matter, DG-CSIR has expressed his unhappiness that charges of 'plagiarism', 'fraud', 'institutional cover-up', etc. were made without proper verification. The use of unusually harsh language against the competence and integrity of the committee appointed by him was also not appreciated, just as the use of other questionable means which included an approach to the media.

I consider it very unfortunate that a reputed scientific journal like *Current Science* has agreed to publish the paper of Sunder at this stage when an independent investigation has gone through the whole scientific matter and given its findings. While a small part of Sunder's paper addresses science, the larger part talks about other issues, mainly to malign a reputed organization, to show its management and its scientists in poor light and to question the scientific integrity of the expert committee members – all the while talking about lofty principles. In a letter sent to the Editor of *Current Science* some of the very senior and respected scientists of NAL have this to say –

> 'If Sunder's article was only an honest narrative about wrong reporting of scientific results, we would welcome its publication. But very soon it degenerates into an unacceptable diatribe against a respected R&D establishment (which, Sunder will recall, treated him extremely well and contributed in no small way to his professional enrichment), its scientists, its Director and its Director-General. By choosing to publish it, *Current Science* is maligning NAL severely and without sufficient basis. We wonder why you are doing it. In fact it is our considered view that any individual, or a journal like *Current Science*, making baseless charges against another individual or institution must be firmly censured.'

Perhaps it cannot be put more eloquently!

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# Adiposity and diabetes: Biochemical link

Indians appear to be on the verge of a diabetes epidemic[1] for which adiposity is a major risk factor. Attempts to biochemically link the two via resistin[2] could herald an etiology-based treatment.

Diabetes apart, obesity is becoming increasingly common in developed countries[3]. Further advances in molecular characterization are to be expected.

Currently diabetes mellitus (DM) is classified into type 1 diabetes, which includes the earlier insulin-dependent diabetes mellitus, and type 2 diabetes, which encompasses what was previously called noninsulin-dependent diabetes mellitus[4].

There are few epidemiological studies from India on the prevalence of obesity. Table 1 summarizes published information.

Based on the body mass index (BMI: [(weight in kg)/(height in metres)2]), we analysed the prevalence of overweight (BMI ≥ 25–29.9) and obesity (BMI ≥ 30) from our prospective computerized database on individuals with type 2 diabetes (Table 2).

The data obviously cannot be extrapolated to the general population. However being a fairly large sample, it reflects the magnitude of the problem at least in those who came for medical advice. They are accessible to weight-correcting measures.

Similarly, we calculated only the BMI, with its inherent limitations. Further studies may be taken up, perhaps on a smaller sample, which includes waist–hip ratio and skin-fold thickness. Direct visualization of fat mass is possible by computerized tomography and dual energy X-ray absorptiometry. It was recently shown that BMI was 'strongly associated with measures of adiposity derived from dual energy X-ray absorptiometry' in children[5].

Table 2 shows that there is a similar prevalence of overweight and obesity in those newly diagnosed to have diabetes and in those with less than one year of known diabetes. Type 2 diabetes cannot be diagnosed 'at onset'. Nearly 20% of patients have diabetic microvascular changes at the time of clinical diagnosis. Similar patterns of weight range in the two groups are consistent with the concept that clinical diagnosis of type 2 diabetes mellitus occurs as part of a continuum. The lower prevalence of both obesity and overweight in those with longer duration of diabetes could be due to medical intervention, and due to differing duration and degree of hyperglycemia. Further analysis of the data has not been attempted in this presentation.

In our computerized database on endocrine disorders[6], among 123 persons registered for evaluation and management principally of obesity, half were children (63/126; 34 boys, 29 girls)[3]. Using the ICMR centiles for weight and height, most of the boys (33/34) and all the girls were above the 95th centile of weight for age. A skewing towards pathological causes must be considered, as the children presented to a referral endocrine centre.

Data from India have shown that adiposity and insulin resistance began in childhood, and they originate *in utero*[7]. Therefore, preventive measures must begin early.

Obesity generally seems to result from decreased expenditure of energy, rather than increased intake of calories[3]. Indians have trunkal or central obesity, which may not be truly reflected in increased total body fat. It forms a component of the metabolic syndrome of insulin resistance, hypertension and dyslipidemia. While Reaven did not include obesity in his original proposal on insulin resistance, WHO definition of 'metabolic syndrome' has obesity as a diagnostic criterion[8].

Ultimately, obesity which results from a complex interplay of social, behavioural, cultural, physiological, metabolic and genetic factors, is as common as it is burdensome to manage. Currently available options such as lifestyle measures, are difficult to implement[9] and sustain.

Advances in adipose tissue-related hormones such as leptin, adiponectin[10] and now resistin could lead to an eventual etiology-based treatment of obesity. With the completion of the human genome project, rapid advances can be anticipated, such as the recognition of resistin-like molecule families[11]. Even

**Table 1.** Published Indian data on prevalence of obesity and overweight

| Area | Population | Definition of obesity (body mass index, BMI) | Prevalence of obesity (%) | Reference (year) |
|---|---|---|---|---|
| Kashmir | 5083 adults* | > 25 | 15.01 | 12 (2000) |
| Varanasi | 625 females<br>Affluent area | – | 30.24 | 13 (1998) |
| Rural area | 318 females | – | 17.3 | 14 (1998) |
| Southern Andhra Pradesh | 456 men<br>663 women<br>Diverse population | > 25 | 6.6 men<br>10 women | 15 (1998) |
| Shimla | 888 random | > 25 | 21.5 | 16 (1996) |
| Delhi | 13,414 adults**<br>25–64 years | > 25 | 27.8 | 17 (1994) |
| Rourkela town | 515 men<br>420 women<br>Oraon tribal | > 25 | 8.5 | 18 (1994) |
| Mumbai | 1784 adults | > 25 | 10.7 male students<br>53.2 male doctors | 19 (1992) |

*Epidemiological study; multistage sampling procedure.
**Community-based randomized study.

**Table 2.** EDC* data on overweight and obesity in persons with diabetes (*n*: 10,147)

| Duration of DM | Overweight** | Obesity*** | Non obese/non overweight**** |
|---|---|---|---|
| Newly diagnosed (*n*: 2362) | 883 (37.38%) | 329 (13.93%) | 1150 (48.7%) |
| Duration of DM: > 0 and ≤ 1 year (*n*: 2502) | 911 (36.41%) | 279 (11.15%) | 1312 (52.4%) |
| Duration of DM: > 1 year (*n*: 5277) | 1768 (33.5%) | 478 (9.1%) | 3031 (57.4%) |

*Endocrine and Diabetes Centre, Visakhapatnam; **BMI ≥ 25–29.9; ***BMI ≥ 30; ****BMI < 25.

though pharmacology should not and perhaps could not be a basis for managing obesity, human nature being what it is, drugs certainly help. To put another way, 'if diet and exercise are the best forms of treating obesity, then celibacy should be the best form of contraception'[8].


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