Launching the Nigerian edition of the *BMJ*: implications for Nigeria's health care

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This month marks the launch of the Nigerian edition of the BMJ, our 18th local edition. It is being published under auspices of the Nigerian Medical Forum, whose secretary general sets out his vision of the journal's role in Nigeria.

The Nigerian Medical Forum sees the *BMJ*'s Nigerian edition as a unique opportunity to fulfil one of its main objectives—the relief of sickness by advancing and sustaining medical education, training, and public health in Nigeria and other west African countries.

The forum was formed in 1991 to operate and serve as a medium for sending much-needed books, journals, equipment, and expertise to medical institutions all over Nigeria. The pioneer members realised that while the military political problems of Nigeria remained unsolved, vital social services such as healthcare delivery will regrettably be starved of financial and other resources. Every health statistic continues to deteriorate. The shelves in the medical libraries are empty or harbour outdated texts. Doctors, health professionals, and planners have little access to current literature and miss being part of the ongoing global revolution in science and technology which has made possible the advances in healthcare delivery that a decade ago were beyond the wildest dreams of society.

Historically, Nigerian doctors returned home by the first available transport after specialisation in Europe or America, but today there is no return home by these highly skilled and devoted professionals. The reason for this emigration varies, but perhaps the most widely cited is the lack of the tools to practise one's skills in the Nigeria of today. However, as the world becomes smaller and smaller, thanks to modern technology, it becomes possible for Nigerians in the diaspora to make constructive contributions to Nigeria's health care.

At present doctors and other health professionals in Nigeria are largely cut off from the revolution in global exchange of information, data, and technology in medicine and health. Cynics might question why Nigeria should even bother with cyberspace when most of the morbidity and mortality are caused by preventable infectious diseases, malnutrition, and poverty. But who is to know if molecular biology or advanced physiology holds the key to solving such problems as resistant malaria strains and the resurgence of tuberculosis and other infections and infestations which are currently endemic in developing countries? Should the doctors in Nigeria not have access to new developments, as was the case before the rat race mentality took over? A popular African proverb says that you cannot easily teach an old man the use of his left hand—therefore, there is advantage in exposing doctors to the best medical education, training, and practice early in their careers, rather than wait until Nigeria has eliminated every infectious disease. Nigeria needs to start the rehabilitation of its healthcare system today. Such a revived system needs to be holistic in concept and implementation, utilising best practice, determined by the principles of evidence based medicine, in both preventive and curative sectors.

Knowledge and practice grow rusty with time without continuing medical education for doctors and other health professionals. Continuing medical education is a vital part of good practice by any self respecting professional. It should be rewarded. The *BMJ*'s Nigerian edition will have a vital role in making the task of continuing medical education easier both for the individual doctor and for the planners of health care. The health professions in Nigeria may neglect the necessity for their members to remain up to date at their peril because the present situation, where patients

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accept treatment and outcomes without asking questions, cannot be expected to last for ever. As in other parts of the world, notably America and Western Europe, it is only a matter of time before an increasingly enlightened and educated population begins to question the outcome of medical interventions. If the professions do not put their houses in order, the patients will soon force them to do so—at great cost to the image and standing of doctors.

Voluntary or enforced isolation from the international revolution in medical and health practices will not convince pharmaceutical companies of the need for change. Why is it that multinational pharmaceutical companies in Nigeria seem content to see their drugs sold on street corners and in open markets? This practice is rampant and indiscriminate, leading to the emergence of resistant strains of micro-organisms, with all the catastrophe that this engenders for effective patient treatment. These companies may wish to point accusing fingers at the government of the day, but that will not do because alone or together they can push for the enforcement of the laws that control the sale and use of essential medicines in Nigeria, just as they do in Europe and America. These companies have the economic leverage to influence government policy for good if they choose to—why don't they do it?

Nigeria's health problems are too urgent to be set aside until the politics of the land is sorted out. Health promotion and education need basic resources. A parlous primary health care system leads to the present overcrowding of the secondary and tertiary sectors of health care in the country. The resolutions of the recent health summit in Abuja need to be implemented urgently, especially the national health insurance scheme. Every country in the world is debating how to finance its health care in view of their populations' increasing cost and demand for modern health care. Nigeria cannot be an exception. In the past decade Nigeria has seen a deterioration in virtually every index of measurement of good health care: doctor-patient ratio, maternal and infant mortality, availability of basic but vital equipment, and so on.^{1 2}

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The Nigerian edition of the *BMJ* will not claim to have all the answers to this multitude of problems. Rather, the mission statement of the publication is to stimulate essential debate between patients and doctors, between doctors and planners of healthcare delivery, and within the the medical and other health professions in the country with a view to facing realities and recognising that a healthy population produces a successful economy. Hard choices have to be made, but Nigeria cannot continue to treat the health of the nation as a

residual matter. To doctors inside Nigeria, the Nigerian edition of the *BMJ* will bring access to first rate, peer reviewed research papers which otherwise most would not be able to afford. It will serve the doctors so that they can serve their patients well.

