23/347 | 5 | National University Hospital, Central Region. |

# 10. SINGAPORE

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 1-year mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Yong, 2020[12] | Obs | 2000-2017 | No National database | 36,082 | 78.2 ± 10.1 | 69 | All | 14.5 | nr | 5 | Population based administrative datasets from the Ministry of Health. Mortality data obtained from the National Death Registry. |
| Ho , 2018[13] | Obs | 2012-2013 | Yes | 1,017 | 78 ± 9.7 | 72 | Sx only | 9.7 | 99/1,017 | 5 | Tan Tock Seng Hospital, Novena Central Region. |
| Lo, 2018[14] | Obs | 2007-2012 | Yes | 644 | 76.4 ± 8.4 | 69 | Sx only | 9.2 | nr | 5 | Singapore General Hospital, Central Region. Mortality outcome determined by nationwide linked electronic health records. |
| Mittal, 2018[4] | Obs | 2013-2014 | Yes | 680 | 80.35 ± 7.4 (65-102) | 69 | Sx only | 9.2 | 63/680 | 5 | Changi General Hospital, Eastern and Northeastern Region. Mortality data was obtained from a national registry. |
| Hong , 2017[5] | Obs | 2009-2012 | Yes | 64 | 79.8 ± nr (56-97) | 70 | Sx only | 3.1 | 2/64 | 4 | National University Hospital, Central Region. |
| Doshi, 2014[6] | Obs | 2011 | Yes | 219 | 82.1 ± nr | 75 | All | 5.9 | 13/219 | 5 | Tan Tock Seng Hospital, Novena Central Region. *less years than Yeo, 2021[2], but included conservatively treated patients. |
| Kau, 2014[8] | Obs | 2009-2010 | Yes | 197 | 78.8 ± 9.0 | 52 | All | 14.6 | nr | 5 | Tan Tock Seng Hospital, Novena Central Region. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

# 10. SINGAPORE

## Excluded studies

| Author, year | Reason(s) for exclusion |
|---|---|
| Ng, 2021[15] | Not representative of low trauma hip fracture population- *only reported 239 matched cases out of a possible 3,065 (7.8%).* |
| Cher, 2020[16] | Subset of cohort reported in Cher, 2019[3]. |
| Ding, 2019[17] | Not representative of low trauma hip fracture population- *only included patients with end-stage chronic kidney and renal disease.* |
| Mok, 2019[18] | Subset of cohort reported in Tan, 2022[1]. |
| Yuan, 2019[19] | Subset of cohort reported in Yeo, 2021[2]. |
| Chandran, 2018[20] | Not representative of low trauma hip fracture population- *only included patients screened by fracture liaison hospital.* |
| Declarador, 2018[21] | Subset of cohort reported in Yeo, 2021[2] |
| Lee, 2018[22] | Not representative of low trauma hip fracture population- *only included non-simultaneous bilateral (second) hip fractures.* |
| Lim, 2018[23] | Not representative of low trauma hip fracture population- *only included those who had conservative treatment.* |
| Hong, 2016[24] | Overlaps with cohort reported in Hong, 2017[5], e*xcluded patients on anticoagulant therapy or who had a history of DVT or PE, haematological conditions, malignancy, pathological fractures and open fractures.* |
| Doshi, 2014[25] | Subset of cohort reported in Doshi, 2014[6], e*xcluded patients with cognitive impairment.* |
| Tay, 2014[26] | Not representative of low trauma hip fracture population- *only included patients aged ≥90 years.* |

# 10. SINGAPORE

## References


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13. Ho SWL, Thwin L, Kwek EBK (2018) Clinical characteristics and short to mid term functional outcomes of surgically treated occult hip fractures in the elderly. Injury 49:2216-2220. https://doi.org/10.1016/j.injury.2018.10.017
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# 10. SINGAPORE

17. Ding BT, Shinde A, Tan KG (2019) Hip hemiarthroplasty for femoral neck fractures in end-stage renal disease patients on dialysis compared to patients with late-stage chronic kidney disease. Singapore Med J 60:403-408. https://doi.org/10.11622/smedj.2019090
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# 11. SOUTH KOREA

## Forest plots, by time period

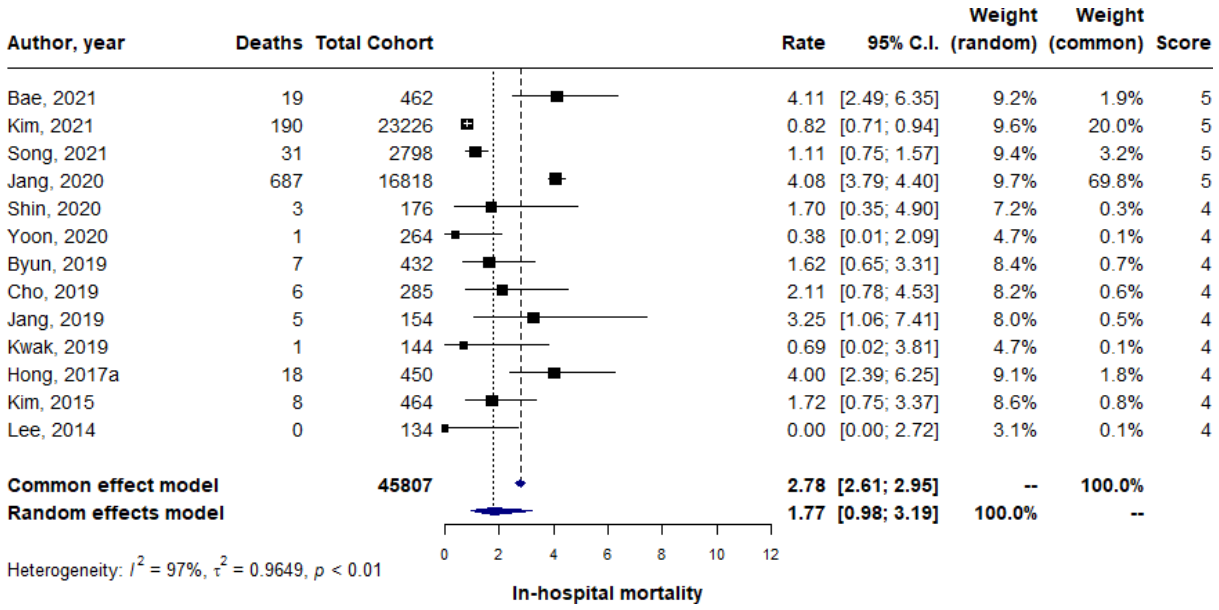


Figure 1: Forest plot of in-hospital mortality, includes 13 studies, 45,807 patients

