Supplementary material: “Associations between socioeconomic status, atrial fibrillation and outcomes: A systematic review”

Anonymous authors

1. Supplementary material S1 – Search Strategy

**Embase Session Results PICO 1, 19 January 2018**

|  |  |  |
| --- | --- | --- |
| 1 | 'socioeconomics'/exp | 330 240 |
| 2 | 'social status'/exp OR 'social isolation'/exp OR 'social exclusion'/exp OR 'unemployment'/exp | 185 115 |
| 3 | 'health care disparity'/exp OR 'health disparity'/exp | 24 239 |
| 4 | socioeconomic\* OR 'socio economic\*' | 210,867 |
| 5 | inequalit\* OR indigen\* | 73 702 |
| 6 | educational NEAR/2 (standard\* OR level\*) | 22 144 |
| 7 | living NEAR/2 (standard\* OR condition\*) | 11 288 |
| 8 | occupation\* OR marginaliz\* OR stigma\* OR employment\* OR unemploy\* OR income\* OR poverty | 732,796 |
| 9 | social NEAR/2 (condition\* OR isolat\* OR class\* OR status\* OR rank OR function\* OR exclusion\* OR aspect\* OR background\*) | 246 694 |
| 10 | (health\* OR medical OR demographic\*) NEAR/2 disparit\* | 36 835 |
| 11 | 'occupation and occupation related phenomena'/exp | 647 399| |
| 12 | #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 | 1 543 374 |
| 13 | 'atrial fibrillation'/exp | 124 107 |
| 14 | 'heart atrium flutter'/exp | 11 991 |
| 15 | (atrial OR atrium OR auricular) NEAR/3 (fibril?ation\* OR flutter) | 139 375 |
| 16 | #13 OR #14 OR #15 | 139 375 |
| 17 | #12 AND #16 | 2484 |

**Embase Session Results PICO 2. 19 January 2018**

|  |  |  |
| --- | --- | --- |
| 1 | 'socioeconomics'/exp | 330 240 |
| 2 | 'social status'/exp OR 'social isolation'/exp OR 'social exclusion'/exp OR 'unemployment'/exp | 185 115 |
| 3 | 'health care disparity'/exp OR 'health disparity'/exp | 24 239 |
| 4 | socioeconomic\* OR 'socio economic\*' | 210,867 |
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| 8 | occupation\* OR marginaliz\* OR stigma\* OR employment\* OR unemploy\* OR income\* OR poverty | 732,796 |
| 9 | social NEAR/2 (condition\* OR isolat\* OR class\* OR status\* OR rank OR function\* OR exclusion\* OR aspect\* OR background\*) | 246 694 |
| 10 | (health\* OR medical OR demographic\*) NEAR/2 disparit\* | 36 835 |
| 11 | 'occupation and occupation related phenomena'/exp | 647 399| |
| 12 | #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 | 1 543 374 |
| 13 | 'atrial fibrillation'/exp | 124 107 |
| 14 | 'heart atrium flutter'/exp | 11 991 |
| 15 | (atrial OR atrium OR auricular) NEAR/3 (fibril?ation\* OR flutter) | 139 375 |
| 16 | #13 OR #14 OR #15 | 139 375 |
| 17 | #12 AND #16 | 2484 |
| 18 | 'drug therapy'/lnk OR 'surgery'/lnk OR 'therapy'/lnk | 5,933,011 |
| 19 | surg\* OR ablation\* OR cardioversion\* OR treatment\* OR therap\* | 13 129 945 |
| 20 | ('anti arrhythmi\*' OR antiarrhythmi\* OR antifibrillat\*) NEAR/2 (drug\* OR agent\* OR class) | 39 448 |
| 21 | 'anti coagulant\*' OR 'anti coagulat\*' OR anticoagulant\* OR anticoagulat\* OR antithrombotic\* | 208,673 |
| 22 | compliance OR adherence | 384,759 |
| 23 | 'mortality'/exp OR 'morbidity'/exp | 1 052 599 |
| 24 | mortality OR morbidity | 1,463,388 |
| 25 | symptom\* NEAR/2 severity | 28 264 |
| 26 | 'quality of life'/exp | 400 556 |
| 27 | 'cognitive defect'/exp | 405 195 |
| 28 | cognition NEAR/2 (impairment\* OR disorder\*) | 5482 |
| 29 | knowledge | 737 558 |
| 30 | cerebrovascular AND 'accident'/exp | 1343 |
| 31 | 'cerebrovascular accident'/exp | 276 776 |
| 32 | 'bleeding'/exp | 805 347 |
| 33 | stroke OR bleeding OR hemmorrhage | 798 867 |
| 34 | #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31 OR #32 OR #33 | 14,759,036 |
| 35 | #17 AND #34 | 2241 |

**Medline PICO 1 19 January 2018**

|  |  |  |
| --- | --- | --- |
| 1 | Atrial fibrillation/ or Atrial Flutter/ | 54847 |
| 2 | (((atrial or atrium or auricular) adj3 fibril?ation\*) or flutter).mp. | 80381 |
| 3 | 1 or 2 | 80381 |
| 4 | exp Socioeconomic Factors/ | 435917 |
| 5 | Healthcare Disparities/ or Health Status Disparities/ | 25181 |
| 6 | exp social conditions/ or exp social isolation/ or exp social marginalization/ | 27045 |
| 7 | (socioeconomic\* or socio economic\*).mp. | 224424 |
| 8 | ((health\* or medical\* or demographic) adj2 disparit\*).mp. | 34187 |
| 9 | (educational adj2 (status or level\*)).mp. | 67252 |
| 10 | (living adj2 (standard\* or condition\*)).mp | 10325 |
| 11 | (occupation\* or marginaliz\* or employment\* or unemploy\* or income\* or poverty).mp | 542326 |
| 12 | (inequalit\* or indigen\*).mp | 65320 |
| 13 | (social adj2 (condition\* or isolat\* or class\* or status or rank or function\* or exclusion\* or aspect\* or background\*)).mp. | 108679 |
| 14 | or/4-13 | 962567 |
| 15 | 3 and 14 | 742 |

**Medline PICO 2 19 January 2018**

|  |  |  |
| --- | --- | --- |
| 1 | Atrial fibrillation/ or Atrial Flutter/ | 54847 |
| 2 | (((atrial or atrium or auricular) adj3 fibril?ation\*) or flutter).mp. | 80381 |
| 3 | 1 or 2 | 80381 |
| 4 | exp Socioeconomic Factors/ | 435917 |
| 5 | Healthcare Disparities/ or Health Status Disparities/ | 25181 |
| 6 | exp social conditions/ or exp social isolation/ or exp social marginalization/ | 27045 |
| 7 | (socioeconomic\* or socio economic\*).mp. | 224424 |
| 8 | ((health\* or medical\* or demographic) adj2 disparit\*).mp. | 34187 |
| 9 | (educational adj2 (status or level\*)).mp. | 67252 |
| 10 | (living adj2 (standard\* or condition\*)).mp | 10325 |
| 11 | (occupation\* or marginaliz\* or employment\* or unemploy\* or income\* or poverty).mp | 542326 |
| 12 | (inequalit\* or indigen\*).mp | 65320 |
| 13 | (social adj2 (condition\* or isolat\* or class\* or status or rank or function\* or exclusion\* or aspect\* or background\*)).mp. | 108679 |
| 14 | or/4-13 | 962567 |
| 15 | 3 and 14 | 742 |
| 16 | (dh or dt or su or th).fs. | 5686079 |
| 17 | exp Surgical Procedures, Operative/ | 3098622 |
| 18 | exp Anti-Arrhythmia Agents/ | 225179 |
| 19 | exp Anticoagulants/ | 218585 |
| 20 | exp Patient Compliance/ | 74382 |
| 21 | (compliance or adherence).mp | 269301 |
| 22 | (surg\* or ablation\* or cardioversion\* or treatment\* or therap\*).mp. | 7701839 |
| 23 | ((Anti-Arrhythmi\* or Antiarrhythmi\* or antifibrillat\*) adj2 (drug\* or agent\* or class)).mp. | 35531 |
| 24 | (anti coagulant\* or anti coagulat\* or anticoagulant\* or anticoagulat\* or antithrombotic\*).mp. | 134480 |
| 25 | exp morbidity/ or exp mortality/ | 865414 |
| 26 | (mortality or morbidity).mp | 888056 |
| 27 | (symptom\* adj2 severity).mp. | 21427 |
| 28 | Quality of Life/ | 179303 |
| 29 | exp Cognition Disorders/ | 88425 |
| 30 | (cognition adj2 (impairment\* or disorder\*)).mp. | 68411 |
| 31 | knowledge.mp. | 679348 |
| 32 | exp Stroke/ | 124269 |
| 33 | exp Hemorrhage/ | 327350 |
| 34 | (stroke or bleeding or hemmorrhage).mp. | 451860 |
| 35 | Or/16-34 | 11952365 |
| 36 | 15 and 35 | 687 |

