**Table S1 Characteristics of included cross-sectional studies**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Investigator | Year | country | Number (case/control) | Age case | Age control | Male% case | Male% control | Recruitment (case) | Recruitment (control) | Mean HbA1c(mM) | T2DM period | Recruitment period | AHRQ  score | Outcome |
| **PD/non-PD** | | | | | | | | | | | | | | |
| Awuti[1] | 2012 | China | 453/509 | NA | NA | 58.4 | 41.6 | P | P | NA | NA | NA | 7 | 1,6 |
| Choi[2] | 2011 | America | 12254 | NA | NA | NA | NA | NHANES | NHANES | NA | NA | NA | 8 | 0 |
| Nesse[3] | 2010 | Netherland | 217/320 | 41 | 33 | 52 | 44 | D | D | NA | NA | NA | 7 | 1,6 |
| Saito[4] | 2005 | Japan | 584 | NA | NA | NA | NA | P | P | NA | NA | 6m | 6 | 0 |
| **T2DM/non-T2DM** | | | | | | | | | | | | | | |
| Abduljabbar[5] | 2017 | Saudi Arabia | 43/87 | 50.6 | 52.3 | NA | NA | P | P | 8.4 | 3.1y | NA | 6 | 3,5 |
| Campus[6] | 2005 | Italy | 71/141 | 61 | 59.1 | 44 | 43 | E | D | 7.5 | >8y | NA | 6 | 1 |
| Demmer[7] | 2012 | Germany | 152/2280 | 59.6 | 44 | 46 | 64 | SHIP | SHIP | 7.18 | NA | 1y | 8 | 2,3,4 |
| Hintao[8] | 2007 | Thailand | 105/103 | 54.3 | 53.3 | 49.5 | 49.5 | E | H | NA | NA | NA | 7 | 2 |
| Kaur[9] | 2009 | Germany | 182/1314 | 64.5 | 61 | 57.1 | 50.4 | SHIP | SHIP | NA | 10y | NA | 8 | 2,3,5 |
| Khader[10] | 2008 | Jordan | 106/106 | 46.9 | 47 | 46.3 | 50.9 | H | H | NA | NA | 4m | 6 | 2,3,5 |
| Kowall[11] | 2015 | Germany | 777/2145 | 56.9 | 44.8 | 56.4 | 46.3 | SHIP | SHIP | 6.66 | NA | 4y | 8 | 0 |
| Lan[12] | 2012 | China | 105/105 | 41.5 | 42.1 | 57.1 | 52.4 | D | D | NA | 1-7y | 1y | 4 | 2,3 |
| Leong[13] | 2007 | USA | 51/102 | 65.06 | 64.01 | 37.25 | 37.25 | H | H | 7.39 | NA | 2y | 6 | 5 |
| Leung[14] | 2008 | China | 161/364 | 64.1 | 63.6 | 46.6 | 46.2 | E | H | 7.9 | 2.5y | 1.5m | 7 | 1,5,6 |
| Liao[15] | 2010 | China | 118/50 | 62 | 62 | 64.4 | 60 | H | H | NA | NA | 4m | 5 | 2,3,5 |
| Liu[16] | 2013 | China | 106/440 | >65 | >65 | 47.2 | 45 | H | H | NA | >6y | 1m | 7 | 1,2 |
| Lopez-Lopez[17] | 2011 | Spain | 50/50 | 60.7 | 61.6 | 40 | 44 | D | D | 6.6 | NA | NA | 4 | 4 |
| Mansour[18] | 2005 | Lraq | 633/960 | 56.7 | 56.9 | 46.6 | 43.8 | E | H | NA | NA | 1y6m | 6 | 1 |
| Marotta[19] | 2012 | Brazil | 30/60 | 58.2 | 58.3 | 40 | NA | D | D | NA | NA | NA | 4 | 4 |
| Mattout[20] | 2006 | France | 71/2061 | 54.5 | 49 | 59.1 | 48.7 | P | P | 8.45 | NA | 1y | 7 | 2,3 |
| Mohamed[21] | 2013 | Norway | 154/303 | 52.6 | 52.4 | 39 | 39.3 | D | D | NA | 9y,>1y | 6m | 8 | 1,6 |
| Morton[22] | 1995 | UK | 24/24 | 46.8 | 45.8 | 33.33 | 62.5 | D | D | NA | 7.9y, 2y | NA | 4 | 2,3 |
| Nelson[23] | 1990 | America | 720/1553 | NA | NA | NA | NA | P | P | NA | NA | 2y | 8 | 1,6 |
| Ou[24] | 2013 | China | 54/54 | 60 | 65 | 51.85 | 62.96 | E | H | 7.3 | 8y, >1y | 2y | 5 | 2,5 |
| Patino[25] | 2008 | Mexico | 35/35 | 45 | 42 | 40 | 39 | D | D | 8 | >5y | 3y | 5 | 2,3,5 |
| Preshaw[26] | 2010 | Sri Lankan | 285/60 | 45.7 | 45.1 | 51.2 | 43.3 | E | P | NA | NA | NA | 5 | 1,2,3,5 |
| Qin[27] | 2014 | China | 52/48 | 64.27 | 65.08 | 63.46 | 58.33 | E | H | NA | NA | 1y | 4 | 1,2,3 |
| Saito[28] | 2004 | Japan | 101/850 | 60.5 | 56.8 | 60.4 | 37.2 | P | P | 6.4 | NA | 4m | 6 | 2,3,4 |
| Saito[29] | 2006 | Japan | 131/62 | 52.1 | 52.3 | 100 | 100 | H | H | NA | NA | 8m | 6 | 4 |
| Serrano[30] | 2012 | Colombia | 72/39 | 61.59 | 59.17 | 50 | 33.33 | P | P | NA | NA | NA | 6 | 2,3,4 |
| Sun[31] | 2009 | China | 657/649 | 68.5 | 67.9 | 45.81 | 45.92 | D | D | NA | >5 | 4y | 4 | 1 |
| Susanto[32] | 2011 | Netherland | 78/65 | 56.7 | 50.5 | 45 | 34 | D/E | D/E | NA | NA | 8m | 7 | 2,3,4 |
| Tanwir[33] | 2009 | Pakistan | 88/80 | 41.8 | 41.3 | 50 | 43 | P | P | NA | NA | NA | 6 | 1,4 |
| Tsai[34] | 2002 | USA | 303/4040 | NA | NA | 70.6 | 48.9 | NHANES III | NHANES III | NA | NA | NA | 4 | 6 |
| Wang[35] | 2009 | Taiwan | 193/8468 | 40.01 | 39.33 | 43.5 | 32.09 | KCIS | KCIS | NA | 4.12y | 4y | 8 | 1,6 |
| Wang[36] | 2015 | China | 50/50 | 72.5 | 73.5 | NA | NA | P | P | NA | NA | 1y | 4 | 1 |
| Yuan[37] | 2001 | Taiwan | 105/141 | 57 | 56.95 | 57.14 | 58.16 | P | P | NA | NA | NA | 7 | 2,3 |
| Zhang[38] | 2012 | China | 44/43 | 51.1 | 51.16 | 52.27 | 51.16 | E | H | NA | >3y | 5m | 5 | 3 |
| Zhang[39] | 2013 | China | 60/90 | 86.35 | 86.93 | 100 | 100 | P | P | 7.27 | >5y | 2m | 4 | 1 |
| Zheng[40] | 2016 | China | 54/50 | 65.8 | 66.6 | 51.85 | 52 | E | D | NA | >1y | 1y | 4 | 2,3 |
| Zhou[41] | 2013 | China | 63/63 | 60.24 | 61.68 | 44.44 | 42.86 | E | H | NA | 8y,1-30y | 1y2m | 5 | 5 |
| Zielinski[42] | 2002 | America | 32/40 | 71 | 74 | 37 | 45 | D | H | 7.3 | 5-15y | NA | 4 | 5 |
| Zou[43] | 2014 | China | 94/420 | 52.36 | 50.82 | 54.25 | 63.57 | D | D | NA | 5y | 2y5m | 4 | 1 |