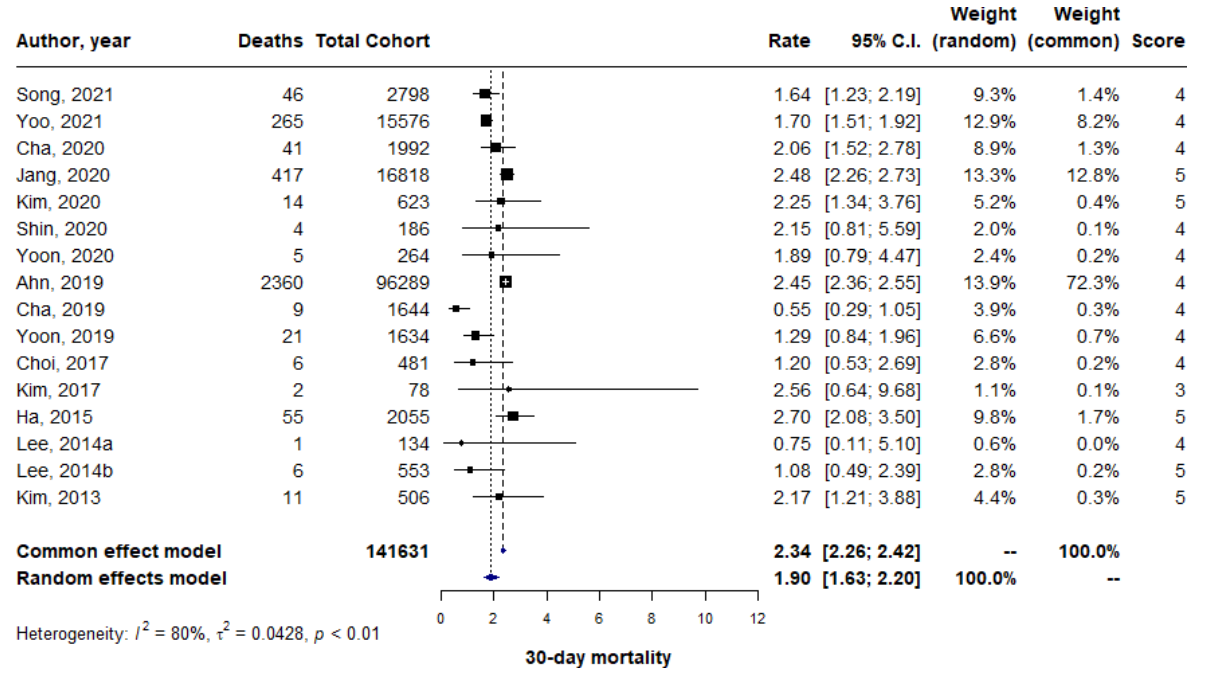


Figure 2: Forest plot of 30-day mortality, includes 16 studies, 141,631 patients

# 11. SOUTH KOREA

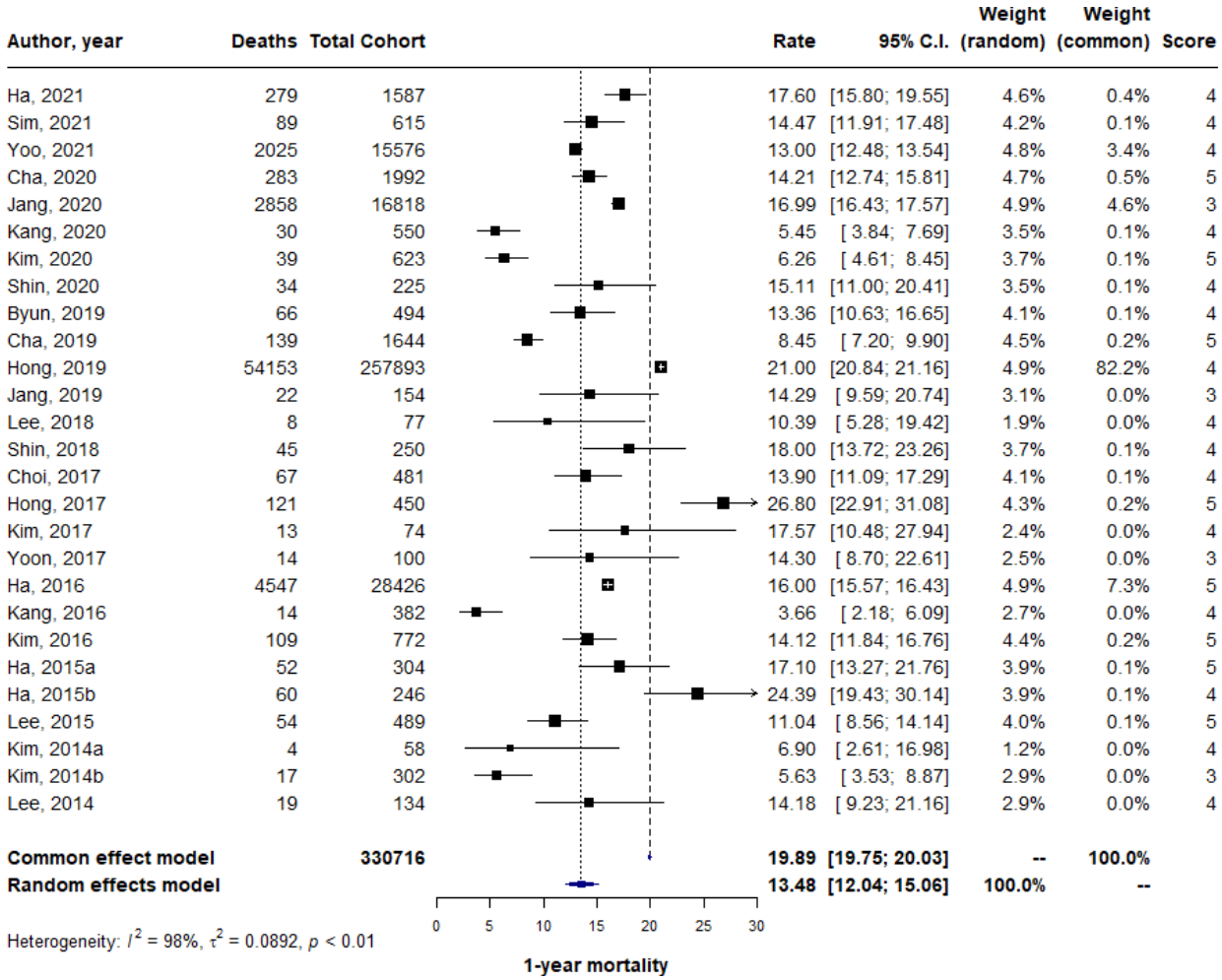


Figure 3: Forest plot of 1-year mortality, includes 27 studies, 330,716 patients

# 11. SOUTH KOREA

## Studies included in meta-analysis, by time period

### In-hospital mortality

| Author, year | Study design | Date Range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | In-hospital mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Bae, 2021[1] | Obs | 2014-2017 | Yes | 462 | 74.3 ± 16.2 | 69 | All | 4.1 | 19/462 | 5 | Ewha Womans University Mokdong Hospital, Seoul. |
| Kim, 2021[2] | Obs | 2016 | No National database | 23,226 | 78.7 ± 9.4 | 73 | Sx only | 0.8 | 190/ 23,226 | 5 | National Health Insurance Services (NHIS) dataset- provides near universal coverage. |
| Song, 2021[3] | Obs | 2003-2018 | Yes | 2,798 | 76.9 ± 12.1 | 71 | Sx only | 1.1 | 31/2,798 | 5 | Seoul National University Bundang Hospital, Seongnam. |
| Jang, 2020[4] | Obs | 2005-2014 | No National database | 16,818 | nr (65-99) age groups only ≥65 years | 75 | Sx only | 4.1 | 687/ 16,818 | 5 | Korean National Health Insurance Service-Senior cohort (NHIS-Senior). |
| Shin, 2020[5] | RCT | 2015-2019 | Yes | 176 | 80.5 ± 7.1 | 74 | Sx only | 1.7 | 3/176 | 4 | Severance Hospital, Yonsei University Health System, Seoul. |
| Yoon, 2020[6] | Obs | 2015-2019 | Yes | 264 | 78.8 (77.4-79.7) | 78 | Sx only | 0.4 | 1/264 | 4 | Dongguk University Ilsan Hospital, Goyang. |
| Byun, 2019[7] | Obs | 2015-2018 | No 3 hospitals | 432 | 79 ± nr (60-100) | 73 | Sx only | 1.6 | 7/432 | 4 | 3 participating hospitals, not named. |
| Cho, 2019[8] | Obs | 2013-2017 | Yes | 285 | 79 ± 6.8 | 75 | Sx only | 2.1 | 6/285 | 4 | Korea University Anam Hospital, Seoul. |
| Jang, 2019[9] | Obs | 2015-2017 | Yes | 154 | 82 ± 7.0 | 72 | Sx only | 3.2 | 5/154 | 4 | Hallym University Sacred Heart Hospital, Anyang. *included proximal femoral fractures with cephalomedullary nailing. |
| Kwak, 2019[10] | Case Control | 2015-2017 | Yes | 144 | 80 ± 5.3 | 75 | Sx only | 0.7 | 1/144 | 4 | Hallym University Sacred Heart Hospital, Anyang. *different patient cohort to Jang, 2019[9] included femoral neck fractures with cementless bipolar hemiarthroplasty. |
| Hong, 2017[11] | Obs | 2010-2012 | Yes | 450 | 79 ± 7.0 (65-95) | 78 | Sx only | 4.0 | 18/450 | 4 | Hallym University Sacred Heart Hospital, Anyang. |

