B”SD

**Jesse C Krakauer, MD**

**Associated Physicains/Endocrinology**

**Berkley, Michigan 48072**

**jckrakauer@gmail.com**

**Nir Y Krakauer, PhD**

**Department of Civil Engineering**

**The City College of New York**

**New York, NY**

**nkrakauer@ccny.cuny.edu**

**ABSI and Mortality**

**ABSI references to 3/24:**[**https://drjessekrakauer.com/absi.html**](https://drjessekrakauer.com/absi.html)

**https://en.wikipedia.org/wiki/Body\_shape\_index**

**ABSI = WC weight-2/3height5/6 = WC/(BMI2/3height1/2)**

**Krakauer NY, Krakauer JC. A new body shape index predicts mortality hazard independently of body mass index. PLoS One. 2012;7(7):e39504. doi: 10.1371/journal.pone.0039504. Epub 2012 Jul 18. PMID: 22815707; PMCID: PMC3399847.**

**Annotation: A body shape index (ABSI) is a power law based on weight and height that normalizes waist circumference (WC) for weight and height. In a large USA population sample, mortality increased significantly with ABSI and independently from BMI.  Since publication, over 360,000 views to this article and over 550 citations have been reported at the journal web site.**

**Krakauer NY, Krakauer JC. Dynamic association of mortality hazard with body shape. PLoS One. 2014 Feb 20;9(2):e88793. doi: 10.1371/journal.pone.0088793. PMID: 24586394; PMCID: PMC3930607.**

**In a British population study we found that elevated ABSI predicted mortality up to 20 years later. We also show that the direction of change in ABSI over time predicted mortality, with rise in ABSI leading to higher mortality. We also show that ABSI predicts mortality better than BMI, height/ WC ratio and WC/ hip circumference ratio.**

**Krakauer NY, Krakauer JC. An Anthropometric Risk Index Based on Combining Height, Weight, Waist, and Hip Measurements. J Obes. 2016;2016:8094275. doi: 10.1155/2016/8094275. Epub 2016 Oct 18. PMID: 27830087; PMCID: PMC5088335.**

**Annotation: HI  (Hip Index)  is a power law of hip circumference for a given  BMI.  We propose an anthropometric risk index (ARI) which allows the combination of risk prediction from the 4 measures: Height, BMI, ABSI, HI.  ARI predicted risk  more strongly than single anthropometric indices and was shown to perform well in risk prediction when applied to a second large population survey with cardiovascular and mortality  outcomes.**

**Krakauer NY, Krakauer JC. Anthropometrics, Metabolic Syndrome, and Mortality Hazard (2018). Journal of Obesity. 2018;2018:9241904. doi:10.1155/2018/9241904.**

**Annotation:For NHANES data, ARI was found to be positively correlated with each component of MS, suggesting connections between the two entities as measures of cardio-metabolic risk. ARI and MS were both significant predictors of mortality hazard. Although the association of ARI with mortality hazard was stronger than that of MS, a combined model with both ARI and MS score as predictors improved predictive ability over either construct in isolation.**

**Cameron AJ, Romaniuk H, Orellana L, Dallongeville J, Dobson AJ, Drygas W, Ferrario M, Ferrieres J, Giampaoli S, Gianfagna F, Iacoviello L, Jousilahti P, Kee F, Moitry M, Niiranen TJ, Pająk A, Palmieri L, Palosaari T, Satu M, Tamosiunas A, Thorand B, Toft U, Vanuzzo D, Veikko S, Veronesi G, Wilsgaard T, Kuulasmaa K, Söderberg S. Combined Influence of Waist and Hip Circumference on Risk of Death in a Large Cohort of European and Australian Adults. J Am Heart Assoc. 2020 Jul 7;9(13):e015189. doi: 10.1161/JAHA.119.015189. Epub 2020 Jun 30. PMID: 32602397; PMCID: PMC7670538.**

**Jayedi A, Soltani S, Zargar MS, Khan TA, Shab-Bidar S. Central fatness and risk of all cause mortality: systematic review and dose-response meta-analysis of 72 prospective cohort studies. BMJ. 2020 Sep 23;370:m3324. doi: 10.1136/bmj.m3324. PMID: 32967840; PMCID: PMC7509947.**