2. Supplementary material S2 – PICO inclusion and exclusion

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Supplementary material S2.** PICO inclusion and exclusion criteria for objective 1 and 2 | | | | |
|  | **Objective 1** | | **Objective 2** | |
|  | **Inclusion criteria** | **Exclusion criteria** | **Inclusion criteria** | **Exclusion criteria** |
| **Population** | Healthy participants with different SES. | Not healthy participants, e.g. stroke populations. | AF-patients.  ICD-8, ICD-9 or ICD-10 codes in hospital, death certificate or register from GP (general practitioners). - Objective measured, e.g. ECG, Holter Monitor, Event Monitor/r-test, and pacemaker. -Self- reported | Not AF patients, AF-patients with another disease, e.g. stroke or AF patients with reversible causes of AF, e.g. postoperative AF, hyperthyroidism, electrolyte imbalance, thyrotoxicosis or fever. |
| **Intervention/ comparator** | Comparing high SES vs. low SES. **SES indicators:**  Income, education,  deprivation,  social relations (e.g. living alone) or employment/job status, indices composed of several indicators. | Not comparing high SES vs. low SES. **SES indicators:**  Work related physical activity, psychosocial stress, low income countries, insurance status, alcohol/drug abuse, depression, SES defined by race/ ethnicity (e.g. aboriginals in Australia). | Comparing high SES vs. low SES. **SES indicators:**  Income, education,  deprivation,  social relations (e.g. living alone) or employment/job status, indices composed of several indicators. | Not comparing high SES vs. low SES. **SES indicators:**  Work related physical activity, psychosocial stress, low income countries, insurance statue, alcohol/drug abuse, depression, SES defined by race/ ethnicity (e.g. aboriginals in Australia). |
| **Outcome** | AF registered with an: - ICD-8, ICD-9 or ICD-10 codes in hospital registers, death certificate or register from GP (general practitioners). - Objective measured, ECG, Holter Monitor, Event Monitor/r-test, and pacemaker.. -Self- reported | Not AF. Reversible causes of AF, e.g. postoperative AF, hyperthyroidism, electrolyte imbalance, thyrotoxicosis or fever. AF and other diseases (e.g. stroke). | **- Treatment received:** Any antiarrhythmic agent, any anticoagulation agent, cardioversion, ablation or surgery. **- Results of treatment:** Stroke (hemorrhagic or ischemic), bleeding, time in therapeutic range or death. **- Quality of life. - Symptoms severity. - Cognitive impairment - Anxiety, depression - Mortality -Knowledge about AF - Symptom severity** | . |
| **Study design** | Observational studies: Cohort studies, case-control studies and cross-sectional studies | Case-series | Observational studies: Cohort studies, case-control studies and cross-sectional studies | Case-series |