- 1 Federal Ministry of Health, Department of Planning and Statistics. *Nigeria health profile (1992-1993)*. Lagos: Federal Ministry of Health, 1993:1-6,54.
- 2 Nigerian Medical Association. *National medical directory*. Lagos: Pacific Printers, 1993. (PP75-81.)

Statistics Notes

Measurement error proportional to the mean

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This is the 23rd in a series of occasional notes on medical statistics

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Fig 1—Absolute difference against mean for data in table 1

Fig 2—Absolute difference against mean after log₁₀ transformation

We often need to know the error with which measurements are made—for example, so that we can decide whether the change in a clinical observation represents a real change in a patient's condition. We have discussed previously the within-subject standard deviation as a practical index of measurement error.¹ We said that this approach should be used when the measurement error was not related to the magnitude of the measurement and recommended that we plot the subject standard deviation against the subject mean to check this. Table 1 shows some duplicate salivary cotinine measurements taken from a larger study. Figure 1 shows absolute subject difference against subject mean, which is equivalent to a standard deviation versus mean plot when we have only two measurements per subject.¹ If we are to use the within-subject standard deviation as an index of measurement error we need the subject standard deviation to be independent of the subject mean. Here, there is a clear relationship, the variability increasing with the magnitude. We can test this using a rank correlation coefficient if we wish; here Kendall's $\tau = 0.62$, $P = 0.0001$. Under these circumstances a logarithmic transformation of the data almost always solves the problem, but we can check by plotting log standard deviation against log mean. For these data the slope is 0.9; as this is very close to 1 the subject standard deviation is roughly proportional to the subject mean and a log transformation is indicated.² Figure 2 shows the plot of absolute difference versus subject mean for the log transformed data. There is now no evidence of a relationship (Kendall's $\tau = 0.07$, $P = 0.7$).

As the variability is now independent of the magnitude of the measurement, we can calculate the within-subject standard deviation¹ as $\sigma_w = 0.175$. This is a standard deviation on the logarithmic scale, so we need to antilog it before we can interpret it easily. We will denote the antilog of σ_w by a_{σ_w} . For the cotinine data, $a_{\sigma_w} = 1.496$.

When we antilog σ_w we have a ratio, not a quantity measured in the units of the original data. This is because to calculate a standard deviation we subtract the mean from each observation. Subtracting on the logarithmic scale is equivalent to dividing on the natural scale.³ Dividing the observation by the mean in this way produces a dimensionless ratio. Hence a_{σ_w} is not a standard deviation in the original units, but a related quantity sometimes referred to as the *geometric standard deviation*.

To estimate one standard deviation on either side of the observed value, we should multiply and divide by a_{σ_w} . The difference between a subject's measurement

Table 1—Duplicate salivary cotinine measurements for a group of Scottish schoolchildren (ng/ml) (D Strachan, personal communication)

Subject No	Measurement 1st	Measurement 2nd	Subject No	Measurement 1st	Measurement 2nd
1	0.1	0.1	11	1.2	0.9
2	0.2	0.1	12	1.9	2.8
3	0.2	0.3	13	2.0	1.4
4	0.3	0.4	14	2.7	1.4
5	0.3	0.4	15	2.8	6.8
6	0.4	0.3	16	3.2	2.9
7	0.4	1.4	17	4.7	4.5
8	0.8	0.5	18	4.9	1.4
9	1.0	1.6	19	4.9	3.9
10	1.1	0.9	20	7.0	4.0

and the true value would be expected to be less than $1.96\sigma_w$ for 95% of observations.¹ To get the equivalent of 1.96 log scale standard deviations on either side of an observed value we would multiply and divide on the natural scale by $a_{\sigma_w}^{1.96}$ or approximately $a_{\sigma_w}^2$. This procedure gives limits which should include the subject's mean for 95% of observations. Thus for the cotinine data we would divide and multiply by $1.496^2 = 2.238$. A measurement of 2 ng/ml would tell us that the person's true value probably lies somewhere between $2/2.238 = 0.9$ and $2 \times 2.238 = 4.5$ ng/ml.

Multiplying on the natural scale is equivalent to adding on the log scale. Multiplying a subject's actual measurement by a_{σ_w} is equivalent to adding one standard deviation on the log scale. Provided the standard deviation is not large compared with the level of the measurement, $a_{\sigma_w} - 1$ is approximately equal to the standard deviation expressed as a proportion of the measurement. The ratio of standard deviation to mean is called a *coefficient of variation*, and here $a_{\sigma_w} - 1$ is the within-subject coefficient of variation.

For the cotinine data the estimated coefficient of variation is $1.496 - 1 = 0.496$ or 49.6%. This is rather too large for the approximation to be reliable.

The within-subject variability for salivary cotinine seems very large, but the possible range of values, from these very lightly exposed children to heavy smokers, is very wide and salivary cotinine is sufficiently precise to distinguish between many different levels of exposure. The precision of a method of measurement must be interpreted in the light of its intended use.

- 1 Bland JM, Altman DG. Measurement error and correlation coefficients. *BMJ* 1996;313:41-2.
- 2 Bland JM, Altman DG. Transforming data. *BMJ* 1996;312:770.
- 3 Bland JM, Altman DG. Logarithms. *BMJ* 1996;312:700.