Female sex is not associated with worse resuscitation rates after out-of hospital cardiac arrest

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① Purpose

This study aimed at investigating whether female sex was associated with different resuscitation rates.

② Methods

2509 patients suffering EMS-attended OHCA in the greater Copenhagen area 2007-2011 were stratified by sex and outcome of resuscitation attempt. Pre-hospital data were collected according to Utstein guidelines. Comorbidities prior to arrest were obtained from the Danish National Patient Registry. Chance of successful resuscitation was assessed in logistic regression adjusting for sex, age, comorbidity, primary rhythm, witnessed arrest, bystander cardiopulmonary resuscitation and arrest in public. Fig. 1 depicts predicted values derived from a univariate model using age as predictor in the two sexes in the age range of the population (18-101 years).

③ Results

837 patients were women, 34% (n=288) were successfully resuscitated, compared to 1672 men with 42% (n=708) being successfully resuscitated, significantly more than women, p<0.001, table 1. For men as well as women, patients who could not be resuscitated were significantly older; fewer had OHCA in public places, witnessed arrest, bystander CPR and shockable rhythm. In univariate, logistic regression female sex was associated with lower odds of successful resuscitation, OR: 0.71 (0.60-0.85), p<0.001, table 2, but this was not significant when adjusting for confounders. In successfully resuscitated patients, women were on average 5 years older than men and in unsuccessfully resuscitated patients, women were 6 years older than men, but female sex did not interact with age in terms of probability of resuscitation, p=0.78 (fig 1)

④ Conclusion

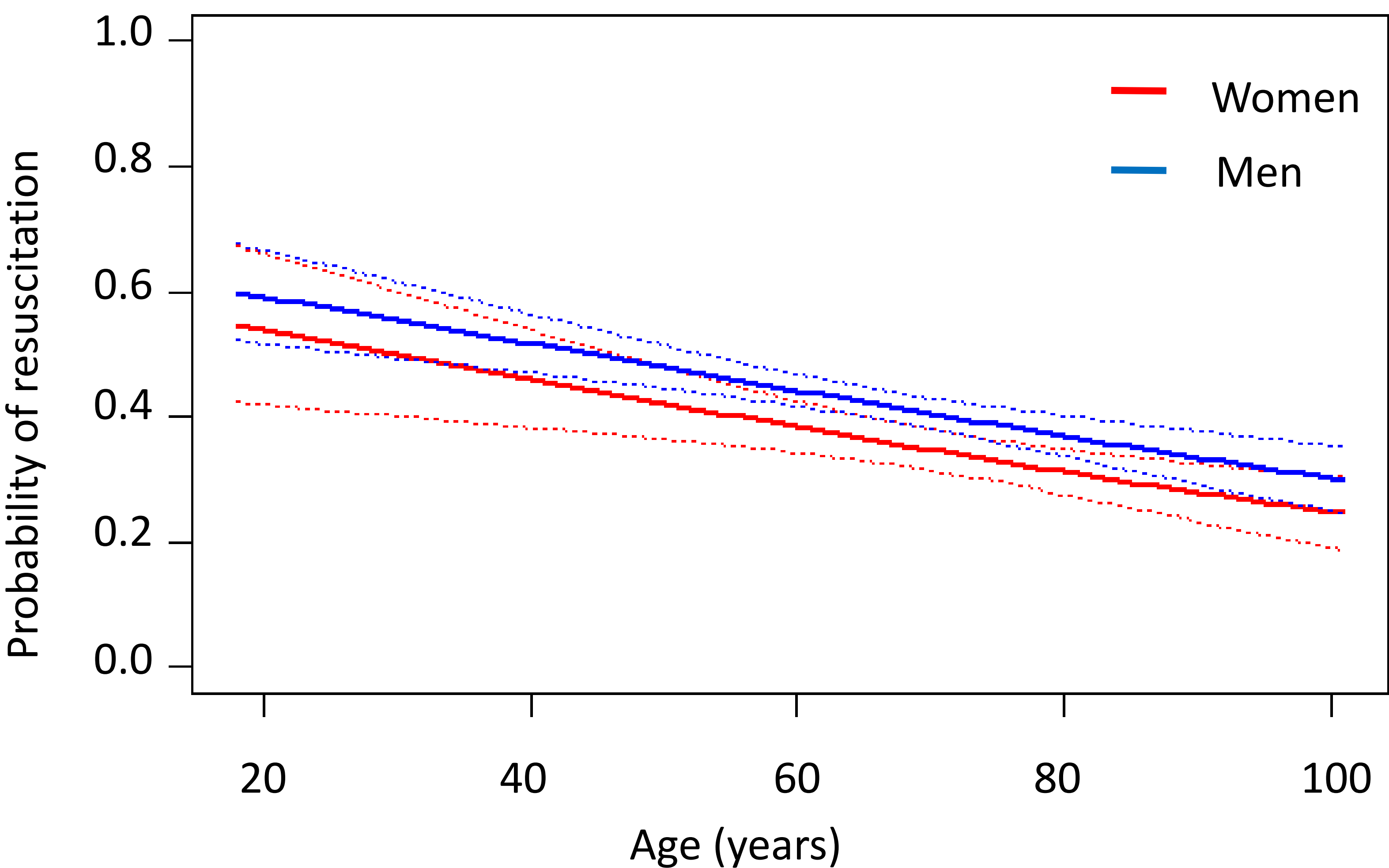More men than women are resuscitated from OHCA, but this difference seem to be explained by factors other than sex

