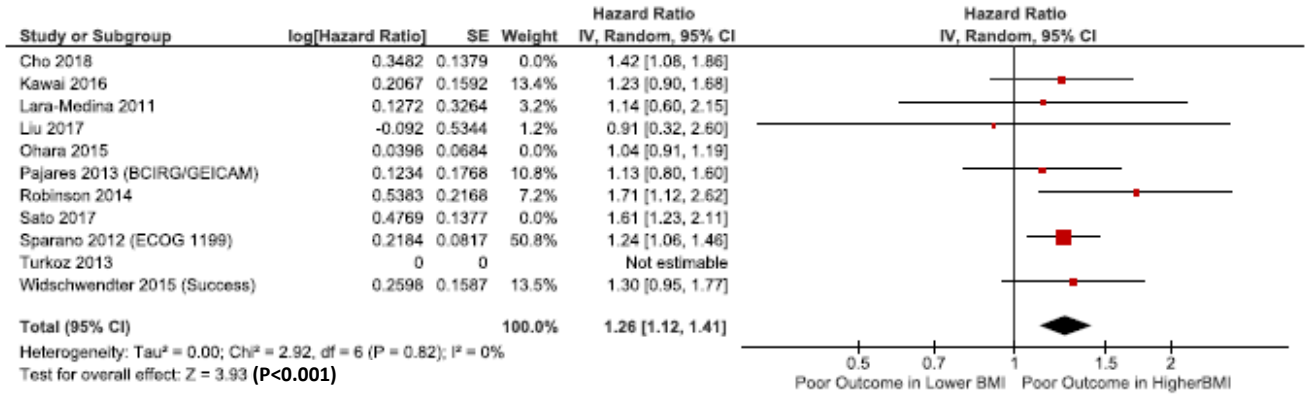
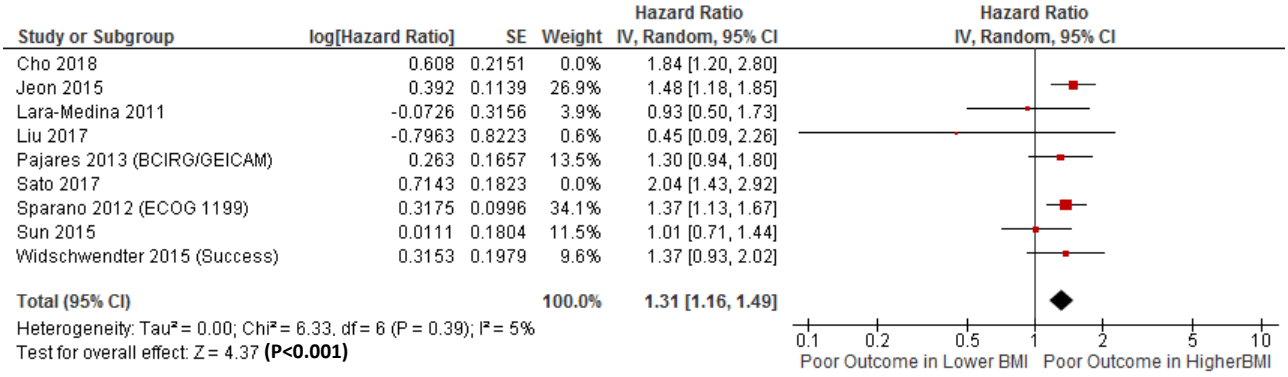
Supplementary Figure 1- Sensitivity Analysis: Association of Obesity, Defined Strictly as BMI ≥ 30 kg/m^2, with Disease-free Survival (DFS) and Overall Survival (OS) in Relation to Breast Cancer Subtypes Hormone Receptor Positive and HER2 Negative (HR+HER2-), HER2 Positive (HER2+) and Triple Negative (TN)*