3. Supplementary material S3 – Risk Of Bias

**Objective 1: Association between SES and the risk of AF**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Authors** | **1. Was selection of exposed and non-exposed  cohorts drawn from the same population?** | **2. Can we be confident in the assessment of exposure?** | **3. Can we be confident that the outcome of interest was not present at the start of the study?** | **4. Did the study match exposed and non-exposed for all variables that are associated with the outcome of interest or did the statistical analysis adjust for these prognostic variables** | **5. Can we be confident in the assessment of the presence or absence of prognostic factors?** | **6. Can we be confident in the assessment of outcome?** | **7. Was the follow-up of the cohorts adequate?** | **Other?** |
| Zöller et al, 2013 | ++++ The study population consisted of the entire Swedish population aged 25–74 years. They were followed from 1 January 2000 until hospitalization for AF,  death, emigration, or the end of the study period (31 December 2008). | ++++  Three SES indicators were used: - A summary measure was used to characterize neighbourhood-level  deprivation. - Education - Income The data sources were several national  Swedish data registers. | +++ No information about excluding participants with AF from the beginning of the study, but the population was identified before AF-patients were. | +++  They presented several models where they adjusted for age, sex, socioeconomic characteristics, chronic lower respiratory diseases, diabetes, hypertension, obesity, heart failure, coronary heart disease and hyperthyroidism.. Unadjusted results were also available. | ++++  Information about prognostic factors were collected from several national  Swedish data registers. | ++++  They used the main diagnoses of AF recorded in the Hospital  Discharge Register. ((ICD-10 code I48)) | +++  They calculated Cox proportional hazard ratios to take into account that individuals may die during follow-up. However, no information about how many that was lost to follow up, but it is probably small as they used register based information for follow-up. |  |
| Misialek et al, 2014 | ++++ The study population consisted of  14 352 persons (25% black, 75% white, 55% women)  participating in the Atherosclerosis Risk in Communities (ARIC) from baseline examination in 1987-79 to end of the study period in 2009. Mean age was 54 years | +++ Education level and total family income were collected at  baseline through questionnaires. | ++++ Only people free of AF from the beginning of the study were included. | +++ They adjusted for age, sex, race, study site, BMI, diabetes, drinking status, smoking status, systolic blood pressure, antihypertensive medication, prevalent heart failure, myocardial infarction or stroke. Results only adjusted for age and sex were also available. | ++++ Prognostic factors were evaluated by questionnaires and health assessments. | ++++ The incidents of AF were assessed by ECGs  from study examinations, hospital discharge codes, and  death certificates. | ++++ Participants were  interviewed annually by telephone to obtain follow-up  information related to hospital admissions and to determine  vital status, with an average response rate of more than  90%. |  |
| Conen et all, 2011 ( | ++ The study population consisted of 34 460 female health professionals from “the women health study” who were free of AF from baseline.  > 45 years. | ++ SES was defined by education and income. Information about SES was self-reported. | ++++ Only people free of AF from the beginning of the study were included. | +++ They adjusted for age, BMI, hypertension, diabetes, hypercholesterolemia, smoking, exercise, alcohol consumption and race/ethnicity. Results only adjusted for age were also available. | + Probably by questionnaire and medical records, but there was not specific information about this. | ++ AF was detected in medical records. No more information about how it was defined. Furthermore, when they reported HR, they do not write what the reference for income is. | ++ Mean follow up time was 13.4 years. They calculated hazard ratios but there was no information about how many was lost to follow up. | Only conference abstract and slides from a presentation available. |
| Christensen et al, 2016 | ++++  The study population consisted of all men and women from the Danish population aged 35-84 years where there was information about education during  the period 2005–2009. | ++++ SES was defined by length of time of the highest completed education and was categorized into four groups. Information about education came from the Danish population Education register. | + AF is presented as cases between 2005-2007 and outcome is “educational inequality”. It is not clear if AF was excluded in the beginning of the study period. | + They adjusted for age and stratified results by sex. Unadjusted results were not available. | ++++ Information about age sex and other cardiovascular diseases were obtained from nationwide Danish registers. | ++++ AF were identified as I48 (ICD 10) or 427.4 (ICD 8) in the National Patient Register. | ++ No information about how many that was lost to follow up. However, follow up was conducted through registers and loss to follow up was probably small. |  |
| Shulman et al, 2017\* | +++ The study population consisted of people aged 45-95 years, living in Bronx County, New York. In total, 48 631 patients met the inclusion criteria and were included in the study population. | +++ SES was assessed per zip code via a log composite of different measures, e.g. income, value of housing unit, education and individuals  in professional positions. | ++++ Individuals included had to be free of AF at baseline. | ++ They adjusted for all baseline differences, age, sex and comorbidities. Unadjusted results were not available. | +++ The variables were extracted from electronic  Medical records (EMR) system. | +++ They used an ECG/EMG database and identified all incidents of AF during the period 2000-2013. | + Mean follow up time was 3.2 years. They calculated hazard ratios but there was no information about how many that was lost to follow up. |  |
| Mattioli et al, 2005 | + (Case control study).  Cases were 116 patients hospitalized with lone atrial fibrillation. Controls were 116 age- and sex-matched  control subjects, healthy outpatient volunteers. Rated as high risk of bias due small sample size, no information about when or where (except that they were hospitalizes). | ++ SES was defined by education and income (from self-administered questionnaire). | + Case-control study where cases had AF and controls did not have AF. Hence, AF was present at start. | ++ Controls were age and sex matched. | ++ Information about other covariates such as sex, age, alcohol and coffee consumption were  assessed by a self-administered questionnaire. | + The diagnosis of AF was confirmed by ECG. However, they do not explain the tables they present the results in. It is difficult to understand how they have calculated the results, and what table to look at. | + Case control study - not relevant. |  |
| Murphy et al, 2007 | +++ The study population consisted of 362 155 patients from 55 primary care practices in Scotland. The study was recruited during 1 April 2001 to 31 March 2002. All ages were included. | ++++ SES was defined by Carstairs  deprivation category: One (least deprived) to five (most  deprived). | + Cross-sectional study – AF was present from start. | +++ They adjusted for age and sex. Unadjusted results were also available. | +++ Information about sex and age were collected from continuous  morbidity recording (CMR) from general practices. |  |  |  |
| Frewen et al. 2013 | ++++ The study population consisted of a population sample of 4890 people aged >50 years  living in the Republic of Ireland. They were recruited as  part of The Irish longitudinal study on ageing. 118 cases of AF were identified. Data was collected between July 2009 and June 2011. | +++ Education was assessed using computer-assisted  personal interviewing. | + Exposures and outcomes are measured during the same timeframe; AF was present from start. However, education is normally fixed early in life. | +++ They adjusted for age, sex and co-morbidities (cardiovascular disease, stroke). Unadjusted results were not available. | +++ Prognostic factors were collected by computer-assisted  personal interviewing, a self-completion  questionnaire and a physical health assessment. | ++++ AF was confirmed by 10-miunte ECGs. | + Cross sectional analysis. However, 8175 participants were originally recruited to the study, but only 4890 underwent ECG and were included as the study population in the cross sectional analysis. |  |
| De Bacquer et al, 2000 | ++ The study population consisted of 47 358 men and women participating in  four large Belgian epidemiological studies from 1970-2000. Age; 25-74 years. | +++ SES was assessed by employment  status (by comparing subjects  in regular employment with those not in regular  employment). It is not clear how this was obtained, but probably by questionnaire. | + Cross-sectional study– exposures and outcomes are measured during the same timeframe; AF was present from start. | ++ They adjusted for  lifestyle characteristics (Coronary heart disease, hyperlipidaemia  hypertension, region, smoking  obesity, age and study (participants were from four different studies). Unadjusted results were not available. | ++ Prognostic factors were obtained from data derived from the four  large epidemiological studies. This included self  administered questionnaires, clinical examination,  and standardised ECG. | ++++  AF was defined by ECGs read by two trained cardiologists. | + Cross-sectional study – not relevant. |  |
| Chien et al. 2010 | +++ The study population consisted of 1703 men and 1899 women from the town Chin-Shan 30 km. north of Taiwan. The study started in 1990 where baseline characteristics were obtained. Age of participants w ≥35 years. | ++ SES was defined by job status and education. It is unclear how this was obtained but it is possible that it was by interview questionnaire. | + Cross-sectional analysis– exposures and outcomes are measured during the same timeframe; AF was present from start. | + No adjustment for prognostic factors. | ++ Although there was no adjustment for prognostic factors, they were descriptively presented and obtained by interview questionnaires. | ++ AF was confirmed by 12-lead ECG. However, number of cases were very small (38), making in difficult to compare them with controls. | + Cross-sectional study – not relevant. | The study is a cohort-study with the aim of investigating the risk of stroke, but baseline characteristic included information about AF and SES. |
| Ramkumar et al, 2017 | ++The study population consisted of 204 participants from the community were followed up for incident AF. All were ≥65 years with 1 or more risk factor(e.g. hypertension, diabetes mellitus). | ++ SES was based on postcode (index of advantage/ disadvantage (IAD), index of education/  occupation (IEO) and index of economic resources (IER)) whereby a higher score indicates more advantaged areas | ++ All patients where most likely AF-free at the beginning,. However, no there was no clear information about this. | + No information about adjusting. | + No information about how other variables were collected. | ++ During follow-up, a 12 lead ECG during clinics or using a single lead portable ECG monitoring device(which was used to record 60 sec ECG tracings 5 times/day for one week. | ++ Participants were followed up for incident AF after approximately 12 months. | Only conference abstract |
| Soliman et al, 2017 | +++ This study population consist of 8,812 participants (mean age 58.1 ± 7.8 years; 63.2%; women; 43.2% black) with data on employment status who were enrolled in the REasons for Geographic And Racial Differences in Stroke study between 2003 and 2007. | ++ SES was based on employment and this was assessed with questionnaire. | +++ Cross sectional study – AF was determined at baseline | ++ They adjusted for e.g. sex, age and comorbidities. Unadjusted results not available. | +++Information about education and income were collected using telephone interview,  in-home evaluation, or self-administered questionnaires. | ++ AF was identified in study participants at baseline by the scheduled ECG and also from self-reported history of a physician diagnosis during the computer-assisted telephone interview surveys |  |  |

**Question 8 “Were co-interventions similar between groups?”**

In this study, “question 8” is omitted from this review because we only included observational studies. In these observational studies, investigators observe the natural relationship between variables and outcome and interventions are rarely made on the participants (other variables associated to outcome are considered in “Question 4”.)

**\***When the search was performed, only conference abstract was available. In 2017, the article was available and risk of bias is based on this.

**The primary aim of each study**

Zöller et al., 2013 The primary aim of this study was to determine whether there is an association between neighbourhood deprivation and hospitalization for AF.

Misialek et al., 2014 The primary aim of this study was to examine the interplay among socioeconomic status, sex, and race with the risk of atrial fibrillation (AF).

Conen et al., 2011 The primary aim of this study was to examine whether the race difference in AF was a result of socioeconomic influences.

Christensen et al., 2016 The primary aim of this study was to quantify and compare the level of educational inequality across different cardiovascular diagnose, including AF.

Shulman et al., 2017 The primary aim of this study was to investigate if SES could be an explanatory factor for the “racial paradox.”

Mattioli et al., 2005 The primary aims of this study was designed to establish the relationship between personality factors, socio-economic factors and acute life stress with development, spontaneous cardioversion and recurrences of acute lone atrial fibrillation.

Murphy et al., 2007 The primary aim of this study was to examine the epidemiology, primary care burden and treatment of atrial fibrillation (AF).

Frewen et al., 2013 The primary aims of this study were to investigate the prevalence of atrial fibrillation (AF), treatment rates of AF and the factors underlying awareness and treatment, in a large nationally representative study.

De Bacquer et al., 2000 The primary aim of this study was to obtain accurate estimates of the prevalence of ECG abnormalities in the general population and to describe them in relation to age, sex, and some lifestyle related factors.

Chien et al. 2010. The primary aim of this study was to investigate the prevalence of atrial fibrillation (AF), incidence and the risk of stroke and all-cause death among ethnic Chinese.