# 11. SOUTH KOREA

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Kim, 2015[12] | Obs | 2011-2014 | Yes | 464 | 79.5 ± 7.3 | 77 | Sx only | 1.7 | 8/464 | 4 | Sanggye Paik Hospital, Seoul. |
| Lee, 2014[13] | Obs | 2007-2010 | No<br>2 hospitals | 134 | 78.4 ± nr<br>(65-108) | 79 | Sx only | 0 | 0/134 | 4 | Seoul National University Bundang and Chung-Ang University Hospitals, Seoul. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

## 30-day mortality

| **Author, year** | **Study design** | **Date range** | **Single centre study** | **Number of patients** | **Age mean ± SD (range) median [IQR]** | **% F** | **All / Sx only** | **30-day mortality** | | **Quality Score** | **Comments** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | **Rate** | **Raw Numbers** | | |
| Song, 2021[3] | Obs | 2003-2018 | Yes | 2,798 | 76.9 ± 12.1 | 71 | Sx only | 1.6 | 46/2,798 | 4 | Seoul National University Bundang Hospital, Seongnam. |
| Yoo, 2021[14] | Obs | 2002-2015 | No<br>National database | 15,576 | nr<br>age groups only ≥65 years | 75 | Sx only | 1.7 | 265/<br>15,576 | 4 | Korean National Health Insurance Service-Senior cohort (NHIS-Senior). |
| Cha, 2020[15] | Obs | 2004-2018 | No<br>2 hospitals | 1,992 | 82 ± 8.1 | 74 | Sx only | 2.1 | 41/1,992 | 4 | 2 hospitals, not named. |
| Jang, 2020[4] | Obs | 2005-2014 | No<br>National database | 16,818 | nr<br>(65-99)<br>age groups only ≥65 years | 75 | Sx only | 2.5 | 417/<br>16,818 | 5 | Korean National Health Insurance Service (NHIS). |
| Kim, 2020[16] | Obs | 2014-2016 | No<br>16 hospitals | 623 | 81.3 ± nr<br>(65-102) | 73 | Sx only | 2.2 | 14/623 | 5 | Korean Hip Fracture Registry-includes 16 hospitals. |
| Shin, 2020[5] | RCT | 2015-2019 | Yes | 186 | 80.5 ± 7.1 | 74 | Sx only | 2.2 | 4/186 | 4 | Severance Hospital, Yonsei University Health System, Seoul. |
| Yoon, 2020[6] | Obs | 2015-2019 | Yes | 264 | 78.8 ± nr<br>(77-80) | 78 | Sx only | 1.9 | 5/264 | 4 | Dongguk University Ilsan Hospital, Goyang. |
| Ahn, 2019[17] | Obs | 2009-2015 | No | 92,289 | 79 [74-84] | 74 | Sx only | 2.5 | 2,360/<br>96,289 | 4 | Korean National Health Insurance Service (NHIS). |
| Cha, 2019[18] | Obs | 2003-2013 | No<br>2 hospitals | 1,644 | 78 ± 8.3 | 73 | Sx only | 0.5 | 9/1,644 | 4 | Seoul National University Bundang Hospital and Seongnam, Eulji University Hospital, Daejeon. |
| Yoon, 2019[19] | Obs | 2003-2014 | Yes | 1,634 | 79 ± 7.9 | 73 | Sx only | 1.3 | 21/1,634 | 4 | Seoul National University Bundang Hospital, Seongnam. |

# 11. SOUTH KOREA

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 30-day mortality | | Quality Score | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Choi, 2017[20] | Obs | 2009-2014 | Yes | 481 | 80 ± nr (75-85) | 71 | Sx only | 1.2 | nr | 4 | Seoul National University Bundang Hospital, Seongnam. Used administrative death data to confirm deaths |
| Kim, 2017[21] | Obs | 2015-2016 | Yes | 78 | 80.1 ± 9.1 | 76 | Sx only | 2.6 | 2/78 | 3 | Myongji Hospital, Goyang. |
| Ha, 2015a[22] | Obs | 2002-2011 | No 8 hospitals | 2,055 | 78.9 ± nr | 79 | All | 2.7 | nr | 5 | 8 hospitals on Jeju Island. |
| Lee, 2014[13] | Obs | 2007-2010 | No 2 hospitals | 134 | 78.4 ± nr (65-108) | 79 | Sx only | 0.7 | 1/134 | 4 | Seoul National University Bundang and Chung-Ang University Hospitals, Seoul. |
| Lee, 2014[23] | Obs | 2006-2013 | Yes | 553 | 79.0 ± 7.0 | 74 | Sx only | 1.1 | 6/553 | 5 | Samsung Medical Center, Seoul. |
| Kim, 2013[24] | Obs | 2006-2010 | Yes | 506 | 77.2 ± 7.4 | 72 | Sx only | 2.2 | 11/506 | 5 | Yeungnam University College of Medicine, Daegu. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

## 1-year mortality

| Author, year | Study design | Date Range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 1-year mortality | | Quality Index Score | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Ha, 2021[25] | Obs | 2010-2013 | No National sample | 1,587 | nr age groups only ≥50 years | 71 | Sx only | 17.6 | nr | 5 | Korean National Health Insurance Service (NHIS). Death determined by linkage with national mortality data. |
| Sim, 2021[26] | Obs | 2014-2018 | Yes | 615 | 80.7 ± 7.7 | 71 | Sx only | 14.5 | 89/615 | 4 | Asan Medical Center, Seoul. |
| Yoo, 2021[14] | Obs | 2002-2015 | No National database | 15,576 | nr | 76 | Sx only | 13.0 | 2,025/ 15,576 | 4 | Korean National Health Insurance Service-Senior cohort (NHIS-Senior). |