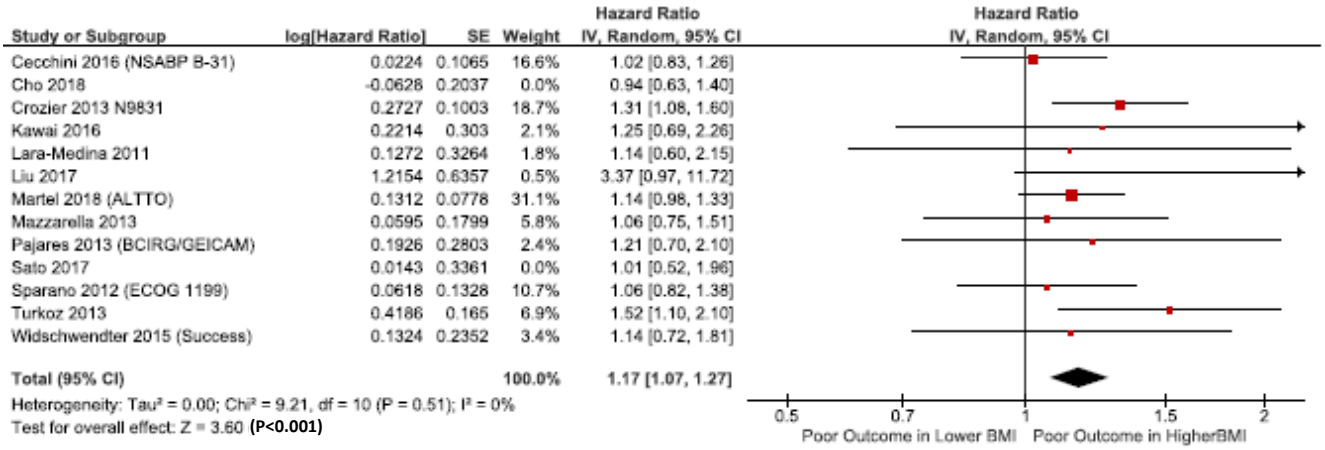
1A- DFS in HR+HER2- Breast Cancer



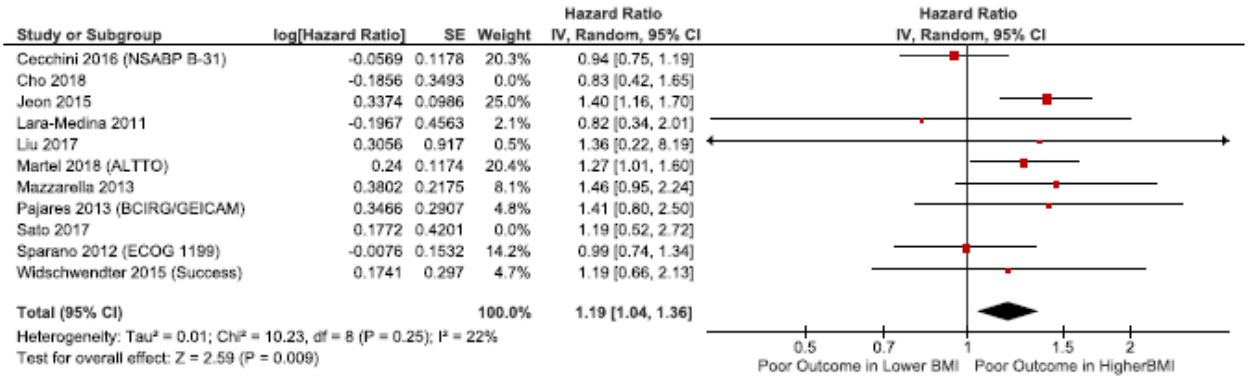
1B- OS in HR+HER2- Breast Cancer



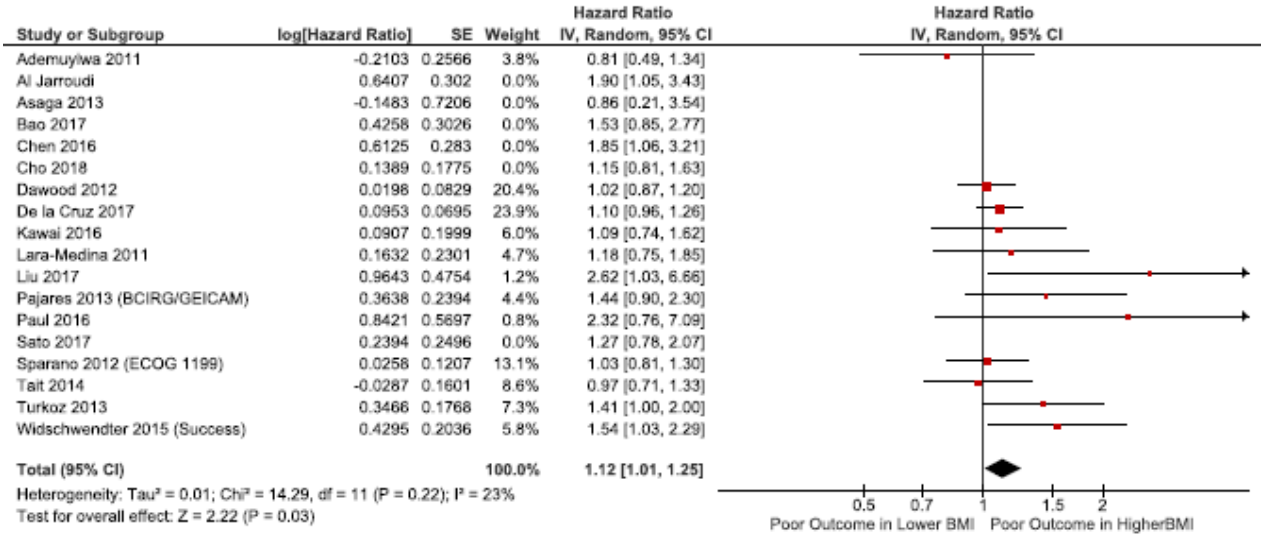
1C- DFS in HER2+ Breast Cancer



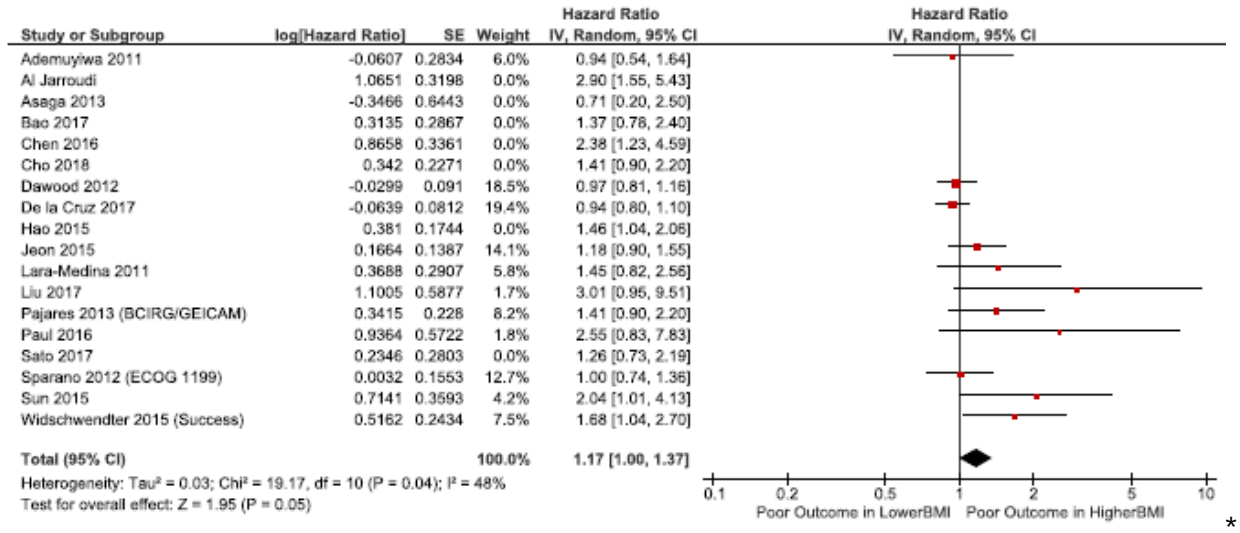