NA: not available; E: endocrine department; D: dental clinic; P: population; H: hospital; PD: periodontitis; T2DM: type 2 diabetes mellitus

0: adjusted data not included into meta-analyses and summarized in table 1. 1-5: unadjusted data of OR, CAL, PPD, NOT, LOT, included into meta-analyses. 6: adjusted data included into meta-analyses.

**Table S2 Characteristics of included case-control studies**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Investigator | Year | Country | Number | Incident Cases | Follow Up | Age | Male% | Longitudinal Study | NOS Score |
| **T2DM/non-T2DM** | | | | | | | | | |
| Chiu[44] | 2015 | Taiwan | 4387 | 1247 | 5 | 35-44 | 30.80% | KCIS | 7 |
| Demmer[7] | 2012 | Germany | 2626 | NA | 5 | 46 | 48% | SHIP | 8 |
| Jimenez[45] | 2012 | USA | 35247 | 3009 | 20 | 54 | All Male | HPFS | 6 |
| Morita[46] | 2012 | Japan | 5856 | 2068 | 5 | 30-69 | 77% | NA | 8 |
| Nelson[23] | 1990 | USA | 701 | 37 | 2.6 | 15-54 | ≈40% | Pima Indians study | 6 |
| Taylor[47] | 1998 | USA | 359 | 151 | 2.3 (1.2-6.9) | 15-57 | 40% | Pima Indians study | 5 |
| **PD/non-PD** | | | | | | | | | |
| Demmer[48] | 2008 | USA | 9296 | 817 | 17±4 | 55 | 40% | NHANES I NHEFS | 7 |
| Ide[49] | 2010 | Japan | 5848 | 287 | 6.5 (2-7) | 43 | 66.40% | NA | 8 |
| Kebede[50] | 2017 | Germany | 2034 | 206 | 11.1 | 45.4 | 46% | SHIP | 6 |
| Miyawaki[51] | 2016 | Japan | 2469 | 133 | 5 | 45 | All Male | My health up | 5 |
| Morita[46] | 2012 | Japan | 6125 | 168 | 5 | 30-69 | 82.40% | NA | 8 |
| Myllymki[52] | 2018 | Finland | 395 | 81 | 15-18 | 55-57 | 46% | Cohort 1935 Survey | 4 |
| Winning[53] | 2016 | UK | 1331 | 80 | 7.8 | 63.7 | All Male | PRIME study | 5 |

NA: not available; PD: periodontitis; T2DM: type 2 diabetes mellitus

**Table 3 Summary of trim and fill method**

|  |  |  |  |
| --- | --- | --- | --- |
| Meta-analyses | Trim and filled method | | |
|  | Mixed model | Flip model | Default model |
| CAL differences | Add 6 studies (p=0.000 WMD=0.45) | Add 1 studies (p=0.000 WMD=0.95) | Add 0 study |
| PPD differences | Add 4 studies (p=0.000 WMD=0.39) | Add 1 study (p=0.000 WMD=0.65) | Add 0 study |
| Mild PD on T2DM incidence | Add 0 study | Add 3 studies (p=0.23 RR=1.14) | Add 3 studies (p=0.23 RR=1.14) |
| Severe PD on T2DM incidence | Add 0 study | Add 2 studies (p=0.000 RR=1.46) | Add 2 studies (p=0.000 RR=1.46) |

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