Ramkumar et al, 2017: The primary aim of this study was to examine “if low socio-economic status was associated with incident AF, independent of risk factors and cardiac function”

Soliman et al, 2017: The primary aim of this study was to “examine if involuntary unemployment increases the risk of AF”

**Objective 2: The association between SES and the risk of outcomes due to AF**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Authors** | **Was selection of exposed and non-exposed  cohorts drawn from the same population?** | **Can we be confident in the assessment of exposure?** | **Can we be confident that the outcome of interest was not present at the start of the study?** | **Did the study match exposed and non-exposed for all variables that are associated with the outcome of interest or did the statistical analysis adjust for these prognostic variables** | **Can we be confident in the assessment of the presence or absence of prognostic factors?** | **Can we be confident in the assessment of outcome?** | **Was the follow-up of the cohorts adequate?** | | **Were co-interventions similar between groups?\*** | | **Other?** | |
| Ertaş et al, 2012 | +++ The study population consisted of 325 Turkish AF-patients visiting the outpatient clinic between September  2008 and October 2009. Mean age was 65 +/- 10. | ++++ The income level (exposure) was based on the minimum  wage during the years the study was conducted.This information was most likely obtained by interview. | ++ Cross sectional study – outcome (warfarin use) was present from the start of the study. However,  they probably identified warfarin-use after identifying AF-patients. | + They used “multivariate regression analysis” but they do not specify what they adjusted for. Most likely, the variables they adjust for is age, sex and the comorbidities they mention in the article (e.g. stroke e and hypertension). Unadjusted results were not available. | +++ The presents of prognostic factors were assessed from the medical records and the patient histories. | +++ Self reported. Patients were asked about  any antiaggregant (aspirin) and/or anticoagulant  (warfarin) treatments. | + Cross sectional study -  Patients were evaluated in a single visit and  no follow-up visits were conducted. | |  | |  | |
| Doucet et al, 2008 | ++ The study population consisted of  209 inpatients (women 60.8%), with chronic AF. They were included between January 2004 and April 2005. Mean age was 84.7 ± 7 years. | ++ Information about “social isolation” were  collected during the hospitalization from the physician  that took the decision for antithrombotic treatment. | + VKA and warfarin was present at start of the study – they identified “exposure” (risk factors) after the patients were distributed into two groups (anticoagulant or aspirin). | + No adjustment or matching. | ++ Data were  collected during the hospitalization from the physician  who took the decision for antithrombotic treatment. | ++ During hospitalization the decision of antithrombotic  treatment was VKA for 102 of 209 patients (48.8%)  (VKA group) and aspirin for 107 of 209 patients (51.2%)  (ASA group). This was determined in the beginning of the study. | ++ During the post-hospital follow-up,  data were collected 3 months later by phone from  the general practitioner. They identified patients falls,  stroke events, change of  antithrombotic drug, hospitalizations and deaths. | |  | |  | |
| Carlsson et al, 2015 | ++++  The study population consisted of men and women who visited any of the 75 primary health care centers (PHCCs) in Sweden (mainly in Stockholm County)  between  2001 and 2008 (n=1 098 420). A subpopulation of 12283 AF-patients were included in this study. | ++++ Neighbourhood deprivation index was determined using data from “Small Area Market Statistics”  The index was derived from the following four variables:  educational status, income  employment  and receipt of social welfare. | ++ Cross sectional study – outcome, population and exposure were present at the same time. However, outcome (the use of warfarin and aspirin) was determined after the AF population and SES was identified. | ++++ They adjusted for age, socio-economic factors and comorbidities such as hypertension and diabetes. Unadjusted results were also available. | ++++ Patient data were from 75 primary health care centers (PHCCs) and were cross-referenced to national Swedish population-based  Registers. | ++++ Prescribed Warfarin, ASA and statins were registered. | ++ Although it is a cross sectional analysis, the study was conducted over a time period:  Moves to neighbourhoods with  different SES were adjusted for. | |  | |  | |
| Murphy et al. 2007 | ++++ The study population was 3135 patients with AF. The AF-patients were a subpopulation of a population drawn from 55 primary care practices (362 155 patients). All AF-patients were identified between 1 April 2001 and 31 March 2002. | +++ Post codes of residence were used to assign a Carstairs deprivation category from one (least deprived) to five (most deprived to each individual). | ++ Cross sectional study – the outcome (treatment with warfarin) was present at start of the study. However, warfarin treatment was evaluated after the AF population was determined. | ++ They adjusted for age, sex and practice. Unadjusted results were not available. | +++ Other prognostic factors were registered in CMR-scheme with a GP. | ++ All drug treatment was registered in CMR-scheme with a GP. However, they report their results as “Relative risk” in their table but “odds” in their text about statistical analysis. | + Cross sectional study – not relevant. | |  | |  | |
| DeWilde et al. 2006 | ++++  The study population consisted of 12267 patients >35 years old with AF in 2003. They were drawn from 131 general practices  contributing to the DIN-LINK database. | +++ Exposure (SES) was “ACORN”, “A Classification of Residential  Neighbourhoods: A five-level classification from ‘‘wealthy achievers’’ through to ‘‘hard pressed’’. | ++ Cross sectional study – Outcome (OAC treatment) was present from the beginning of the study. However, it was determined after the AF population was determined. | +++ Relevant risk factors such as sex. age, drugs and comorbidity e.g. heart failure were adjusted for. Unadjusted results were also available. | +++ Prognostic variables were collected from  the DIN-LINK database. | +++ Prescriptions for oral anticoagulants were identified in the database. | + Cross sectional study – not relevant | |  | |  | |
| Meschia et al. 2010 | ++++ The study population consisted of 432 people with AF. Participants were enrolled during January 2003 to October 2007 Data came from the “REGARDS” study - a national, population-based,  longitudinal study. | +++ Information about education and income were collected using telephone interview,  in-home evaluation, or self-administered questionnaires. | + Awareness of AF (outcome (a)) was assessed *before* AF was diagnosed and  OAC-treatment (outcome (b)) was evaluated at the same time AF was diagnosed (in-home visit). Hence, the outcomes was present at start of the study | ++++ They adjusted for e.g. age, sex insurance status and co-morbidity such as hypertension and diabetes. Unadjusted results were also available | +++ Information about prognostic factors were collected using telephone interview,  in-home evaluation, or self-administered questionnaire. | ++ Aspirin and warfarin treatment was defined “on the basis of an in-home medications inventory.” | + Cross sectional analysis- not relevant. | |  | |  | |
| Frewen et al, 2013 | ++++ The study population consisted of 118 people with AF aged > 50 years living in the Republic of Ireland. They were recruited as  part of The Irish longitudinal study on ageing | +++ Education was assessed using computer-assisted  personal interviewing (CAPI). | ++ Cross sectional study –outcome was present at start. However, the AF population was identified before outcome (“awareness” and “not in treatment”) was evaluated. | +++ Prognostic variables such as age and sex were adjusted for. Unadjusted results were not available. | +++ Prognostic factors were collected by (i) computer-assisted  personal interviewing (CAPI), (ii) a self-completion  questionnaire and (iii) a physical health assessment. | +++ Computer-assisted  personal interviewing were used to identify treatment (OAC). | + Cross sectional study – not relevant. | |  | |  | |
| Desai et al, 2014 | ++++  Study population consisted of 6893 patients in the USA with nonvalvular atrial fibrillation. They used medical and prescription claims data from a large insurer to identify patients with  AF who were prescribed an OAC between 2010 and 2013 (outcome in this study is type of OAC). Mean age 63 years. | +++ Information about median income was obtained by linking zip code of residence with data from “the 2000 United State Census”. | ++ All patients included in the study had to have AF and be  prescribed an oral anticoagulant during the study period. There is no information about excluding patients if they were on OAC treatment (outcome) from the beginning. | +++ They adjusted for prognostic variables such as sex, age, HAS-BLED-score and CHADS2 score.  Unadjusted results were not available. | +++ Prognostic variables were identified using nationwide medical and prescription claims data  from commercial patients covered by Aetna which is a large health  care benefits company. | ++++ Patients had to fulfil a prescription  for warfarin, dabigatran, rivaroxaban, or apixaban  during the study period (they used prescription data). | ++ No information about follow up. However, only patients with all data available were included. | |  | |  | |