1D- OS in HER2+ Breast Cancer



1E- DFS in TN Breast Cancer



1F- OS in TN Breast Cancer

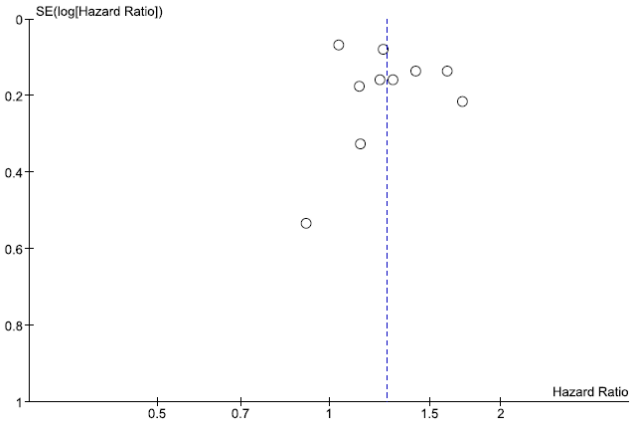


*

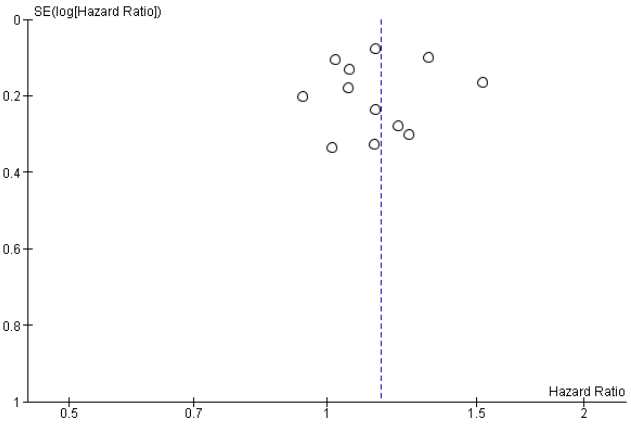
Studies that did not define obesity as BMI>=30 are listed but were not included in the calculations (hazard ratio "Not estimable").

Supplementary Figure 2- Funnel Plot of Studies Assessing Outcomes in Obese versus Non-Obese Groups by Breast Cancer Subtypes with more than 10 studies in each subgroup

