



Addendum: Metabolic Syndrome, and Particularly the Hypertriglyceridemic-Waist Phenotype, Increases Breast Cancer Risk, and Adiponectin Is a Potential Mechanism: A Case–Control Study in Chinese Women

OPEN ACCESS

Edited and reviewed by:

Eva Surmacz,
Allysta Pharmaceuticals, Inc.,
United States

*Correspondence:

Zhigang Yu
yzg@medmail.com.cn

†These authors have contributed
equally to this work and share first
authorship

Specialty section:

This article was submitted to
Translational Endocrinology,
a section of the journal
Frontiers in Endocrinology

Received: 28 February 2020

Accepted: 30 March 2020

Published: 04 June 2020

Citation:

Xiang Y, Zhou W, Duan X, Fan Z,
Wang S, Liu S, Liu L, Wang F, Yu L,
Zhou F, Huang S, Li L, Zhang Q, Fu Q,
Ma Z, Gao D, Cui S, Geng C, Cao X,
Yang Z, Wang X, Liang H, Jiang H,
Wang H, Li G, Wang Q, Zhang J,
Jin F, Tang J, Tian F, Ye C and Yu Z
(2020) Addendum: Metabolic
Syndrome, and Particularly the
Hypertriglyceridemic-Waist
Phenotype, Increases Breast Cancer
Risk, and Adiponectin Is a Potential
Mechanism: A Case–Control Study in
Chinese Women.
Front. Endocrinol. 11:227.
doi: 10.3389/fendo.2020.00227

Yujuan Xiang^{1,2†}, Wenzhong Zhou^{1,3†}, Xuening Duan⁴, Zhimin Fan⁵, Shu Wang⁶,
Shuchen Liu^{1,3}, Liyuan Liu^{1,2}, Fei Wang^{1,2}, Lixiang Yu^{1,2}, Fei Zhou^{1,2}, Shuya Huang^{1,2},
Liang Li^{1,2}, Qiang Zhang^{1,2}, Qinye Fu^{1,2}, Zhongbing Ma^{1,2}, Dezong Gao^{1,2}, Shude Cui⁷,
Cuizhi Geng⁸, Xuchen Cao⁹, Zhenlin Yang¹⁰, Xiang Wang¹¹, Hong Liang¹²,
Hongchuan Jiang¹³, Haibo Wang¹⁴, Guolou Li¹⁵, Qitang Wang¹⁶, Jianguo Zhang¹⁷,
Feng Jin¹⁸, Jinhai Tang¹⁹, Fuguo Tian²⁰, Chunmiao Ye^{1,3} and Zhigang Yu^{1,21*}

¹ Department of Breast Surgery, The Second Hospital of Shandong University, Jinan, China, ² Institute of Translational
Medicine of Breast Disease Prevention and Treatment, Shandong University, Jinan, China, ³ School of Medicine, Shandong
University, Jinan, China, ⁴ Breast Disease Center, Peking University First Hospital, Beijing, China, ⁵ Department of Breast
Surgery, The First Hospital of Jilin University, Changchun, China, ⁶ Breast Disease Center, Peking University People's Hospital,
Beijing, China, ⁷ Department of Breast Surgery, Affiliated Tumor Hospital of Zhengzhou University, Zhengzhou, China, ⁸ Breast
Center, The Fourth Hospital of Hebei Medical University, Shijiazhuang, China, ⁹ Department of Breast Surgery, Tianjin Medical
University Cancer Institute and Hospital, Tianjin, China, ¹⁰ Department of Thyroid and Breast Surgery, The First Affiliated
Hospital of Binzhou Medical University, Binzhou, China, ¹¹ Department of Breast Surgery, Cancer Hospital, Chinese Academy
of Medical Sciences, Beijing, China, ¹² Department of General Surgery, Linyi People's Hospital, Linyi, China, ¹³ Department of
General Surgery, Beijing Chaoyang Hospital, Beijing, China, ¹⁴ Breast Center, Qingdao University Affiliated Hospital, Qingdao,
China, ¹⁵ Department of Breast and Thyroid Surgery, Weifang Traditional Chinese Hospital, Weifang, China, ¹⁶ Department of
Breast Surgery, The Second Affiliated Hospital of Qingdao Medical College, Qingdao Central Hospital, Qingdao, China,
¹⁷ Department of General Surgery, The Second Affiliated Hospital of Harbin Medical University, Harbin, China, ¹⁸ Department of
Breast Surgery, The First Affiliated Hospital of China Medical University, Shenyang, China, ¹⁹ Department of General Surgery,
Nanjing Medical University Affiliated Cancer Hospital Cancer Institute of Jiangsu Province, Nanjing, China, ²⁰ Department of
Breast Surgery, Shanxi Cancer Hospital, Taiyuan, China, ²¹ Suzhou Institute, Shandong University, Suzhou, China