**Boniface, D; A new obesity measure based on relative waist circumference – how useful is it?(2013) David R Boniface. Eur J Public Health 2013; 23 (suppl\_1): ckt126.033. doi: 10.1093/eurpub/ckt126.033 (ABSI-UK)**

**Krakauer, N.Y.; Krakauer, J.C. Association of X-ray Absorptiometry Body Composition Measurements with Basic Anthropometrics and Mortality Hazard. Int. J. Environ. Res. Public Health 2021, 18, 7927.**

**Annotation: This study brings together allometric anthropometrics and body composition.  Remarkably, directly measured body composition parameters such as %fat can be accurately predicted from height, BMI and ABSI, and overall mortality risk is better predicted by anthropometrics than by body composition.  However, both low limb non-fat tissue (skeletal muscle) and high trunk non fat tissue (perhaps a marker of enlarged internal organs) predict mortality.  The allometric methods in this paper allow combination of body composition and anthropometrics to better estimate mortality risk**

 **Krakauer, N.Y.; Krakauer, J.C. Diet Composition, Anthropometrics, and Mortality Risk. Int. J. Environ. Res. Public Health 2022, 19, 12885. https://doi.org/10.3390/ijerph191912885**

**Christakoudi S, Tsilidis KK, Muller DC, et al. A Body Shape Index (ABSI) achieves better mortality risk stratification than alternative indices of abdominal obesity: results from a large European cohort. *Sci Rep*. 2020;10(1):14541. Published 2020 Sep 3. doi:10.1038/s41598-020-71302-5**

# Nascimento-Souza MA, Mambrini JVM, Peixoto SV, Lima-Costa MF. Association between "a body shape index" and mortality: Bambuí Cohort Study of Aging, Brazil. Cad Saude Publica. 2021 Jan 11;37(1):e00016020. doi: 10.1590/0102-311X00016020. PMID: 33440407. (adjusted ABSI for BMI!)

**Song X, Jousilahti P, Stehouwer CD, Söderberg S, Onat A, Laatikainen T, Yudkin JS, Dankner R, Morris R, Tuomilehto J, Qiao Q. Comparison of various surrogate obesity indicators as predictors of cardiovascular mortality in four European populations. Eur J Clin Nutr. 2013 Dec;67(12):1298-302. doi: 10.1038/ejcn.2013.203. Epub 2013 Oct 23. PMID: 24149442.**

**Wierup Ia, Carlsson AC, Wändell P, Riserus U, Ärnlöv J, Borné Y. Low anthropometric measures and mortality--results from the Malmö Diet and Cancer Study. Ann Med. 2015 Jun;47(4):325-31. doi: 10.3109/07853890.2015.1042029. Epub 2015 May 18. PMID: 25982798.**

**Achim Peters, Bruce S. McEwen (2015, Stress habituation, body shape and cardiovascular mortality. Neuroscience & Biobehavioral Reviews** [**doi:10.1016/j.neubiorev.2015.07.001**](http://dx.doi.org/10.1016/j.neubiorev.2015.07.001)

**Dhana K, Kavousi M, Ikram MA, Tiemeier HW, Hofman A, Franco OH. Body shape index in comparison with other anthropometric measures in prediction of total and cause-specific mortality. J Epidemiol Community Health. 2016 Jan;70(1):90-6. doi: 10.1136/jech-2014-205257. Epub 2015 Jul 9. PMID: 26160362.**

**Rahman SA, Adjeroh D (2015) Surface-Based Body Shape Index and Its Relationship with All-Cause Mortality. PLoS ONE 10(12): e0144639. doi:10.1371/journal.pone.0144639**

**Thomson CA, Garcia DO, Wertheim BC, Hingle MD, Bea JW, Zaslavsky O, Caire-Juvera G, Rohan T, Vitolins MZ, Thompson PA, Lewis CE. Body shape, adiposity index, and mortality in postmenopausal women: Findings from the Women's Health Initiative. Obesity (Silver Spring). 2016 May;24(5):1061-9. doi: 10.1002/oby.21461. Epub 2016 Mar 15. PMID: 26991923; PMCID: PMC5014350.**

**Sardarinia, Mahsa, et al. "Mortality prediction of a body shape index versus traditional anthropometric measures in an Iranian population: Tehran Lipid and Glucose Study." *Nutrition* 33 (2017): 105-112.**