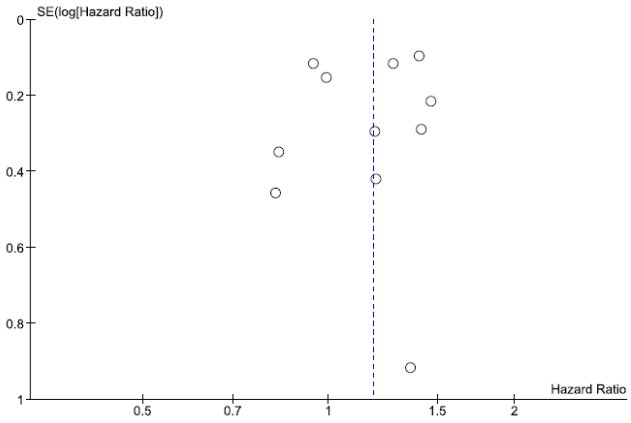
2A- DFS in HR+HER2- Breast Cancer



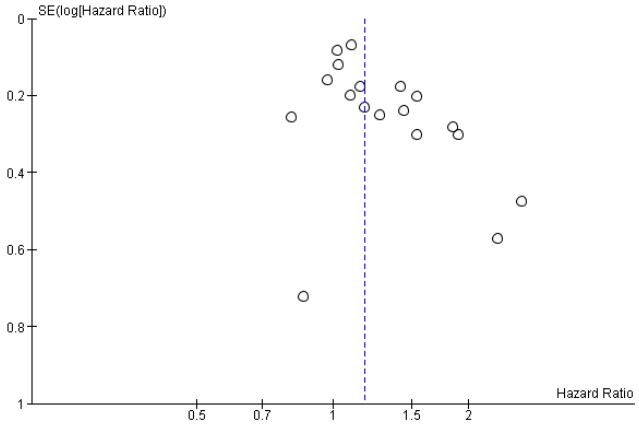
2B- DFS in HER2+ Breast Cancer



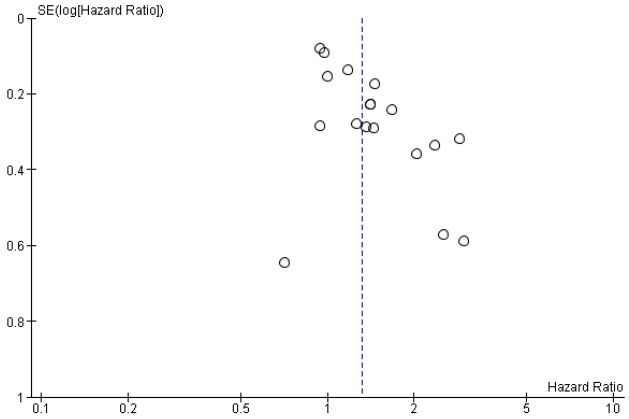
2C-OS in HER2+ Breast Cancer



2D- DFS in TN Breast Cancer



2E- OS in TN Cancer



*Funnel plot for OS in ER+ was not assessed due to fewer than 10 studies

Abbreviations: DFS: Disease- free survival, OS: Overall Survival, HR+HER2-: Hormone receptor positive and HER2 negative, HER2+: HER2 positive, TN: Triple negative

Supplementary Table 1- Baseline patient characteristics of included studies.

Author	n	Menopausal status	Stage	Grade	Ethnicity/country of origin	Histology	Subtype
Jeon et al., 2015 [24]	41021	n/a	T < 2 cm 21931 T ≥ 2 cm 19090 N - 25205 N + 15816	I-II 20043 III 15890 unkn 5088	Korea	n/a	HR+HER2- 21094 HR+HER2+ 4118 HR-HER2+ 3887 TN 7436 unkn 4486
Pajares et al.,2013 [16]	5683	pre 3022 post 2661	pT1 2794 pT2 2665 pT3 224 N - 2963 N + 2720	I 499 II 2404 III 2391 unkn 389	caucasian 98%	ductal 4809 lobular 510 mixed 62 others 301 unkn 1	ER/PR both - 1502 ER/PR any + 4132 unkn 49 HER2+ 830 HER2- 4055 unkn 798
Sparano et al.,2012 [5] E1199 trial	4770	pre 2219 post 2551	T1 1726 T2 2532 T3 468 unkn 44 N0 553 N1 2645 N2 1084 N3 463 unkn 25	n/a	white 4031 hispanic 177 black 400 other 145 unkn 17	n/a	ER/PR any + 3411 ER/PR both - 1293 unkn 66 HER2+ 940 HER2- 3344 unkn 486
Sun et al., 2015 [25]	1109	pre 541 post 568	T1 526 T2 455 T3 102 N - 665 N + 439 stage I 403 stage II 543 Stage III-IV* 133	I-II 309 III 170	white 612 african american 497	ductal 911 others 198	luminal 714 basal-like 197 her2+ 72 normal-like 126