Keywords: breast cancer, metabolic syndrome, hypertriglyceridemic-waist phenotype, adiponectin, risk

An Addendum on

Metabolic Syndrome, and Particularly the Hypertriglyceridemic-Waist Phenotype, Increases Breast Cancer Risk, and Adiponectin Is a Potential Mechanism: A Case–Control Study in Chinese Women

by Xiang, Y., Zhou, W., Duan, X., Fan, Z., Wang, S., Liu, S., et al. (2020) *Front. Endocrinol.* 10:905. doi: 10.3389/fendo.2019.00905

In the original article, there were mistakes in Table 6, Table 7, Table 9 as published. The numbers of patients in **Table 6** and **Table 9** were incorrect. The contents in **Table 7** and **Table 9** were repetitive to some degree in that we had shown the association between adiponectin with metabolic syndrome and HW phenotype. Therefore, for this Correction, we analyzed

the association between adiponectin and metabolic syndrome, and the association in pre- and postmenopausal subgroups in **Table 7**. In **Table 9**, we converted the numerical variable into categorical variable, which should provide better guide for clinical practice. In our view, this avoids the repetition. These new tables appear below as Tables 6, 7, 9. The authors apologize for these errors and any confusion that may have arisen due to them and hopes these additional tables sufficiently addresses them.

In the original article, corresponding text of Table 6, Table 7, and Table 9 was corrected.

A correction has been made to Abstract, Results, Paragraph number 1:

In addition, total adiponectin levels among breast cancer patients were much lower than among controls ($p = 0.005$) only in the HW phenotype subgroup. Furthermore, the HW phenotype was associated with increased risk of estrogen receptor/progesterone receptor-positive (ER+/PR+) breast cancer, with a 95% (OR = 1.95, 95% CI:1.21–3.13) increase. However, there was no significant association between the HW phenotype and both ER+/PR- and ER-/PR- subtypes.

A correction has been made to Results, Cluster Mode of HW Phenotype Significantly Increases Breast Cancer Risk, Paragraph number 3:

HW phenotype was associated with ER+/PR+ breast cancer, with a 95% (OR = 1.95, 95% CI:1.21–3.13) increase in risk for women with a positive HW phenotype. However, there was no significant association between HW phenotype and both ER+/PR- and ER-/PR- subtypes.

A correction has been made to Results, Adiponectin Might Be the Mechanism Linking Metabolic Syndrome to Breast Cancer, Paragraph number 2:

total adiponectin levels among breast cancer patients were much lower than among the controls($p = 0.005$) in the HW phenotype subgroup.

A correction has been made to Results, Adiponectin Might Be the Mechanism Linking Metabolic Syndrome to Breast Cancer, Paragraph number 3:

there was a significant difference of total adiponectin in ER+/PR+ ($p = 0.028$) and ER-/PR- ($p = 0.043$) breast cancer compared to the controls, who were much lower in the HW phenotype subgroup.

A correction has been made to Discussion, Paragraph number 6:

We revealed that HW phenotype was an independent risk factor for the ER+/PR+ subtype.

The authors apologize for this error and state that this does not change the scientific conclusions of the article in any way. The original article has been updated.

Copyright © 2020 Xiang, Zhou, Duan, Fan, Wang, Liu, Liu, Wang, Yu, Zhou, Huang, Li, Zhang, Fu, Ma, Gao, Cui, Geng, Cao, Yang, Wang, Liang, Jiang, Wang, Li, Wang, Zhang, Jin, Tang, Tian, Ye and Yu. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

TABLE 6 | Association between HW phenotype and breast cancer by logistic regression.

	All subjects(n = 595)			Premenopausal(n = 383)			Postmenopausal(n = 209)			ER+/PR+(n = 293)			ER+/PR-(n = 59)			ER-/PR-(n = 148)		
	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P	OR	95% CI	P
Univariate model																		
WC+TG (normal = reference)	1.66	1.10–2.50	0.016	1.63	0.95–2.82	0.077	1.72	0.91–3.22	0.09	2.06	1.29–3.27	0.002	1.70	0.73–4.00	0.222	1.43	0.76–2.67	0.266
Multivariate model^a																		
WC+TG (normal=reference)	1.56	1.02–2.39	0.039	1.49	0.85–2.63	0.167	1.60	0.82–3.12	0.170	1.95	1.21–3.13	0.006	1.71	0.72–4.08	0.225	1.21	0.63–2.33	0.571

WC, waist circumference; TG, triglycerides; ER, estrogen receptor; PR, progesterone receptor.

^aAdjusted for age, number of childbirths, age at menarche, breastfeeding, smoking, alcohol use, family history of breast cancer, and contraceptive drug use.

TABLE 7 | Association between total adiponectin, HMW adiponectin, HMW/total ratio, and metabolic syndrome.