**He S, Zheng Y, Wang H, Chen X.**[**Assessing the relationship between a body shape index and mortality in a group of middle-aged men.**](https://www.ncbi.nlm.nih.gov/pubmed/27663543)**Clin Nutr. 2017 Oct;36(5):1355-1359. doi: 10.1016/j.clnu.2016.09.003. Epub 2016 Sep 14. PubMed PMID: 27663543.**

**Thomson CA, Garcia DO, Wertheim BC, Hingle MD, Bea JW, Zaslavsky O, Caire-Juvera G, Rohan T, Vitolins MZ, Thompson PA, Lewis CE. Body shape, adiposity index, and mortality in postmenopausal women: Findings from the Women's Health Initiative. Obesity (Silver Spring). 2016 May;24(5):1061-9. doi: 10.1002/oby.21461. Epub 2016 Mar 15. PMID: 26991923; PMCID: PMC5014350.**

**Sato Y, Fujimoto S, Konta T, Iseki K, Moriyama T, Yamagata K, et al. (2017) Body shape index: Sex-specific differences in predictive power for all-cause mortality in the Japanese population. PLoS ONE 12(5): e0177779.** [**https://doi.org/10.1371/journal.pone.0177779**](https://doi.org/10.1371/journal.pone.0177779)

**Grant JF, Chittleborough CR, Shi Z, Taylor AW. The association between A Body Shape Index and mortality: Results from an Australian cohort. PLoS One. 2017 Jul 31;12(7):e0181244. doi: 10.1371/journal.pone.0181244. PMID: 28759582; PMCID: PMC5536270.**

**RÃ¸nn,PF, Lucas M, Laouan S, Elhadji A et al. The obesity-associated risk of cardiovascular disease and all-cause mortality is not lower in Inuit compared to Europeans: A cohort study of Greenlandic Inuit, Nunavik Inuit and Danes. doi: 10.1016/j.atherosclerosis.2017.08.011 http://dx.doi.org/10.1016/j.atherosclerosis.2017.08.011-2017/08/22**

**Afsar B, Elsurer R, Kirkpantur A.**[**Body shape index and mortality in hemodialysis patients.**](https://www.ncbi.nlm.nih.gov/pubmed/23830741)**Nutrition. 2013 Oct;29(10):1214-8. doi: 10.1016/j.nut.2013.03.012. Epub 2013 Jul 4. PubMed PMID: 23830741.**

**Lee DY, Lee MY, Sung KC.**[**Prediction of Mortality with A Body Shape Index in Young Asians: Comparison with Body Mass Index and Waist Circumference.**](https://www.ncbi.nlm.nih.gov/pubmed/29719128)**Obesity (Silver Spring). 2018 May 2. doi: 10.1002/oby.22193. [Epub ahead of print] PubMed PMID: 29719128.**

**Park Y, Kim NH, Kwon TY, Kim SG.**[**A novel adiposity index as an integrated predictor of cardiometabolic disease morbidity and mortality.**](https://www.ncbi.nlm.nih.gov/pubmed/30425288)**Sci Rep. 2018 Nov 13;8(1):16753. doi: 10.1038/s41598-018-35073-4. PubMed PMID: 30425288.**

**Lee H, Chung HS, Kim YJ, Choi MK, Roh YK, Chung W, Yu JM, Oh CM, Moon S. Association between body shape index and risk of mortality in the United States. Sci Rep. 2022 Jul 4;12(1):11254. doi: 10.1038/s41598-022-15015-x. PMID: 35788633; PMCID: PMC9253149.**

**Qiao YS, Tang X, Chai YH, Gong HJ, Zhang X, Stehouwer CDA, Zhou JB. Association of Sarcopenia and A Body Shape Index With Overall and Cause-Specific Mortality. Front Endocrinol (Lausanne). 2022 Jul 5;13:839074. doi: 10.3389/fendo.2022.839074. PMID: 35865317; PMCID: PMC9294172.**

# Wei Zhou, Lingjuan Zhu, Yu Yu, Chao Yu, Huihui Bao, Xiaoshu Cheng,

# A Body Shape Index is positively associated with all-cause and cardiovascular disease mortality in the Chinese population with normal weight: A prospective cohort study,Nutrition, Metabolism and Cardiovascular Diseases,2023, https://www.sciencedirect.com/science/article/pii/S0939475323001990)