Ademuyiwa et al., 2011 [27]	418	n/a		N -	257	I-II	40	caucasian	325	ductal	377	TN	418
				N +	161	III	356	other	93	inflammatory	9		
				stage I	154	unkn	22			lobular	15		
				stage II	199					other	17		
				stage III	65								
Dawood et al.,2012 [32]	2311	pre	971	stage I	570	I	12	white	1508	ductal	2091	TN	2311
		post	1328	stage II	1177	II	188	black	417	lobular	22		
				stage III	526	III	2043	other	386	mixed	26		
										other	148		
Paul et al., 2016 [33]	74	n/a		n/a		n/a		n/a		n/a		TN	74
Tait et al,2014 [34]	448	pre	159	pCR	30	I-II	60	african american	136	n/a		TN	448
		post	257	stage I	143	III	386	caucasian	304				
		unkn	32	stage IIA	114	unkn	2	other	8				
				stage IIB	49								
				stage III	88								
				stage IV*	20								
				unkn	4								
Wid-Schwendter et al.,2015 [15]	3754	pre	1565	pT1	1552	I	176	n/a		ductal	3060	HR+HER2-	2045
		post	2189	pT2	1929	II	1783			lobular	419	HER2+	883
				pT3	198	III	1773			other	253	TN	742
				pT4	52	unkn	22			unkn	22	unkn	84
				unkn	23								
				pN0	1273								
				pN1	1705								
				pN2	511								
				pN3	236								
				unkn	29								
Cecchini et al., 2016 [12] NSABPB31trial	2102	n/a		n/a		n/a		n/a		n/a		HER2+	2102
Crozier et al., 2013 [13]	3017	pre	1610	pT < 2 cm	1002	I-II	858	white	2532	ductal	2852	HR+HER2+	1618
		post	1407	pT ≥ 2 cm	2015	III	2159	other	455	lobular	92	HR-HER2+	1399
				N -	403					mucinous	12		
				N +	2614					papillary	5		

										medullary intra-ductal other missing	11 3 39 3	
Martel et al.,2018 [14]	8381	n/a		n/a		n/a			n/a			HER2+	8381
Mazzarella et al., 2013 [26]	1250	pre post	577 673	pTx pT1 pT2 pT3 pT4 N0 N1-3 N≥4 unkn	12 680 467 78 13 621 343 264 22	I-II III unkn	419 795 36	n/a		ductal lobular mixed other	1138 30 19 63	HR+HER2+ HR-HER2+	759 491
Turkoz et al., 2013 [4]	818	pre	818	T1-2 T3-4 N - N +	569 164 304 427	I II III	71 289 325	n/a		n/a		luminal HER2 over-expressing TN	561 65 107
Robinson et al., 2014 [22]	1199	n/a		stage I stage > I	624 536	n/a		Australia UK + Falklands Europe Asia other (Oceania incl. NZ, Africa, North and South America)	921 102 87 38 36	ductal lobular	944 207	HR+HER2-	1199
Kawai et al.,2016 [18]	20090	pre post unkn	6785 12576 729	stage I stage II stage III	8304 9841 1945	n/a		Japan		n/a		luminal A luminal B HER2 over-expressing TN	9850 3988 1485 2993

											others	1774
Lara-Medina et al.,2011 [19]	2065	pre	1045	stage I stage II stage III stage IV*	9.7% 34.6% 44% 11.7%	I II III	12.4% 36.9% 50.8%	hispanic (Mexico)		ductal lobular other	82.70%	HR+HER2- HER2+ TN	56.5% 20.4% 23.1%
De la Cruz et al., 2017 [17]	1495	pre	45%	T3-4 N +	46.1% 58.8%	n/a		Peru		n/a		TN	1495
Liu et al., 2018 [20]	273	n/a		cT1 cT2 cT3 clinical stage I-II clinical stage III	39 171 63 171 99	I-II III	92 178	non-hispanic white non-hispanic black hispanic asian/other	91 66 95 16	n/a		HR+/HER2- HER2+ TN	135 94 44
Bao et al., 2016 [30]	518	post	53.1%	stage I stage II stage III unkn	30.89% 55.60% 10.23% 3.28%	n/a		China		n/a		TN	518
Chen et al., 2016 [31]	206	pre post	113 93	pT1 pT2 pT3 pN0 pN1 pN2 pN3	76 112 18 121 50 27 8	low median	65 141	China		n/a		TN	206
Cho et al., 2018 [6]	5668	n/a		pT1 pT2 pT3 pT4 pN0 pN1 pN2 pN3	3411 1980 263 14 3350 1608 440 264	n/a		Korea		n/a		HR+HER2- HR+HER2+ HR-HER2+ TN unkn	3352 498 653 793 372