# 11. SOUTH KOREA

| Author, year | Study design | Date Range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 1-year mortality | | Quality Index Score | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Cha, 2020[15] | Obs | 2004-2018 | No<br>2 hospitals | 1,992 | 82 ± 8.1 | 74 | Sx only | 14.2 | 283/<br>1,992 | 4 | 2 hospitals, not named. |
| Jang, 2020[4] | Obs | 2005-2014 | No<br>National database | 16,818 | nr<br>(65-99)<br>age groups only ≥65 years | 75 | Sx only | 17.0 | 2,858/<br>16,818 | 5 | Korean National Health Insurance Service-Senior cohort (NHIS-Senior). |
| Kang, 2020[27] | Obs | 2011-2016 | Yes | 550 | 70.1 ± 8.6 | 71 | Sx only | 5.5 | 30/550 | 3 | Inha University Hospital, Incheon. |
| Kim, 2020[16] | Obs | 2014-2016 | No<br>16 hospitals | 623 | 81.3<br>(65-102) | 73 | Sx only | 6.3 | 39/623 | 5 | Korean Hip Fracture Registry-includes 16 hospitals. |
| Shin, 2020[28] | Obs | 2013-2015 | Yes | 225 | 80 [75-86] | 72 | Sx only | 15.1 | 34/225 | 4 | Hospital not named. |
| Byun, 2019[29] | Obs | 2011-2017 | Yes | 494 | 78 ± 9.7<br>(50-103) | 76 | Sx only | 13.4 | 66/494 | 4 | Institution not named.<br>Used administrative data for 1-year mortality. |
| Cha, 2019[18] | Obs | 2003-2013 | No<br>2 hospitals | 1,644 | 78 ± 8.3 | 73 | Sx only | 8.5 | 139/<br>1,644 | 4 | Seoul National University Bundang Hospital and Seongnam, Eulji University Hospital, Daejeon. |
| Hong, 2019[30] | Obs | 2006-2015 | No<br>National database | 257,893 | nr<br>age groups only ≥50 years | 70 | All | 21.0 | 54,153/<br>257,893 | 5 | Korean National Health Insurance Service (NHIS). |
| Jang, 2019[9] | Obs | 2015-2017 | Yes | 154 | 82 ± 7.0<br>(75-89) | 72 | Sx only | 14.3 | 22/154 | 4 | Hallym University Sacred Heart Hospital, Anyang. |
| Lee, 2018[31] | Obs | 2003-2016 | No<br>4 hospitals | 77 | 81 ± 6.6<br>(63-92) | 75 | Sx only | 10.4 | 8/77 | 3 | 4 participating hospitals not named. |
| Shin, 2018[32] | Obs | 2011-2015 | Yes | 250 | 79 ± 8.9<br>(65-97) | 75 | Sx only | 18.0 | 45/250 | 4 | Pusan National University Hospital, Busan. |
| Choi, 2017[20] | Obs | 2009-2014 | Yes | 481 | 80<br>(75-85) | 71 | Sx only | 13.9 | nr | 4 | Seoul National University Bundang Hospital, Daejeon. |
| Hong, 2017[11] | Obs | 2010-2012 | Yes | 450 | 79 ± 7.0<br>(65-95) | 78 | Sx only | 26.8 | nr | 4 | Hallym University Sacred Heart Hospital, Anyang. |
| Kim, 2017[33] | Case - control | 2010-2014 | Yes | 194 | 81 ± 6.7<br>(65-97) | 61 | Sx only | 17.6 | 13/74 | 4 | Hospital not named. |
| Yoon, 2017[34] | Obs | 2003-2014 | Yes | 100 | 82.3 ± 8.8 | 78 | Sx only | 14.3 | nr | 3 | Inje University College of Medicine, Seoul Paik Hospital, Seoul. |

# 11. SOUTH KOREA

| Author, year | Study design | Date Range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 1-year mortality | | Quality Index Score | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Ha, 2016[35] | Obs | 2008-2012 | No<br>National database | 28,426 | nr<br>age groups only ≥50 years | nr | All | 16.0 | 4,547/ 28,426 | 5 | Korean National Health Insurance Service (NHIS). |
| Kang, 2016[36] | Obs | 1996-2013 | Yes | 382 | 75 ± nr | 70 | Sx only | 3.7 | 14/382 | 4 | Inha University Hospital, Incheon. |
| Kim, 2016[37] | Obs | 2003-2011 | Yes | 772 | 79.4 ± 7.3 | 75 | Sx only | 14.1 | 109/772 | 5 | Seoul National University Bundang Hospital, Daejeon. |
| Ha, 2015a[22] | Obs | 2011 | No<br>8 hospitals | 304 | nr for 2011 | 79 | All | 17.1 | nr | 5 | 8 hospitals on Jeju Island |
| Ha, 2015b[38] | Obs | 2009-2012 | Yes | 246 | 74.3 ± 8.7 | 68 | Sx only | 24.4 | 60/246 | 4 | Myongji Hospital, Goyang |
| Lee, 2015[39] | Obs | 2010-2014 | Yes | 489 | 76.6 ± 9.6 | 70 | All | 11.0 | 54/489 | 5 | Hospital not named. |
| Kim, 2014[40] | Obs | 1999-2011 | Yes | 58 | 77.5 ± nr (65-96) | 69 | Sx only | 6.9 | nr | 4 | Inje University Haeundae Paik Hospital, Busan. |
| Kim, 2014[41] | Obs | 2010-2012 | Yes | 302 | 78.7 ± 8.6 | 67 | Sx only | 5.6 | 17/302 | 3 | Seoul National University Bundang Hospital, Daejeon. |
| Lee, 2014[13] | Obs | 2007-2010 | No<br>2 hospitals | 134 | 78.4 ± nr (65-108) | 79 | Sx only | 14.2 | 19/134 | 4 | Seoul National University Bundang Hospital and Chung-Ang University Hospital, Daejeon. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

# 11. SOUTH KOREA

## Excluded studies

| Author, year | Reason(s) for exclusion |
|---|---|
| Cha, 2021[42] | Not representative of low trauma hip fracture population- e*xcluded patients with cognitive impairment and comorbidities. High loss to follow-up.* |
| Jeon, 2021[43] | Not representative of low trauma hip fracture population- e*xcluded patients with cognitive impairment, comorbidities and those transferred to another hospital.* |
| Ahn, 2020[44] | Same cohort as reported in Ahn 2019[17], but smaller sample size (n=7,810). |
| Ahn, 2020[45] | Raw numbers of hip fractures not reported, so unable to derive overall 1-year mortality rate. |
| Bae, 2020[46] | Not representative of low trauma hip fracture population-e*xcluded patients with delirium and dementia. Only included those with minimum of 1 year follow-up.* |
| Jang, 2020[47] | Same cohort as reported in Jang, 2020[4], but smaller sample size (n=14,736). |
| Jang, 2020[48] | Same cohort as reported in Jang, 2020[4], but smaller sample size (n=7,223). |
| Jang, 2020[49] | Same cohort as reported in Jang, 2020[4], but smaller sample size (n=14,774). |
| Lee, 2020[50] | Not representative of low trauma hip fracture population- *only includes patient who went to ICU post-surgery.* |
| Yoo, 2020[51] | Not representative of low trauma hip fracture population- *includes >18 years (13% were aged <60 years.* |
| Cha, 2019[52] | Same cohort as reported in Cha 2020[15] , but shorter date range. |
| Jang, 2019[53] | Same cohort as reported in Jang, 2020[4], but smaller sample size (n=15,210). |
| Kim, 2019[54] | Not representative of low trauma hip fracture population- *only includes patients ≥90 years.* |
| Cho, 2018[55] | Not representative of low trauma hip fracture population- *only included males.* |
| Kim, 2018[56] | Not representative of low trauma hip fracture population- s*ignificant exclusion criteria- only included those who had abdominal CT before surgery. 297/388 (76%) excluded.* |
| Kim, 2018[57] | Not representative of low trauma hip fracture population- *only included patients who sustained an acute displaced intracapsular femoral neck fracture (Garden III or IV), subsequently treated with either bipolar hemiarthroplasty or dual mobility cup, and available follow-up records of at least 12 months post-operatively.* |
| Yoo, 2018[58] | Not representative of low trauma hip fracture population- *excluded patients with delirium, depression and dementia significant exclusion and those not examined and not DXA scanned 82/406 = 20.1% excluded.* |
| Cha, 2017[59] | Same cohort as reported in Cha, 2019[18] |
| Ji, 2017[60] | Not representative of low trauma hip fracture population- *excluded patients with cognitive impairment.* |

# 11. SOUTH KOREA

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|---|---|
| Suh, 2017[61] | Not representative of low trauma hip fracture population- *only included patients with chronic kidney disease.* |
| Cho, 2016[62] | Not representative of low trauma hip fracture population- *only includes nursing home residents.* |
| Jang, 2016[63] | Not representative of low trauma hip fracture population- *only reported mortality outcomes for the propensity score matched groups 276/ 639 (43% of possible patients). Matched on indication for geriatric management.* |
| Kim, 2015[64] | Not representative of low trauma hip fracture population- *excluded patients with medical comorbidities.* |
| Cheng, 2014[65] | Not representative of low trauma hip fracture population- *only included patients with major bleeding (n=13).* |
| Park, 2014[66] | Not representative of low trauma hip fracture population- o*nly included second hip fractures.* |
| Yoon, 2013[67] | Not representative of low trauma hip fracture population- *only included patients who received conservative treatment.* |
| Kang, 2012[68] | Not representative of low trauma hip fracture population- o*nly includes patients ≥90 years.* |