| Steinberg et al, 2013 | +++ The study population consisted of 9974 AF- patients enrolled from the  ORBIT-AF Registry between June 2010 and August 2011. 6654 patients received warfarin at baseline. No information about what type of AF it is (valvular/non-valvular). | ++ No specific information about how education level was obtained.  . | ++++ To assess baseline  and follow-up characteristics that may have influenced  dabigatran adoption, they excluded all patients  already taking dabigatran at baseline. | + They report that they use “Multivariable models”, but it is not clear what they include in their model. | +++ Data about prognostic factors were collected with a web-based  case report form from the  patient’s medical record and treating physician. | +++ Information about dabigatran use was obtained from the ORBIT-AF registry - a nationwide registry. | ++++ Patients without follow-up visits at 6  or 12 months (n=670) and those missing data on dabigatran  at follow-up (n=9) were excluded. | |  | |  | |
| Moreno-Arribas et al, 2015 | ++++ The study population was collected by cardiologists,  general practitioners, and internists participated. They recruited 20 consecutive patients each with nonvalvular AF where  16 patients received VKA and 4 NOACs. In total, 1290 patients were included-994 received VKA (77.1%) and 296 NOAC (22.9%). Mean age 73.8+9.4 years. The study was conducted in Spain. | +++ “Education defined as: Cannot read or write, primary school, high school,  vocational training, and college.” There is no specific information about how this was obtained, but probably by interview. | +  Outcome (factors associated with choice of treatment) was there from the beginning. However,  They identified patients in treatment of NOAC and VKA before they analyzed outcome. | ++ They adjusted for e.g. age, drugs and some co-morbidity such as heart failure and diabetes.  Unadjusted results were not available. | +++ Demographic variables were probably obtained by interview; other variables came from e.g. medical treatment data and laboratory data. | +++ Outcome was to analyze prognostic variables, including education, which probably was obtained by interview (Education defined as: Cannot read or write, primary school, high school,  vocational training, and college.) | + No information about loss to follow up. | |  | | Outcome in this study is actually “exposure” (as outcome is “factors (e.g. education)associated with choice of treatment”) | |
| Sholzberg et al, 2016 | ++++ The study population was approximately 35 000 patients with nonvalular AF from Ontario, Canada.  Data came from “Ontario Registered Persons Database.”  > 66 years. | ++++ SES was defined by quintiles according to median neighborhood income. This was available from “the Ontario Registered Persons Database”. | ++++ All patients were initially using warfarin and outcome was prognostic variables associated with switching to a NOAC. | +++ They adjusted for e.g. age, sex, aspirin use and comorbidities such as diabetes and Charlson Comorbidity Index. Unadjusted results were not available. | ++++ Prognostic factors were identified in different databases described in the study. | ++++ They identified patients who switch to NOAC in “The Ontario Drug Benefit Program (ODBP)” database. | ++ They excluded patients who died prior to the end of the study period. Otherwise, no information about loss to follow up. | |  | |  | |
| Zimmerman et al, 2016 | +++ The study population was 4261 AF-patients from a major tertiary referred hospital collected from the Research Patient Data Registry between January 2013 and June 2014.  No information about what type of AF it is (valvular/non-valvular). | ++ SES was determined by home ZIP code as marker of family income. It is not clear how this was obtained. | ++  Prescription of NOAC was present from start of the study. However,  patients with AF where identified regardless of OAC-treatment. Secondly they evaluated percentages of NOAC prescriptions and variables associate with this. | + No adjustment. | +++ Prognostic variables where drawn from the Research Patient Data Registry. | ++ Outcome was prescription of NOAC and variables associated with it, in this case family income. | + Cross sectional analysis, not relevant. | |  | | Only conference abstract. | |
| Keshishian et al, 2016 | ++ 11 051 patients with AF who were prescribed NOAC or Warfarin were included from a national Medicare database between January 2013 to 31 December 2013. Age >65 years | + No information about how information about SES was obtained. | ++  Cross sectional study – Outcome (OAC treatment) and exposure (SES) was both present from the beginning of the study. | + No information about what they adjust for. | ++ Other prognostic variables were most likely obtained from the Medicare database. | +++  Information about OAC treatment were obtained from the Medicare database. | + Cross sectional analysis – not relevant | |  | | Only conference abstract | |
| Choudhry et al, 2008 | ++ The population consisted of three cohorts from the USA and Canada with AF patients (>20 000 participants) (>66 years). The study started 01 January 1998 and continued until December 31,  2004, using population-based cohorts in the US and Canada. AF- patients were identified by using hospital  discharge code (ICD-9 code 427.3). | + The Ontario cohort was divided into low and  high SES. Low SES in Ontario was defined as annual  income of less than $16,018. Patients  in Pennsylvania were more similar to the low SES than the  non-low SES Ontario cohort. (Rated as high risk of bias due to very rough division of SES) | +++ The use of rate controlling medications were measured 2 years before the trial started and 2 years after the trial was published. Changes in the use of rhythm controlling medications were measured as outcome. | +  They only adjusted for “pre-existing trends” when evaluating the magnitude of the change between the cohorts. They did not adjust for e.g. contradictions or indications. | +++ Hospital discharge abstracts, physician service  claims, and prescription drug claims during the year prior  to cohort entry were used to identify co-morbidity. | +++ They divided divided each year of the study period into four 3-  month quarters for a total of 28 intervals. During  each interval, they identified every prescription for  rhythm control agents and rate control agent. Prescriptions were identified in the database. | ++  They do not mention how many was lost to follow up. However, the number of patients before and after the AFFIRM trial was not the same, although that was not necessarily the aim. | |  | |  | |
| Kummer et al, 2015 | ++ The study population consisted of 397612 AF-patients at nonfederal acute care hospitals in California, Florida and New York between 2005 and 2011. The patients had different health insurance type and they are therefore rated as high risk of bias. | ++ Household income, no information about how this was obtained. | ++++ They excluded all patients whose first visit involved an ablation procedure. | +++ They adjusted for insurance type, age, sex and comorbidities such as hypertension, diabetes and heart failure.  Unadjusted results were not available. | ++ Data were obtained from emergency department visits. However, it is unclear if all data, e.g. demographic characteristics also were available here. | +++ AF-ablation was identified with code 37.34.To avoid false-positive procedure code (ablation for ventricular tachycardia) they looked at people hospitalized with a primary discharge diagnosis og AF and no ventricular tachycardia. This had a sensitivity of 96 % and specificity of 100 %. | ++ They calculate hazard ratios, but they could not rule out loss to follow-up. | | . | |  | |
| Al-Hijji et al, 2015 | ++++ The study population consisted of 8648 privately insured AF-patients who underwent catheter ablation for AF between January  1, 2004, and September 30, 2014. Median age was 61 +/- 54-65. | ++++ Household income was obtained from “the Optum Labs Data  Warehouse” database. | ++++ 8,648  AF-patients underwent catheter  ablation for AF and were included at baseline. 1,263 patients underwent **repeat ablation** (outcome), after a median follow up of 1.1 years. | +++ They adjusted for e.g. age, gender,  race, baseline  antiarrhythmic drug use, CHA2DS2 -VASc and Charlson comorbidity index score  or individual comorbidities.  Unadjusted prevalence rates of repeat ablation stratified by income were reported. | ++++ Prognostic information was obtained from “the Optum Labs Data  Warehouse” database. | ++++ They identified all patients with repeat ablation defined as ICD-9 procedure code 37.34 and/or Current Procedural  Terminology, Version 4 procedure codes 93651,  93656, and 93657. | ++ They calculate hazard ratios, but no information about loss to follow up. | | . | |  | |
| McCabe et al, 2008 | ++++ The study population consisted of 100 AF- patients aged >18 years  hospitalized in medical cardiovascular  progressive care units within a large Midwestern  medical center. All data collection occurred between  July 2004 and March 2005. | ++ Participants were interviewed by telephone and asked about their education. They were grouped into three categories. | ++ Cross sectional study –outcome was present at start. However, the AF-patients were identified 2 weeks before they were interviewed about knowledge about of AF. | + No information about adjusting for prognostic variables. | + Only age was assessed as another prognostic factor for knowledge about AF. | ++++ Telephone interview. Assessment of the patient’s knowledge and self-management  behaviours were consistent with the ICSI  guidelines for education regarding AF self-management  and anticoagulation. | + Cross sectional study – not relevant. | |  | |  | |