	All subjects			Premenopausal			Postmenopausal		
	With MetS	Without MetS	p	With MetS	Without MetS	p	With MetS	Without MetS	p
Total adiponectin	5.970 ± 3.789	2.807 ± 2.007	0.004	5.960 ± 3.830	6.637 ± 3.558	0.054	5.979 ± 3.762	6.909 ± 3.875	0.022
HMW adiponectin	2.408 ± 1.870	2.807 ± 2.007	0.004	2.371 ± 1.830	2.757 ± 1.958	0.037	2.445 ± 1.915	2.935 ± 2.116	0.024
HMW/total ratio	0.39 ± 0.14	0.41 ± 0.16	0.101	0.39 ± 0.14	0.40 ± 0.17	0.233	0.39 ± 0.15	0.42 ± 0.15	0.150

MetS, metabolic syndrome; HMW, high molecular weight.

TABLE 9 | The association among metabolic syndrome, breast cancer, and adiponectin.

	Controls	All cases		ER+/PR+	ER+/PR-		ER-/PR-		
METABOLIC SYNDROME									
YES									
Total adiponectin			0.362			0.944		0.764	0.203
High	26 (22.2%)	27 (17.8%)		17 (21.8%)	3 (15.8%)		5 (12.8%)		
Low	91 (77.8%)	125 (82.2%)		61 (78.2%)	16 (84.2%)		34 (87.2%)		
HMW adiponectin			0.296			0.597		0.113	0.403
High	66 (56.4%)	76 (50.0%)		41 (52.6%)	7 (36.8%)		19 (48.7%)		
Low	51 (43.6%)	76 (50.0%)		37 (47.4%)	12 (63.2%)		20 (51.3%)		
HMW/total ratio			0.354			0.069		0.805	0.711
High	59 (50.4%)	68 (44.7%)		29 (37.2%)	9 (47.4%)		21 (53.8%)		
Low	58 (49.6%)	84 (55.3%)		49 (62.8%)	10 (52.6%)		18 (46.2%)		
No									
Total adiponectin			0.097			0.121		0.339	0.118
High	106 (25.5%)	92 (20.8%)		43 (20.0%)	13 (32.5%)		20 (18.3%)		
Low	309 (74.5%)	351 (79.2%)		172 (80.0%)	27 (67.5%)		89 (81.7%)		
HMW adiponectin			0.507			0.970		0.588	0.244
High	287 (69.2%)	297 (67.0%)		149 (69.3%)	26 (65.0%)		69 (63.3%)		
Low	128 (30.8%)	146 (33.0%)		66 (30.7%)	14 (35.0%)		40 (36.7%)		
HMW/total ratio			0.359			0.229		0.873	0.062
High	213 (51.3%)	213 (48.2%)		99 (46.3%)	20 (50.0%)		45 (41.3%)		
Low	202 (48.7%)	229 (51.8%)		115 (53.7%)	20 (50.0%)		64 (58.7%)		
HW PHENOTYPE									
YES									
Total adiponectin			0.005			0.028		1.000	0.043
High	14 (35.9%)	9 (13.0%)		6 (14.6%)	2 (28.6%)		1 (6.7%)		
Low	25 (64.1%)	60 (87.0%)		35 (85.4%)	5 (71.4%)		14 (93.3%)		
HMW adiponectin			0.717			0.527		0.424	0.583
High	24 (61.5%)	40 (58.0%)		28 (68.3%)	3 (42.9%)		8 (53.3%)		
Low	15 (38.5%)	29 (42.0%)		13 (31.7%)	4 (57.1%)		7 (46.7%)		
HMW/total ratio			0.570			0.263		1.000	0.839
High	17 (43.6%)	34 (49.3%)		23 (56.1%)	3 (42.9%)		7 (46.7%)		
Low	22 (56.4%)	35 (50.7%)		18 (43.9%)	4 (57.1%)		8 (53.3%)		
NO									
Total adiponectin			0.247			0.442		0.632	0.150
High	118 (23.9%)	110 (20.9%)		54 (21.4%)	14 (26.9%)		24 (18.0%)		
Low	375 (76.1%)	416 (79.1%)		198 (78.6%)	38 (73.1%)		109 (82.0%)		
HMW adiponectin			0.252			0.505		0.191	0.157
High	329 (66.7%)	333 (63.3%)		162 (64.3%)	30 (57.7%)		80 (60.2%)		
Low	164 (33.3%)	193 (36.7%)		90 (35.7%)	22 (42.3%)		53 (39.8%)		
HMW/total ratio			0.136			0.011		0.813	0.132
High	255 (51.7%)	247 (47.0%)		105 (41.8%)	26 (50.0%)		59 (44.4%)		
Low	238 (48.3%)	278 (53.0%)		146 (58.2%)	26 (50.0%)		74 (55.6%)		

ER, estrogen receptor; PR, progesterone receptor.

Cut-off value of high and low level for total adiponectin, HMW adiponectin, and HMW/total ratio is 8.768, 1.635, and 0.399, respectively.