Figure 1: Probability of resuscitation with age in men and women

	Univariate	Model 1	Model 2	Model 3
	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)
Female sex	0.71 (0.60-0.85)	0.77 (0.65- 0.92)	1.00 (0.82-1.21)	1.19 (0.97-1.48)

Table 2: Odds of successful resuscitation in women.
Model 1: Demographic factors: Sex, age and degree of comorbidity.
Model 2: Sex, age, degree of comorbidity and primary rhythm
Model 3: Sex, age, degree of comorbidity, primary rhythm, OHCA location, witnessed arrest, bystander CPR
Abbreviations: CI: Confidence intervals, CPR: Cardiopulmonary resuscitation, OHCA: out-of-hospital cardiac arrest, OR: Odds ratio

	Total population (n=2509)	Successfully Resuscitated Women (n=288)	Successfully Resuscitated Men (n=708)	Unsuccessfully Resuscitated Women (n=549)	Unsuccessfully Resuscitated Men (n=964)
Age (years)	67.3 (57.4-78.9)	68.9 (60.6-80.8)	63.3 (53.5-73.6) *	72.7 (63.7-85.0) *	66.7 (56.6-78.2) ¤
Comorbidity level					
0	1123 (45%)	75 (26%)	285 (40%)	232 (42%)	426 (44%)
1	432 (17%)	81 (28%)	171 (24%) *	105 (19%) *	147 (15%)
2	350 (14%)	64 (22%)	101 (14%)	78 (14%)	133 (14%)
≥ 3	604 (24%)	67 (23%)	143 (20%)	134 (24%)	258 (27%)
OHCA in public	579 (23%)	69 (24%)	298 (42%) *	43 (8%) *	170 (18%) ¤
Bystander witnessed	1630 (65%)	241 (84%)	603 (85%)	274 (50%) *	512 (53%)
Bystander CPR	1018 (41%)	142 (49%)	416 (59%) *	152 (28%) *	308 (32%)
Time from OHCA to ROSC	15 (9-22)	15 (10-21)	15 (9-22)		
Time to EMS arrival	7 (5-10)	7 (5-9)	7 (4-9)	7 (5-10)	7 (5-10)
Time to DC	6 (3-10)	6 (3-10)	5.5 (3-10)	8 (4-14.25) *	7 (4-11)
EMS witnessed OHCA	121 (5%)	19 (7%)	50 (7%)	28 (5%)	24 (3%) ¤
First monitored rhythm					
VF/ VT	770 (31%)	109 (38%)	413 (58%) *	58 (11%)	190 (20%)
PEA	463 (19%)	73 (25%)	125 (18%)	100 (18%) *	165 (17%) ¤
Asystole	1086 (43%)	80 (28%)	127 (18%)	342 (62%)	537 (56%)
Other/unknown	185 (7%)	73 (25%)	125 (18%)	47 (9%)	69 (7%)
Time of arrest					
Daytime	1157 (46%)	150 (52%)	335 (47%)	254 (46%)	417 (43%)
Evening time	927 (37%)	109 (38%)	276 (39%)	189 (35%) *	352 (37%)
Night time	427 (17%)	29 (10%)	97 (14%)	108 (20%)	196 (20%)
Cardiac etiology	1802 (72%)	206 (72%)	592 (84%) *	388 (71%)	687 (71%)

Table 1: Characteristics of successfully and un-successfully resuscitated men and women
Significant differences are marked with * when the difference are compared with women with successful resuscitation and ¤ when the difference relates to women with unsuccessful resuscitation.
Abbreviations: DC: Direct Current, CPR: Cardiopulmonary resuscitation, EMS: Emergency Medical Services, OHCA: Out of Hospital Cardiac Arrest, PEA: Pulseless electrical activity, ROSC: Return of Spontaneous Circulation, VF/VT: Ventricular fibrillation/Ventricular tachycardia.

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