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# 12. SRI LANKA

## Forest plots, by time period

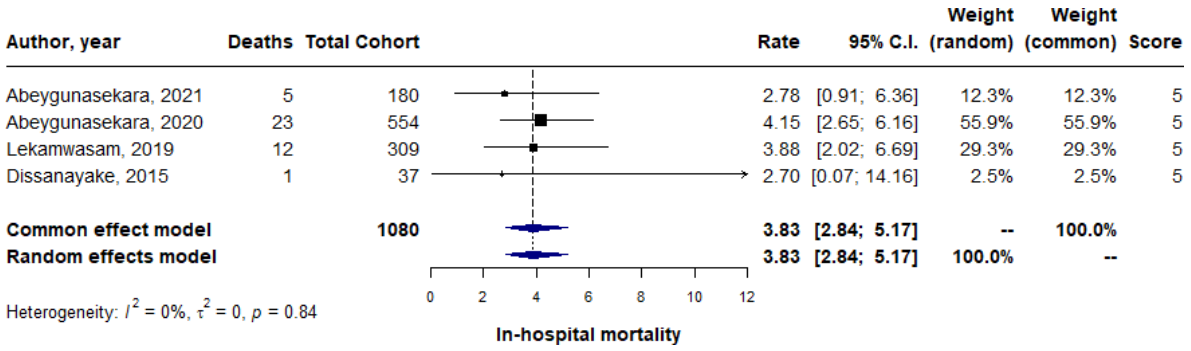


Figure 1: Forest plot of in-hospital mortality, includes 4 studies, 1,080 patients

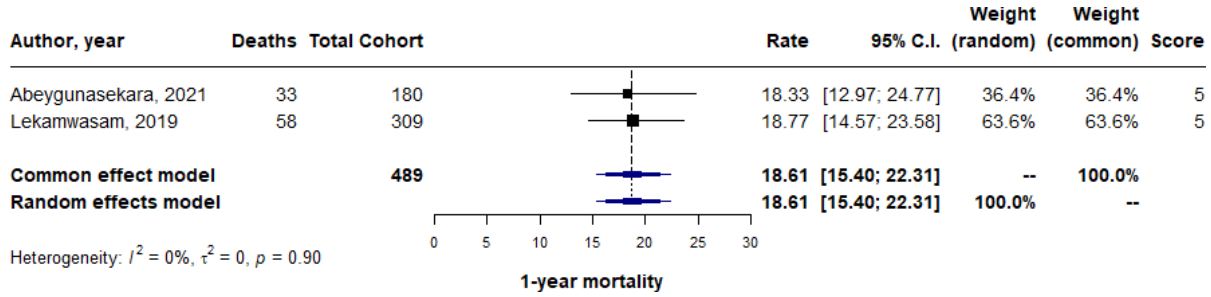


Figure 2: Forest plot of 1-year mortality, includes 2 studies, 489 patients

# 12. SRI LANKA

## Studies included in meta-analysis, by time period

### In-hospital mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All /Sx only | In-hospital mortality | | Quality Score | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Abeygunasekara, 2021[1] | Obs | 2017-2020 | Yes | 180 | 77.0 ± 8.2 | 83 | All | 2.8 | 5/180 | 5 | Teaching Hospital, Karapitiya, Galle. |
| Abeygunasekara, 2020[2] | Obs | 2017-2018 | No | 554 | 76.8 ± 9.6 | 82 | All | 4.2 | 23/554 | 5 | Multiple hospital study. |
| Lekamwasam, 2019[3] | Obs | 2014-2015 | Yes | 309 | 75 ± 11.3 | 68 | All | 3.9 | 12/309 | 5 | Teaching Hospital, Karapitiya, Galle. |
| Dissanayake, 2015[4] | Obs | 2014 | Yes | 37 | 76 ± nr | 73 | Surgery only | 2.7 | 1/37 | 5 | Colombo North Teaching Hospital, Ragama. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

### 1-year mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD, (range), median, [IQR] | % F | All /Sx only | 1-year mortality | | Quality Score | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Abeygunasekara, 2021[1] | Obs | 2017-2020 | Yes | 180 | 77.0 ± 8.2 | 83 | All | 18.3 | 33/180 | 5 | Teaching Hospital, Karapitiya, Galle. |
| Lekamwasam, 2019[3] | Obs | 2014-2015 | Yes | 309 | 75 ± 11.3 | 68 | All | 18.8 | 58/309 | 5 | Teaching Hospital, Karapitiya, Galle. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

# 12. SRI LANKA

## Excluded studies

| Author, year | Reason(s) for exclusion |
|---|---|
| Sabapathippillai, 2018**[5]** | Same cohort as reported in Lekamwasam, 2019[3]. |

# 12. SRI LANKA

## References


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# 13. TAIWAN

## Forest plots, by time period

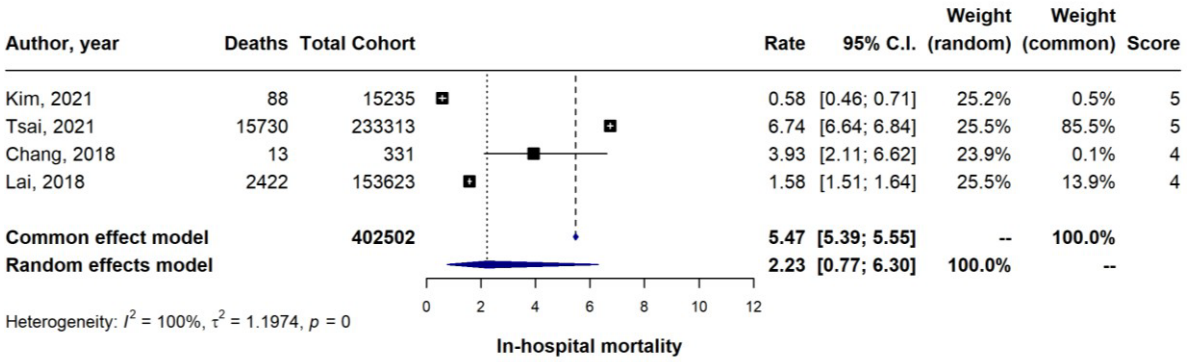


Figure 1: Forest plot of in-hospital mortality, includes 4 studies, 402,502 patients