| Reading et al, 2017 | ++ The study population consisted of 12 517 AF patients, all members in an integrated healthcare system. Most common age: 71-77 years old | ++ Education and household income were defined as SES (exposure). The information was obtained from questionnaire. | ++ Cross sectional study – outcome was present at start of the study. However, the AF-patients were identified before awareness of AF. | +++ They adjusted for e.g. sex, age and several chronic comorbidities. | + They were probably evaluated with interview/questionnaires but there is no specific information about this. | + Self-reported awareness of AF was defined by a positive response to the question, "Have you ever been told by a doctor or other health professional that you have a heart rhythm problem called atrial fibrillation or atrial flutter?" They did not specify numbers in the results and are therefor rated as high risk of bias. | Cross sectional study – not relevant. | |  | | Awareness of AF due to SES was not the primary aim of this study and therefore not “primary analysis” | |
|  |
| Hernandez et al, 2015 | ++ The study population consisted of 1147 men and women with AF from eight European countries. Mean age was 66 years +/- 13 years. | +++ Information about education was obtained by the survey questionnaire. | ++  Cross sectional study – outcome was present at start of the study. However Knowledge and deviations in INR was assessed after identification of the AF-population. | +  No adjustments were done. | +++ All information was obtained from the survey questionnaire, but no adjustments were done. | **++++ Knowledge about OAC-treatment was assessed by a questionnaire in their native language**. The questionnaire was tested in  advance in clinical practice to obviate misinterpretations by participating  patients.  ++ **Bleeding risk:** Was also assessed with questionnaire. | + Not relevant. Cross-sectional analysis. | |  | |  | |
| Cressman et al, 2015 | ++++ The study population consisted of 66 742 men and women with AF. They commenced warfarin  therapy between April 1, 1997, and November 30, 2011,  in Ontario, Canada. Age was >66 years | ++++ Neighbourhood-level income quintiles were used as a measure of socioeconomic status. Information about this was obtained from Statistics Canada Postal Code Conversion File. | +++ The primary outcome was an emergency department visit  or hospital admission for haemorrhage. Most patients were probably free of haemorrhage at start of the study, but there are no specific information about excluding patients if they had. | ++++ They adjusted for e.g. sex, age, potential interacting drugs (e.g. antiplatelet agents) and comorbidities such as liver disease and kidney disease. Unadjusted results were also available. | ++++ Basic demographic  information was acquired from the Ontario  Health Insurance Plan (OHIP) Registered Persons Database,  Insurance Co-morbidity was collected in disease-specific databases and from hospital admissions. | ++++ Hospitalization with haemorrhage (ICD-10 codes for intracranial haemorrhage, gastrointestinal haemorrhage or other). | +++ Median follow-up time was 369 days. They calculated hazard ratios. However, there was no specific information about how many was lost to follow up.  . | |  | |  | |
| Schauer et al, 2005 | ++++ The study population consisted of 25200 Ohio Medicaid recipients with AF. Of these, 9345 patients received warfarin between 1997 and 2002. Data were collected using the Ohio Medicaid administrative claims  database. | ++ They identified psychosocial features of interest from the database  using ICD-9-CM codes. Social risk factors included e.g. lack  of housing (V60.0), inadequate housing or  persons living alone (V60.3). | ++++ Retrospective cohort study. Patients were initially excluded if they had prior strokes or haemorrhage. | +++ They adjusted for “significant” variables from unadjusted model such as hypertension and diabetes. Unadjusted results were also available. | +++ Information about prognostic factors were  from the Ohio Medicaid administrative claims  database. | ++++ They identified adverse events based on ICD-9-CM. The primary adverse events considered  were stroke ,intracranial hemorrhage  and gastrointestinal  bleeding. | + No information about loss to follow up. | |  | |  | |
| Dlott et al, 2014 | ++++  The study population consisted of 138 319 AF patients with INR-data for more than >2 months.  Data was collected from a national database in the study period from 1. January 2007 to December 31 2008. Mean age was 74 years. | ++++ Median income was obtained from “the 2007 US Census” based on the patient’s  home ZIP code. | +++ Patients with an AF-diagnosis were identified first, then Patients with ≥2 consecutive  months of INR test results coupled with >1 INR value of >1.2 during  a 12-month period were registered. | + No information about adjustment or matching. | +++  The explanatory variables included were (e.g. age, sex, length  of testing period, number of referred patients per provider) available in the database. | ++++ TTR - Time in therapeutic range measured by INR (target INR 2.0-3.0): All Quest Diagnostics laboratories (>100) in the United States use a  standard thromboplastin reagent to measure INR. | + The average length of follow-up  was 8.8 person-months. Otherwise, no information about loss to follow up. | |  | |  | |
| Bernaitis et al, 2016 | ++++ The study population was 3692 AF-patients from “Sullivan Nicolaides Pathology”, a major pathology practice which offers warfarin care program in Australia. They were enrolled to the study in September 2014. Patients lived in both Queensland and Northern New South Wales. | ++ SES was defined by indexes with the lowest group given a  decile of 1 up to the highest 10%. They do not specify how the socioeconomic indexes are determined (e.g. based on education or income…) | +++ Retrospective cohort study, patients and INR values were obtained before calculation of Time in Therapeutic range. | + No adjustments or matching were done. | +++ Prognostic variables where collected from Sullivan Nicolaides Pathology at baseline. | ++++ They used INR results and test dates to calculate TTR by using the Rosendaal method. | ++ Patients with less than 2 INR tests and time of treatment less than 30 days were excluded. Otherwise, no information about lost to follow-up. | |  | |  | |
| Goli et al, 2012 | ++++ The study population consisted of 300 outpatients with AF. They were recruited  through the electrophysiology clinics at the  University of North Carolina at Chapel Hill between September 08 and July 2011.Mean age 61.7 (+/-13.5) | +++ To assess level of  education (SES), participants were asked the question,  “What is the highest level of school that you  have completed?” | ++ Cross sectional study – outcome (Quality of life) was present at start of the study. However, AF-patients were identified before the interview about Quality of life. | +++ They adjusted for e.g. sex, age and comorbidity such as heart failure, anxiety and depression. Unadjusted results were not available. | ++++ Age, gender, and medication history were  obtained through electronic chart review. Ethnicity,  employment status, living status, and  medical comorbidities were determined by  questionnaire. | +++ To assess AF symptom severity,  they utilized the Atrial Fibrillation Severity Scale  (AFSS). It is a disease-specific  scale developed from qualitative interviews with  symptomatic AF patients and clinicians experienced  in the field. | +  Not relevant. Cross-sectional analysis. | |  | |  | |
| Ling et al, 2014 | ++ The study population consisted of 7243 AF-patients. Patients were > 18 years old and from centres in 7 European countries.  They were enrolled from “the PREFER in AF registry”. | ++ Uncertain how information about SES (occupation) was obtained. | ++ Cross sectional study – outcome was present at start of the study. However, the AF-patients were identified before the interview about Quality of life. | + No adjustment or matching in relation to our research question. | ++ Sociodemographic data, co-morbidities, AF-characteristics and therapies were evaluated. This was obtained with “ baseline visit”; probably by obtained by interview/questionnaire. | +++ An overall  measure of quality of life derived from the EQ5D-5L health questionnaire. | +  Not relevant. Cross-sectional analysis. | |  | | Only conference abstract . | |
| Ball et al, 2013 | +++ The study population consisted of 260 non-demented AF-patients from three tertiary referral hospitals within Australia. Mean age was 72 +/-11 years. | ++ Information about education was collected at baseline. They do not specify how it is obtained but most likely by interview. | + They write that it is a prospective study, but outcome (MCI measures by using the MOCA score) was measured at baseline at the same time SES was measured. Hence, this is a cross sectional analysis. | ++  Sex and age adjusted. Unadjusted results were not available. | ++ Prognostic factors such as sex, age, co-morbidity were obtained.  They do not specify how this information is obtained but most likely by interview/questionnaires. | +++ They measured cognitive function  using the Montreal Cognitive Assessment (MoCA) tool that  was designed to be sensitive and specific to MCI. | +  Not relevant. Cross-sectional analysis. | |  | |  | |