				unkn	6							
Sato et al.,2017 [23]	1924	pre	632	clinical stage I	836	n/a		Japan	n/a		HR+HER2-	1371
		post	1289	clinical stage II	899						HR+HER2+	117
		unkn	3	clinical stage III	189						HR-HER2+	141
											TN	295
Ohara et al., 2015 [21]	184	post	184	pT1	130	I	25	Japan	ductal	164	HR+HER2-	184
				pT2	49	II	132		lobular	4		
				pT3	1	III	22		other	16		
				pT4	4	unkn	5					
				N-	144							
				N+	40							
Al Jarroudi et al., 2017 [28]	115	pre	85	T ≤ 3 cm	42	I-II	65	Morocco	n/a		TN	115
		post	30	T > 3 cm	73	III	50					
				N-	48							
				N+	67							
Hao et al.,2015 [35]	1106	pre	568	T ≤ 2 cm	456	I-II	462	China	n/a		TN	1106
		post	538	T > 2 cm	632	III	602					
				N-	652							
				N+	454							
Asaga et al.,2013 [29]	135	pre	57	cT1	6	I	6	Japan	ductal	112	TN	135
		post	78	cT2	75	II	42		lobular	9		
				cT3	34	III	87		other	14		
				cT4	20							
				cN-	73							
				cN+	62							
				pT1	70							
				pT2	35							
				pT3	20							
				pN0	71							
				pN1	41							
				pN2	15							
				pN3	8							

.N.B. Values represent absolute number of patients, except when only % were reported (%) or values unavailable (n/a) * not included in DFS analyses. N/a: not available, unkn: unknown.

Supplementary Table 2- Association of Obesity with Overall Survival (OS) and Disease-free Survival (DFS) in Relation to the Triple Negative Breast Cancer Subtype, Broken Down by Menopausal status.

Study	HR for	Group	Outcome	n, HR, 95% CI	Pooled HR
Sato et al., 2017 [23]	BMI ≥ 25 vs <25	Premenopausal	OS	n=80, HR=2.10, 95% CI=0.69-6.05	HR: 2.40 95%CI: 1.50-3.86 *P*<0.001
Al Jarroudi et al., 2017 [28]	BMI ≥ 25 vs <25			n=85, HR=2.752, 95% CI=1.267-5.978	
Hao et al., 2015[35]	BMI > 24 vs ≤24			n=568, HR=2.27, 95% CI=1.11-4.63	
Sato et al.,2017 [23]	BMI ≥ 25 vs <25	Postmenopausal	OS	n=214, HR=1.07, 95% CI=0.55-2.01	HR: 1.03 95% CI: 0.70-1.50 *P*=0.89
Al Jarroudi et al., 2017 [28]	BMI ≥ 25 vs <25			n=30, HR=1.345 95% CI=0.375-4.831	
Hao et al., 2015 [35]	BMI > 24 vs ≤24			n=538, HR=0.96, 95% CI=0.58-1.58	
Sato et al., 2017 [23]	BMI ≥ 25 vs <25	Premenopausal	DFS	n=80, HR=0.57, 95% CI=0.48-4.56	HR: 1.44 95% CI: 0.68-3.03 *P*=0.34
Al Jarroudi et al.,2017 [2017]	BMI ≥ 25 vs <25			n=85, HR=3.248, 95% CI=1.249-8.412	
Turkoz et al., 2013[4]	BMI ≥ 30 vs. 18.5-24.9			n=733, HR=1.41, 95% CI=1.0-2.0	

BMI: body mass index, HR: hazard ratio, CI: confidence interval

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