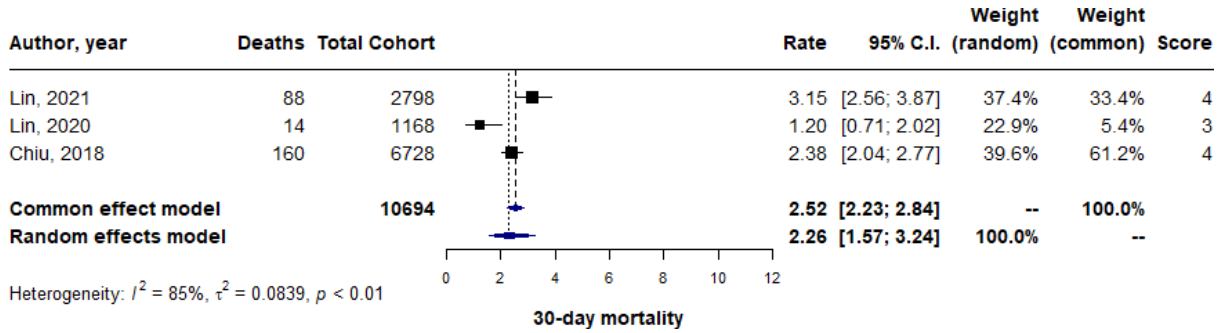


Figure 2: Forest plot of 30-day mortality, includes 3 studies, 10,694 patients

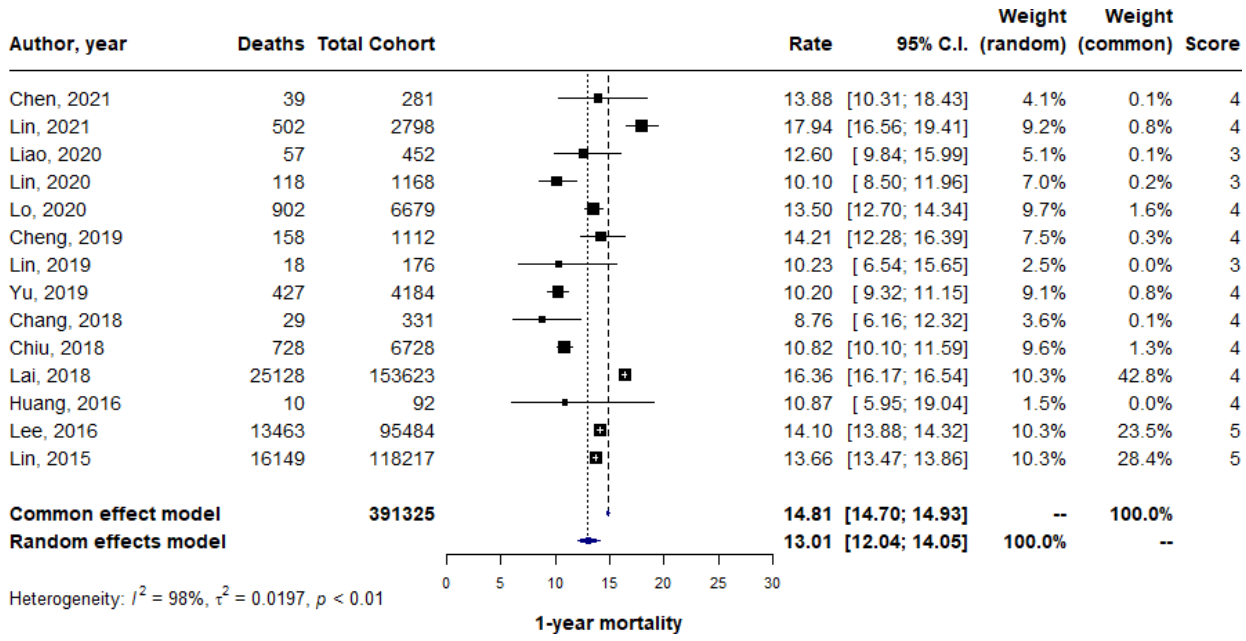


Figure 3: Forest plot of 1-year mortality, includes 14 studies, 391,325 patients

# 13. TAIWAN

## Studies included in meta-analysis, by time period

### In-hospital mortality

| Author, year | Study design | Date Range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | In-hospital mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Kim, 2021[1] | Obs | 2016 | No National Database | 15,235 | 78.2 ± 9.4 | 64 | Sx only | 0.6 | 88/ 15,235 | 5 | National Health Insurance Research Database (~99% coverage) linked to mortality register. |
| Tsai, 2021[2] | Obs | 2007-2014 | No National Database | 233,313 | 80.1 ± 0.0 | 78 | All | 6.7 | 15,730/ 233,313 | 5 | National Trauma Data Bank (NTDB) registry. |
| Chang, 2018[3] | Obs | 2014-2015 | Yes | 331 | 81.4 ± 7.2 | 68 | Sx only | 3.9 | 13/331 | 4 | National Yang-Ming University Hospital, Yi-Lan County. |
| Lai, 2018[4] | Obs | 2000-2011 | No National Database | 153,623 | nr age group only ≥65 years | 62 | Sx only | 1.6 | 2,422/ 153,623 | 4 | National Health Insurance Research Database. Mortality was defined as a subject withdrawing from the NHI program and not re-joining. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

### 30-day mortality

| Author, year | Study Design | Date Range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 30-day mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Lin, 2021[5] | Obs | 2000-2010 | No National database | 2,798 | 79.8 ± 7.9 | 68 | Sx only | 3.2 | nr | 4 | National Health Insurance Research Database and mortality register. |
| Lin, 2020[6] | Obs | 1996-2012 | No National database | 1,168 | 67.4 ± 16.3 | 59 | Sx only | 1.2 | nr | 3 | National Health Insurance Research Database (no mention of mortality register). |

# 13. TAIWAN

| Author, year | Study Design | Date Range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 30-day mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| | | | | | | | | | | | Propensity score matched study |
| Chiu, 2018[7] | Obs | 1997-2012 | No National database | 6,728 | nr age groups only ≥ 65 years | 68 | Sx only | 2.4 | 160/ 6,728 | 4 | Taiwan National Health Insurance Research Database (1M random sample). |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

## 1-year mortality

| Author, year | Study Design | Date Range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 1-year mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Chen, 2021[8] | Obs | 2017-2019 | Yes | 281 | 81.3 ± 9.6 | 70 | Sx only | 13.9 | 39/281 | 4 | Hospital not named. |
| Lin, 2021[5] | Obs | 2000-2010 | No National database | 2,798 | 79.8 ± 7.9 | 68 | Sx only | 17.9 | nr | 4 | National Health Insurance Research Database & National Register of Deaths Database. |
| Liao, 2020[9] | Obs | 2008-2015 | Yes | 452 | 76.2 ± 10.3 | 67 | Sx only | 12.6 | nr | 3 | Kaohsiung Chang Gung Memorial Hospital, Kaohsiung. *Propensity score matched study |
| Lin, 2020a[6] | Obs | 1996-2012 | No National database | 1,168 | 67.4 ± 16.3 | 59 | Sx only | 10.1 | nr | 3 | National Health Insurance Research Database (no mention of mortality register) *Propensity score matched study |
| Lo, 2020[10] | Obs | 2000-2010 | No National database | 739 | 81.8 ± 7.13 | nr | Sx only | 15.0 | 111/739 | 4 | National Health Insurance Research Database (Selected random sample of 1M people). |
| Cheng, 2019[11] | Case Control | 2000-2010 | No National database | 1,112 | nr age groups only ≥ 60 years | 56 | Sx only | 14.2 | 158/ 1,112 | 4 | National Health Insurance Research Database. *Matched case control study. |
| Lin , 2019[12] | Obs | 2008-2013 | Yes | 176 | 77.8 ± 8.0 | 67 | Sx only | 10.2 | 18/176 | 3 | Kaohsiung Medical University Hospital, Kaohsiung. |

# 13. TAIWAN

| Author, year | Study Design | Date Range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All / Sx only | 1-year mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw Numbers | | |
| Yu, 2019[13] | Obs | 2001-2010 | No National database | 4,184 | 77.5 ± 9.2 | 79 | All | 10.2 | nr | 4 | National Health Insurance Research Database - randomly selected 2M records. Propensity score matched study |
| Chang, 2018[3] | Obs | 2014-2015 | Yes | 331 | 81.6 ± 6.9 | 68 | Sx only | 8.8 | 29/331 | 4 | National Yang-Ming University Hospital, Yi-Lan. |
| Chiu, 2018[7] | Obs | 1997-2012 | No National database | 6,728 | nr age groups only ≥ 65 years | 68 | Sx only | 10.8 | 728/ 6,728 | 4 | National Health Insurance Research Database (1M random sample). No mention of link to death register. |
| Lai, 2018[4] | Obs | 2000-2011 | No National database | 153,623 | nr age group only ≥65 years | 62 | Sx only | 16.4 | 25,128/ 153,623 | 4 | National Health Insurance Research Database. Mortality was defined as a subject withdrawing from the NHI program and not re-joining. |
| Huang, 2016[14] | Obs | 2010-2014 | Yes | 92 | 81.4 ± 7.2 | nr | Sx only | 10.9 | 10/92 | 4 | Kaohsiung Chang Gung Memorial Hospital, Kaohsiung. |
| Lee, 2016[15] | Obs | 2006-2011 | No National database | 95,484 | nr | nr | Sx only | 14.1 | nr | 5 | National Health Insurance Research Database. |
| Lin, 2015a[16] | Obs | 2004-2010 | No National database | 118,217 | 76.1 ± nr | 58 | Sx only | 13.7 | 16,149/ 118,217 | 5 | National Health Insurance Research Database. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