| Wändell and et al, 2016 | ++++ The study population included 12 283 adult men and women diagnosed with AF in 75 primary  care centers in Sweden between 2001 and 2007. | ++++ The neighborhood SES index was based on education, income and receipt of social welfare. They also used education as an indicator of SES. The information was obtained from Swedish databases. | ++ Cross sectional study –outcome (anxiety and depression) were present at start of the study. However, they were identified after the AF-population was identified. | ++++ Thy adjusted for e.g. age, marital status and comorbidities such as heart failure, hypertension and diabetes. Unadjusted prevalence of depression and anxiety stratified by SES are reported, but not how SES is distributed in the rest of the AF patients. | ++++ Prognostic variables were collected from Swedish databases, which were described shortly in the paper. | +++ Depression and anxiety (and related diagnosis, e.g. dysthymia) were identified with ICD-10 codes. Depression: F32–F34, F38–  F39 and anxiety: F40–F41. | + Cross sectional analysis – not relevant. However, they adjusted for changes in SES and diagnosis of anxiety and depression during follow up. (The follow up period was for another purpose). | |  | |  | |
| Kargoli et al\*\*, 2017 | ++ The study population consisted of 4503 AF-patients, >18 years, admitted to Montefiore Medical Center between 1/1/2000 and 1/1/2010. | ++++ SES was determined using New York City Department of Health Standardized  Score (based on household income, value of housing units, net rental income, household occupations and educational  level). | +++ They retrospective identified all patients with AF and followed them until death. | +++ They adjusted for e.g. age, sex and comorbidity such as diabetes, heart failure and hypertension. Unadjusted results were available in percentages but not OR. | ++++ Prognostic variables were extracted  from the electronic medical records | ++++ Outcome (all-cause mortality) was obtained from death notification if  occurring during hospitalization or from the Social Security  Death Index. | +  Mean follow up was 4.5 years, but there was no information about loss to follow up. | |  | |  | |
| Akerkar et al, 2017\*\* | ++++ The study population was 42432 men and women hospitalized with AF between 2008 and 2012 in Norway. Mean age 70 (SD 13) years. | ++++ Information about education was provided by “Statistics”. Education was stratified into 3  classes; low (up to 10 years of compulsory education), medium (high school or vocational school) and high  (college/university). | +++ The included participants were most likely alive when included in the study, but no information about this. | +++ They adjusted for age, gender and some comorbidity such as diabetes, chornic renal failure and neoplasm. Unadjusted results were not available in the abstract. | +++ Variables were obtained from Norwegian nationwide registers. | ++++ Information about mortality was obtained from the “Cause of death  Registry” (and information about education came from “Statistics”) | + They calculated hazard ratios, but there was no information how many was lost to follow up. | |  | |  | |
| Wändell et al, 2016 | ++++ The study population included 12 283 adult men and women diagnosed with AF in 75 primary care centers between Sweden from 2001 and 2007. >45 years. | ++++ The neighborhood SES index was based on education, income and receipt of social welfare. | +++ The included participants were most likely alive when included in the study, but no information about this. | ++++ They adjusted for e.g. age, marital status and comorbidities such as hypertension, heart failure and diabetes. Unadjusted results were also available**.** | ++++ Prognostic variables were collected from Swedish databases which are described shortly in the paper, | ++++ Information about mortality was obtained from the “Cause of death  Registry”. | ++++ A few emigrants (less than 1 %) from Sweden to other countries were lost to follow up. | |  | |  | |
| Guhl et al, 2012 | ++ The study population consisted of 201 individuals with AF (age 71±10, 63% men) | +++ Annual income was measured as <$19,000; $20,000-$49,999; $50,000-$99,999; >$100,000 and education was measured as: HS/Vocational; some college; bachelor's; graduate. | ++ No, cross sectional study . | +They did not adjust for prognostic variables. | + Unclear how | ++ They used the Atrial Fibrillation Effect on QualiTy of Life (AFEQT) instrument to obtain composite and domain scores | | + Cross sectional study | |  | Only conference abstract |
| Hagengaard et al, 2017 | ++ the study population consisted of all patients with an incident AF hospitalization in Denmark during 2005-2014. Age? | +++  Patient educational level was assessed according to the International Standard Classification of Education (ISCED) groups: lower, 0-2 medium, and higher, 6-8- | +++ Cohort study – they examined 1-year mortality – yes patients were not dead when included. | +++ They adjusted for CHADS -VASc-score, chronic obstructive pulmonary disease, rate- and rhythm- controlling drugs and patient civil status | ++ Identified in Danish registers | + Information about how mortality was identified not available | | ++ Patients were followed up after 1 year. | |  | Only conference abstract |
| Kupsky et al, 2017 | ++ The study population consisted of all patients with non-valvular AF requiring long term anticoagulation who underwent LAA exclusion with Watchman device between From June 2015 to December 2016 were evaluated. A control group were also included, in total 201 patients with non-valvular AF. | ++ Socioeconomic status was defined as median income. | + Outcome was present at the start of the study (case-control study) | + No information about adjusting | + Unclear | + Unclear how information about prognostic variables were obtained. | | + NO follow up, case-control study | |  | Only conference abstract. |
| Lane et al, 2017 | +++ The study population consisted of 936 adult patients (mean (SD) age 54.3 (16.6) years; 37.2% female) with AF on OACs in the USA, Canada, Germany, France and Japan. | ++ Education were grouped as follows: no school-leaving certificate (low), high school diploma, community college and university/technical college. | ++ The study population was most likely identified before the questionnaire was performed | + No information about adjusting | + No information about prescence or absence of prognostic factors or how they was obatined | ++ Knowledge about AF perception, concern about stroke, OAC treatment preferences and adherence was obtained with questionnaires. | | + No follow up | |  | Only conference abstract |
| Steinberg et al, 2017 | +++ The study population consisted of 4,670 patients with new-onset AF receiving  OAC at baseline | ++ Education were grouped as follows: some school, high school graduate, college graduate, and postgraduate. | ++ OAC treatment was initiated after the AF diagnoses, however this was approximately at the same time. | +They adjusted for factors associated with selection of NOAC versus warfarin, e.g. bleeding risk og renal function. | +++ Data about prognostic factors were collected with a web-based  case report form from the  patient’s medical record and treating physician. | +++ Information about initiation of OAC were obtained from the medical records. | | + No information about loss to follow up | |  |  |
| Rodríguez-Bernal et al, 2017 | +++ The study population consisted of all patients with NVAF (n=21,881) who had a first prescription of OAC from November 2011 to February 2014, Valencia region, Spain | ++ SES was defined with income and was split into 3 groups; low, middle and high. | ++ AF was probably diagnosed before OAC treatment, but it was probably initiated shortly after. | ++ They adjusted for e.g. age, sex and comorbidities. Unadjusted results were not available. | +++ Information about prognostic variables came from different registers. | +++ Information about prescription of OAC was obtained from the “ABUCASIS system  “ | | ++ Patients with e.g. temporary residents in the area were excluded due to limitations of follow up | |  |  |
| Suzuki et al, 2017 | ++ The study population consisted of 378 outpatients with NVAF, mean age 69 +/- 12 | ++ SES was defined by employment (employed/unemployed) or by living alone/not living alone. | +++Questionnaire about adherence was conducted after AF-patients were identified. | + It is unclear what and why they adjusted for. | + It is unclear how information about prognostic factors were obtained. | ++ Information about adherence was self-reported, using a “Siegal scale” | | + No information about loss to follow up | |  |  |
| Vlacho et al, 2017 | +++ The study population consisted of 15,075 people with new diagnosis  of atrial fibrillation who initiated treatment with dabigatran or  VKA spanning 2011–2013. | +++ They used a SES-index base don followin: Manual workers, unemployment, eventual workers, insufficient education overall and young people | +++ Information about OAC-treatment was collected after the diagnosis of AF. | +++ They adjusted for factors associated with OAC treatment | +++ Information about prognostic variables were obtained from databases. | ++++ Information about OAC treatment was obtained from registers using ATC-codes. | | + No information about loss to follow up | |  |  |
| Basaran et al, 2017 | ++ The study population consisted of 6273 patients with non-valvular AF. 3312 (52.8%) patients were treated in tertiary hositals and 2961 (47.2%) patients were treated  in secondary hospitals. | ++  Educational status included Illiterate primary school, secondary school, high school and  university. There is no specific information about how this was obtained. | ++ Cross sectional analysis – they were most likely treated from the beginning of the study. However, outcome was determined after the AF population was identified. | ++ They calculated CHA2DS2VASc and HAS-BLED scores. | ++ Information about prognostic variables were obtained from the RAMSES study, not further specified. | ++ Information about OAC treatment was obtained from the RAMSES study, not further specified. | | + No information about loss to follow up | |  |  |
|  |  |  |  |  |  |  |  | |  | |  | |

