Of cup and bra size: Reply to a prospective study of breast size and premenopausal breast cancer incidence.

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Published in:
International Journal of Cancer

DOI:
10.1002/ijc.22104

2006

ICJ-06-0647

LETTER TO THE EDITOR

Of cup size and breast size

Reply to: A prospective study of breast size and premenopausal breast cancer incidence

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Key words: cup size, breast size, breast volume, breast cancer, BMI

Dear Sir,

We read with interest the paper ”A prospective study of breast size and premenopausal breast cancer incidence” by Kusano et al. [1]. Their main finding was that larger bra cup size at a young age was associated with a higher incidence of premenopausal breast cancer, though this association was limited to leaner women. The cup sizes were divided into the four categories ”A or smaller”, ”B”, ”C”, ” D or larger”. The authors did not take into account the rib cage circumference.

Most women who use brassieres are aware of the fact that cup size labeling is not standardized; different brands of brassieres differ in their labeling of cup size for the same breast volume. The actual cup volume of one brand’s “C” may be equal to the cup volume of another brand’s “D”. Furthermore, cup size labeling takes rib cage circumference into account. An increase in rib cage circumference results in a decrease in cup size. Thus for two women with the same breast volume but different rib cage circumferences, the woman with the smaller rib cage would wear a larger cup size than the one with the larger rib cage.

We have measured the breast volumes of 355 women participating in an ongoing study regarding genetic and non-genetic factors that could be associated with breast cancer prognosis. Women scheduled for primary breast cancer treatment at the Lund University Hospital in Southern Sweden were invited to participate in the study, which was approved by the Lund University Ethics committee.

Written informed consents were collected during the pre-operative visit at the Department of Surgery at the Lund University Hospital. During that visit, the research nurse collected a

baseline questionnaire, which contained a question regarding brassiere size (eg 75A, 85C), and measured body weight, height, waist and hip circumferences, and breast volumes.

Three trained research nurses measured the volume of each breast with plastic cups used by plastic surgeons doing breast reductions and reconstructions [2]. The breast volume was measured with the patient in a sitting position with her arms hanging down. The volume measurements obtained from these cups have been used since 1994 together with a computerized program to prioritize patients on the waiting list for breast reductions at the Department of Plastic and Reconstructive Surgery of the University Hospital MAS, Malmö, Sweden. These cups come in the following 11 sizes: 200 mL, 275 mL, 350 mL, 500 mL, 650 mL, 800 mL, 950 mL, 1150 mL, 1325 mL, 1500 mL, and 2000 mL. Weight was measured with the patient wearing light clothing.

The 355 participating women were between 25 and 99 years old. Fifty women reported using cup size “A”, 128 used cup size “B”, 77 women used cup size “C” and 56 women used cup size “D or larger”. Forty-four women did not specify their brassiere size. Measured breast volumes ranged between 100 and 2000 mL per breast. There was a strong correlation between the right and the left breast volumes ($r = 0.985$; $p < 0.0001$). The cup size was a poor proxy for the breast volume as indicated by the very wide ranges of volumes among women using the same cup size (table 1).

Table 1.		Measured volume of the right breast in all women
	(n)	Median (range)
Cup size “A”	50	225 mL (100 – 500 mL)
Cup size “B”	128	425 mL (150 – 1100 mL)
Cup size “C”	77	700 mL (350 – 1800 mL)
Cup size “D or larger”	56	950 mL (250 – 2000 mL)

This was also true when we restricted the analysis to women with a BMI < 25 kg/m^2 (table 2).

Table 2.

	(n)	Measured volume of the right breast in women with BMI < 25 kg/m^2 Median (range)
Cup size "A"	34	225 mL (100 – 400 mL)
Cup size "B"	56	350 mL (150 – 800 mL)
Cup size "C"	22	525 mL (350 – 1025 mL)
Cup size "D or larger"	9	650 mL (250 – 950 mL)

When we also took the rib cage circumference into consideration, these ranges in actual breast volumes became considerably narrower. In table 3 we show how the breast volumes of the right breast vary with the rib cage circumference in the 127 women using cup size "B" who had also indicated the circumference labeled on their brassieres.

Table 3.

Rib cage circumference	(n)	Measured volume of the right breast in women using cup size "B". Median (range)
70 cm	1	350 mL
75 cm	31	350 mL (150 – 750 mL)
80 cm	43	350 mL (150 – 650 mL)
85 cm	39	500 mL (200 – 1100 mL)
90 cm	7	600 mL (500 – 800 mL)
95 cm	3	650 mL (400 – 800 mL)
100 cm	2	850 mL (800 – 900 mL)
105 cm	1	700 mL

In conclusion, we found that the use of cup size alone without taking rib cage circumference into account is a poor surrogate for actual breast volumes, even when BMI is taken into consideration. We would like to know whether the results of Kusano et al. remain significant, and whether they are still limited to lean women, when the rib cage circumference is taken into consideration.

Yours Sincerely,

Anita Ringberg, Erika Bågeman, Carsten Rose, Christian Ingvar, Helena Jernström

ACKNOWLEDGEMENTS

This study was supported by the Lund University Hospital Fund, the Crafoord Foundation, the Swedish Cancer Society (Cancerfonden; 4980-B04-01XAB), the GA´s donation for Breast Cancer Research at the Lund Surgery Clinic, the 1049 fund at the Lund Oncology Clinic. Helena Jernström's position is supported by the Swedish Research Council (Vetenskapsrådet; K2002-27GP-14104-02B), and the Medical Faculty at Lund University, Sweden. We thank Dr. Eric T Dryver for proofreading this manuscript.

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