# 13. TAIWAN

## Excluded studies

| Author, year | Reason(s) for exclusion |
|---|---|
| Chang, 2021[17] | Hip fracture mortality not reported separately. |
| Shen, 2021[18] | Inconsistent results: 30-day mortality reported as 5.4% in abstract and 0.5% in Table 2. |
| Tang, 2021[19] | Not representative of low trauma hip fracture population- *only included patients with dementia.* |
| Tseng, 2021[20] | Not representative of low trauma hip fracture population- *only included patients with cognitive impairment.* |
| Chang, 2020[21] | Provides a range of 1Y-mortality-between 12.8-14.8% over time. Raw numbers not reported. |
| Lee, 2020[22] | Not representative of low trauma hip fracture population- *propensity score matched study- matched to cases with diabetes.* |
| Lin, 2020b[23] | Not representative of low trauma hip fracture population- *only included patients on long term dialysis.* |
| Lin, 2020c[24] | Not representative of low trauma hip fracture population- *only includes patients with diabetes*. |
| Su, 2020[25] | Subset of cohort reported in Chou, 2019[26], but smaller sample size. |
| Wang, 2020[27] | Deaths during index hospitalization were excluded from cohort- underreporting of death. |
| Chou, 2019[26] | Not representative of low trauma hip fracture population- *includes all femoral fractures- unable to disaggregate hip fracture mortality.* |
| Huang, 2019[28] | Not representative of low trauma hip fracture population- *only includes patients with diabetes.* |
| Tsai, 2019[29] | Not representative of low trauma hip fracture population- *only included octogenarians treated with arthroplasty.* |
| Lin, 2018[30] | Not representative of low trauma hip fracture population- *propensity score matched study- matched to cases with pulmonary embolism.* |
| Pan, 2018[31] | 30-day and 1-year mortality reported from date of hospital discharge not admission. |
| Tung, 2018[32] | Not representative of low trauma hip fracture population- *included aged 18 years and above and only included patients discharged alive.* |
| Hung, 2017[33] | Not representative of low trauma hip fracture population- *propensity score matched study- matched to cases on dialysis.* |
| Lin, 2017[34] | Not representative of low trauma hip fracture population- *only included nonagenarians undergoing surgery.* |
| Rau, 2017[35] | Not representative of low trauma hip fracture population- *included all femoral fractures, i.e. included high trauma and aged 20 years and above.* |
| Wang, 2017[36] | Not representative of low trauma hip fracture population- *Only included patients that were recruited for a RCT (Shyu, 2013[37]). Excluded: those unable able to perform full range of motion against gravity and against some or full resistance of the unaffected limb at admission, and have a pre-fracture Chinese Barthel Index (CBI) score > 70 and severely cognitively impaired [MMSE] score < 4, or 3) and terminally ill.* |
| Wu, 2017[38] | Mortality rate is age-adjusted not observed rate- raw numbers not reported. |

# 13. TAIWAN

| | |
|---|---|
| Huang, 2016[39] | Not representative of low trauma hip fracture population- *Excluded patients with patients with delirium or dementia and cannot decide their choice of osteoporosis treatments and cannot cooperate to assess the functional outcomes.* |
| Shyu, 2016[40] | Not representative of low trauma hip fracture population- *Only included 299 out of 1,112 possible hip fracture patients. Exclusions: poor pre-fracture self-care ability (CBI score <70); (b) severely cognitively impaired and completely unable to follow orders (Chinese Mini-Mental State Examination score < 10) (Yip et al., 1992), (c) inability to communicate, (d) living in a nursing home, and (e) not living in northern Taiwan.* |
| Tung, 2016[41] | Not representative of low trauma hip fracture population- *included 6.2% patients aged < 50 years.* |
| Wu, 2016[42] | Not representative of low trauma hip fracture population- *only include patients who were previously ambulatory, lived with 30 minutes taxi drive of hospital and discharged home.* |
| Lin, 2015b[43] | Not representative of low trauma hip fracture population- *only included nonagenarians undergoing surgery.* |
| Shyu, 2013[37] | Not representative of low trauma hip fracture population- *RCT- excluded frail patients. Of 1,873 possible hip # patients included only 299 (16%).* |

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# 14. THAILAND

## Forest plots, by time period

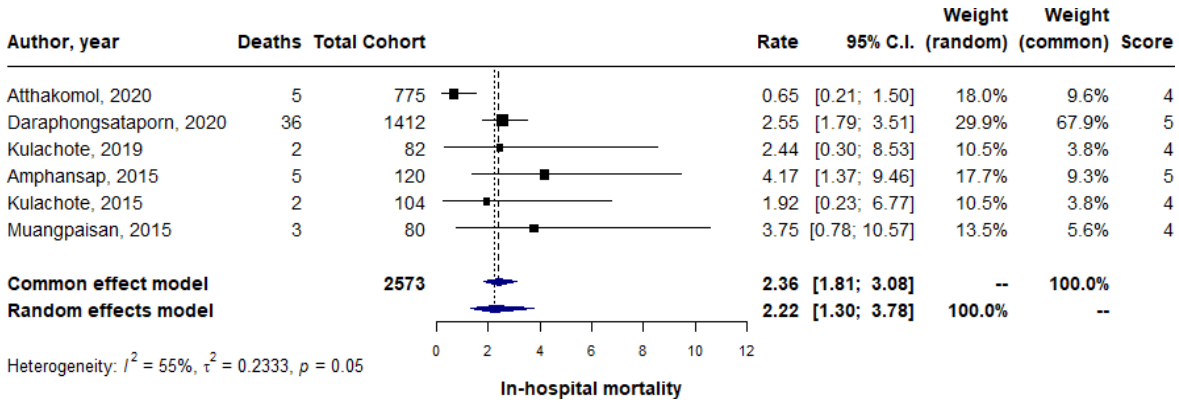


Figure 1: Forest plot of in-hospital mortality, includes 6 studies, 2,573 patients