**\*Were co-interventions similar between groups?**

In this study, “question 8” is omitted from this review because we only included observational studies. In these observational studies, investigators observe the natural relationship between variables and outcome and interventions are rarely made on the participants (other variables associated to outcome are considered in “Question 4”).  
**\*\***Only abstract was available when the search was performed, we later replaced it with the full article when it was published

# **The primary aim of each study**

Ertaş et al. 2012: The primary aim of this study was “to investigate the predictors of warfarin use in patients with non-valvular AF”.

Doucet et al. 2008 The primary aim of this study was “to determine the main parameters taken into account for the decision of antithrombotic treatment of AF by vitamin K antagonist or aspirin”.

Carlsson et al. 2015. The primary aim of this study was “to study differences in the prescribing of warfarin, aspirin and statins to patients with AF in socio-economically diverse neighborhoods. They also aimed to explore the effects of neighbourhood deprivation on the relationship between CHADS2 risk score and warfarin prescription”.

Basaran et al., 2016: The primary aim of this study was to investigate oral anticoagulant (OAC) use in patients with NVAF and high risk of stroke.

Murphy et al. 2007: The primary aim of this study was “to examine the epidemiology, primary care burden and treatment of AF”.

DeWilde et al., 2006, The primary aim of this study was ”to examine trends in the prevalence of diagnosed atrial fibrillation (AF), its treatment with oral anticoagulants between 1994 and 2003, and predictors of anticoagulant treatment in 2003”.

Meschia et al., 2010: The primary aims of this study were” to examine predictors of awareness of the diagnosis of AF and treatment with warfarin”.

Frewen et al. 2013: The primary aim of this study were “to investigate the prevalence of AF, treatment rates of AF and the factors underlying awareness and

treatment in a large nationally representative study”.

Desai et al. 2014: The primary aims of this study were “to investegate wheather the availability of NOACs have affected utilization patterns, whether the adoption of the novel anticoagulants in typical practice is consistent with the controlled trials on which their approval was based, or how their use has affected spending for patients and insurers”.

Steinberg et al., 2013: The primary aim of this study were “to (1) describe early patterns of dabigatran use in community practice, (2) identify patient and/or provider factors associated with the use of dabigatran in patients with AF and (3) describe dosing patterns of dabigatran”.

Moreno-Arribas et al. 2015: The primary aim of this study was “to analyze variables associated with prescription of NOAC”.

Sholzberg et al. 2016: The primary aims of this study were “to determine whether older Ontarians who switched from warfarin to dabigatran during this period were more likely to live in wealthier neighborhoods, as compared with those who remained on warfarin. A secondary objective tested whether any identified socioeconomic gradient persisted once dabigatran became available through the public drug program”.

Zimmermann et al., 2016: The primary aim of this study was “to investegate if the decision to prescribe a NOAC might be influenced by nonmedical

factors such as prescriber subspecialty or patient demographics”.

Keshishian et al, 2016: The primary aim of this study was to identify the demographic and socioeconomic predictors associated with non-valvular atrial fibrillation (NVAF) patients that impact initiation of warfarin versus novel oral anticoagulants (NOACs).

Choudhry et al, 2008: The primary aim of this study was to determine the extent to which the AFFIRM trial results have been

adopted into actual practice.

Kummer et al., 2015: The primary aim of this study was “to investigate demographic characteristics of patients undergoing catheter ablation procedure

Al-Hijji et al, 2015: The primary aim of this study was “to examine the predictors and trends of repeat ablation using a large national administrative claims database”.

McCabe et al. 2008: The primary aim of this study was “to describe the self-management knowledge and behaviors of patients with recently detected AF and identify demographic characteristics associated with differences in knowledge scores”.

Reading et al, 2017: The primary aim of this study was to examine the association between health literacy and AF awareness

Hernandez et al. 2015: The primary aim of this study was “to analyse the knowledge about blood thinningmedications relative to gender, age, education, and region of residence in patients with AF”.

Cressman et al., 2015: The primary aim of this study was to examine the extent to which socioeconomic status influences the risk of hemorrhage in older individuals newly commencing warfarin therapy for atrial fibrillation.

Schauer et al., 2005: The aims of this study was “to establish whether psychosocial risk factors for nonadherence, previously identified as negative predictors of warfarin prescribing, are predictors of adverse events for patients with nonvalvular AF receiving warfarin”.

Dlott et al. 2014: The aim of this study was to “was to provide a comprehensive and unbiased assessment of anticoagulation care in the United States by taking advantage of a unique data resource”. They also “examined the relationship of TTR to demographic features, physician case load, geographic region, duration of INR monitoring, and economic status”.

Bernaitis et al, 2016: The primary aim of this study was to “ to determine warfarin control by a pathology practice in Queensland Australia and identify factors

influencing TTR”.

Goli et al. 2012: The primary aim of this study was “to investigate if factors associated with SES and health literacy such as age, race, working status and educational attainment may influence patients’ AF symptoms”.

Ling et al, 2014: The primary aim of this study was “to investigate clinical determinants of quality of life in AF”.

Ball et al, 2013: The primary aim of this study was “to investigate cognitive function in older hospitalized patients with chronic AF”.

Wändell and Carlsson et al., 2016:The primary aim of this study “was to study depression and anxiety in AF patients as risk factors for all-cause mortality in a primary care setting”.

Kargoli et al. 2017: The primary aim of this study was “to examined whether SES predicts all-cause mortality in patients hospitalized with AF”.

Akerkar et al., 2017: The primary aim of this study “was to investigate the association between educational inequalities in the prognosis (mortality) of AF using 5year period data of the patients with cardiovascular disease (CVD) in Norway from 2008 to 2012”.

Wändell et al., 2016: The primary aim of this study “was to study the potential impact of neighbourhood socio-economic status (SES) on all-cause mortality in patients with AF treated in primary care”.  
Guhl et al, 2017: To primary aim of this study was to “examine the association of income and education with HRQoL in a cohort with prevalent AF.”  
Hagengaard et al, 2017: The primary aim of this study was to “investigate the association between patient educational level and 1-year mortality among AF patients.”

Kupsky et al, 2017: The primary aim of this study was to examine “if there were any socioeconomic or racial disparities among patients with atrial fibrillation (AF), at elevated thromboembolic risk, and with contrain- dication to anticoagulation who were undergoing consideration for Watchman.”  
Lane et al, 2017: The primary aim of this study was to “examine the effect of educational level on stroke knowledge, AF perception, concern about stroke, OAC treatment preferences and adherence.”

Steinberg et al, 2017: The primary aim of this study was to ”describe the factors associated with selection of NOACs versus warfarin in patients with new onset AF.”

Rodríguez-Bernal et al, 2017: The primary aim of this study was to “assess patterns of initiation of Vitamin K antagonists (VKA) and non-VKA oral anticoagulants (NOAC) in naive patients with non-valvular atrial fibrillation and the factors associated with starting treatment with NOAC.“

Suzuki et al, 2017: The primary aim of this study was to assess “adherence to medication and risk factors for non-adherence in Japanese NVAF patients who are prescribed anticoagulants”.

Vlacho et al, 2017 The aim primary aim of this study was to ”characterize the profile of patients with non-valvular atrial fibrillation who start an anticoagulant treatment after diagnosis with dabigatran and compare it with those who start with vitamin K antagonists (VKAs)”

# References

References are available in the main article.