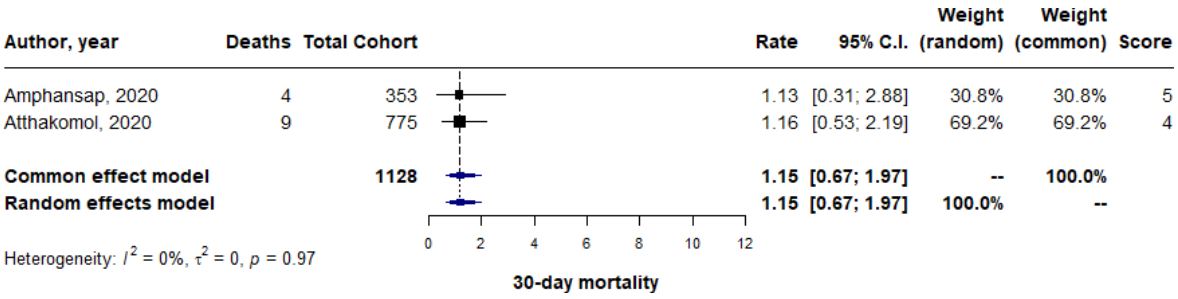


Figure 2: Forest plot of 30-day mortality, includes 2 studies, 1,128 patients

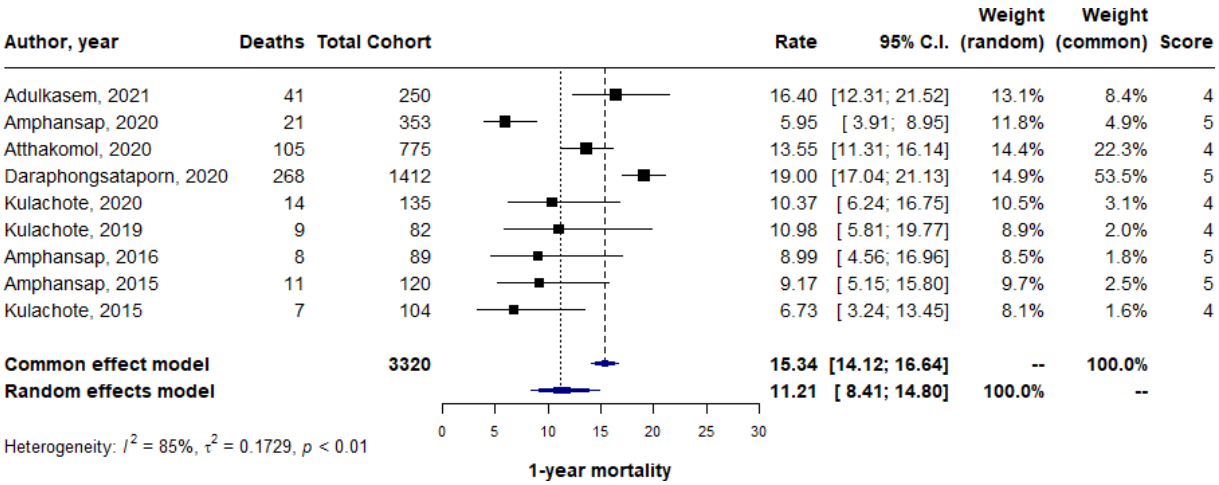


Figure 3: Forest plot of 1-year mortality, includes 9 studies, 3,320 patients

# 14. THAILAND

## Studies included in meta-analysis, by time period

### In-hospital mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All /Sx only | In-hospital mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Atthakomol, 2020[1] | Obs | 2014-2018 | Yes | 775 | 79.1 ± 9.6 | 72 | All | 0.6 | 5/775 | 4 | Academic University Hospital, Chiang Mai University, Chiang Mai.<br>* Raw numbers obtained from author. |
| Daraphongsataporn 2020[2] | Obs | 2014-2018 | No<br>2 hospitals | 1,412 | 78.8 ± 8.9 | 71 | Sx only | 2.5 | 36/1,412 | 5 | Nan Hospital and Pua Crown Prince Hospital, Nan. |
| Kulachote, 2019[3] | Obs | 2012 | Yes | 82 | 79 [74 to 84] (58-94) | 76 | Sx only | 2.4 | 2/82 | 4 | Ramathibodi Hospital, Bangkok. |
| Amphansap, 2015[4] | Obs | 2013 | Yes | 120 | 79.4 ± nr | 73 | All | 4.2 | 5/120 | 5 | Police General Hospital, Bangkok. Used mortality registry data to determine death. |
| Kulachote, 2015[5] | Obs | 2012-2014 | Yes | 104 | 81 ± 8 (60-95) | 70 | Sx only | 1.9 | 2/104 | 4 | Ramathibodi Hospital, Bangkok. *includes similar cohort as Kulachote, 2019[3] but more years |
| Muangpaisan, 2015[6] | Obs | 2010-2012 | Yes | 80 | 79.4 ± 7.9 | 77 | Sx only | 3.8 | 3/80 | 4 | Siriraj Hospital, Bangkok. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

### 30-day mortality

# 14. THAILAND

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All /Sx only | 30-day mortality | | Quality Index Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Amphansap, 2020[7] | Obs | 2014-2019 | Yes | 353 | 78.9 ± nr (50-97) | 74 | All | 1.1 | 4/353 | 5 | Police General Hospital, Bangkok. Active follow up through Fracture Liaison Service. |
| Atthakomol, 2020[1] | Obs | 2014-2018 | Yes | 775 | 79.1 ± 9.6 | 72 | All | 1.2 | 9/775 | 4 | Academic University Hospital, Chiang Mai University, Chiang Mai. * Raw numbers obtained from author. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

## 1-year mortality

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All /Sx only | 1-year mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Adulkasem, 2021[8] | Obs | 2017-2020 | Yes | 254 | 82 ± 7 | 74 | Sx only | 16.4 | 41/250 | 4 | Maharaj Nakorn Chiang Mai Hospital, Chiang Mai. |
| Amphansap, 2020[7] | Obs | 2014-2019 | Yes | 353 | 78.9 ± nr (50-97) | 74 | All | 5.9 | 21/353 | 5 | Police General Hospital, Bangkok. |
| Atthakomol, 2020[1] | Obs | 2014-2018 | Yes | 775 | 79.1 ± 9.6 | 72 | All | 13.6 | 105/775 | 4 | Academic University Hospital, Chiang Mai University, Chiang Mai. * Raw numbers obtained from author. |
| Daraphongsataporn, 2020[2] | Obs | 2014-2018 | No 2 hospitals | 1,412 | 78.8 ± 8.9 | 71 | Sx only | 19.0 | nr | 5 | Nan Hospital and Pua Crown Prince Hospital, Nan. |
| Kulachote, 2020[9] | Obs | 2010-2017 | Yes | 135 | 84 ± 6 (71-96) | 73 | Sx only | 10.4 | 14/135 | 4 | Ramathibodi Hospital, Bangkok. |
| Kulachote, 2019[3] | Obs | 2010-2012 | Yes | 82 | 70 [74 to 84] | 76 | Sx only | 11.0 | 9/82 | 4 | Ramathibodi Hospital, Bangkok. *Some cross over with cohort from Kulachote, 2020[9] |

# 14. THAILAND

| Author, year | Study design | Date range | Single centre study | Number of patients | Age mean ± SD (range) median [IQR] | % F | All /Sx only | 1-year mortality | | Quality Score | Data source / Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Rate | Raw numbers | | |
| Amphansap, 2016[10] | Obs | 2014-2015 | Yes | 89 | 79.7 ± nr (51-97) | 84 | All | 9.0 | 8/89 | 5 | Police General Hospital, Bangkok. Subset of cohort included in Amphansap, 2020[7] |
| Amphansap, 2015[4] | Obs | 2013 | Yes | 120 | 79.4 ± nr | 73 | All | 9.2 | 11/120 | 5 | Police General Hospital, Bangkok. |
| Kulachote, 2015[5] | Obs | 2012-2014 | Yes | 104 | 81 ± 8 (60-95) | 70 | Sx only | 6.7 | 7/104 | 4 | Ramathibodi Hospital, Bangkok. *overlaps some of same cohort as Kulachote, 2019[3], but later years. |

**Notes:** Obs = observational studies; SD = standard deviation; IQR = interquartile range; nr = not reported; % F = percentage female; Sx only = study only included patients who underwent surgical repair of hip fracture.

# 14. THAILAND

## Excluded studies

| Author, year | Reason(s) for exclusion |
|---|---|
| Sucharitpongpan, 2019[11] | Subset of cohort reported in Daraphongsataporn, 2020[2]. |
| Sa-Ngasoongsong, 2018[12] | Not representative of low trauma hip fracture population –*small sample size (n=20), excluded patients who died before Sx, had dementia or were uncooperative for assessments.* |
| Muangpaisan, 2015[13] | Same cohort as reported in Muangpaisan, 2015[6]. |
| Petchara, 2015[14] | Not representative of low trauma hip fracture population – *only included those being evaluated as high surgical risk, defined by having ASA physical status III or IV. Similar cohort as Kulachote, 2019[3] includes more years, but only includes high surgical risk patients.* |
| Sa-Ngasoongsong, 2015[15] | Not representative of low trauma hip fracture population – *inclusion criteria included: previously taking at least one antiplatelet agent or more; having high surgical risk with ASA physical status grade 3 or more; and having stable medical condition and able to perform early surgical intervention within 72 h after admission.* |
| Udombhornprabha, 2012[16] | Not representative of low trauma hip fracture population – *only included patients discharged from hospital. Only 50% response rate to 12 month survey.* |

# 14. THAILAND

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# 15. THE PHILIPPINES

## Studies included in meta-analysis, by time period

### In-hospital mortality

No studies identified.

### 30-day mortality

No studies identified.

### 1-year mortality

No studies identified.

### Excluded study

| Author, year | Reason(s) for exclusion |
|---|---|
| Valera, 2014[1] | Not representative of low trauma hip fracture population- *only included patients aged ≥80 years.* |

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