A STATISTICAL EVALUATION OF THE EFFECTIVENESS OF MEDICAL SHEEPSKINS FOR THE PREVENTION OF PRESSURE SORES

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The pioneering work of Ewing and his co-workers[1] on the prevention of pressure sores by supplying bedridden patients with medical sheepskins came to our notice* during the second part of 1963. Ewing *et al.* wrote:[1] 'Since (Australia's) fortune is closely related to the qualities of the merino sheep, we felt constrained, for national no less than for medical reasons, to see whether sheepskins could indeed prevent bedsores . . .' This particular statement may equally well be applicable to South Africa. Although gold is our most important national product, the golden fleece is not far behind on the rungs of our economic ladder. A further statement in Ewing's paper urged us to start the investigation which is reported in this paper: 'We cannot yet assess the value of the skins in the prevention of pressure sores . . . but we do know of the measure of comfort which they afford to our patients . . .' These words suggested to us that not enough was known about the effectiveness of medical sheepskins and it was suggested that an experiment should be started to evaluate on a quantitative basis the effectiveness of medical sheepskins for the prevention of bedsores.

Although no doubt existed about the comforts which these skins afforded patients, many factors had to be considered before decisions could be reached on, for instance, whether skins should be introduced to hospitals on a national scale. The economics of such a project are of prime importance and a wrong decision may be costly. One had to be convinced, for instance, that not only do medical sheepskins afford patients the comfort which they were purported to do (which may of course be partly due to psychological factors), but that the sheepskins actually do prevent the formation of bedsores. Also, if a saving in manpower on nursing staff could be demonstrated it would be most important. (If it could be proved to be so effective that attention could be given to patients, say, every 4 hours instead of 2-hourly, then much will have been said on its behalf.)

*Through discussions initiated by officials of the South African Wool Board.

MATERIAL AND METHOD

An investigation was started by scrutinizing the files of each patient admitted during 1961 to 3 specific wards of the Pretoria General Hospital. The records of these 3 groups of patients were examined because it was thought that they were particularly prone to the development of pressure sores. From this it appeared that out of about 2,500 patients only 3 developed pressure sores in hospital whereas about 25 were admitted to hospital with pressure sores. These figures indicated that it would be a long and costly affair to conduct a properly controlled experiment in order to study the preventive effect of medical sheepskins on pressure sores. Moreover it was not clear whether a pronounced result would be available at com-

pletion of the experiment. Accordingly we have decided to conduct a short-term experiment using only 3 patients (these were the only suitable ones readily available at that time) to indicate the existing trend for research of this type. Two of the patients had already been in hospital for a very long time, having been unconscious for some 12 months. Their main pressure points were being watched constantly to avoid the formation of bedsores. These patients were attended by nursing staff once every 2 hours. The pressure points were rubbed thoroughly and the positions of patients changed.

It appeared that the skin at pressure points takes on a certain degree of redness. After long periods of rubbing, the skin of bedridden patients seems to be kept at some intermediate position between a state of health and a pressure sore. The skin has a peculiar redness about it which will, if the patient is neglected, become darker in colour before it changes to a pressure sore and which will of course change to more normal skin colour if health sets in again. We have selected this position of intermediate redness as the centre of a 5-point scale by which to judge the intensity or degree of redness of pressure points. An intensity index, I, was defined such that:

I–0=Pressure points not affected at all.
I–1=Somewhat reddish areas appear.
I–2=Red areas such as would be expected to appear when an unconscious patient lies still and unattended for 2 hours.
I–3=Dangerous red signs indicating the possible formation of a pressure sore.
I–4=Pressure sore.

The premonitory signs of pressure sore development in prone patients are quite clear-cut and the 5-point scale was selected after it was ascertained that nurses on duty could distinguish between the 5 degrees of redness with relative ease. Originally the nurses made trial observations on the patients to get used to the system of measurement and to compare notes about every case. Afterwards, the actual recording was done for the purpose of analysis.

Patients were provided with medical sheepskins and observations taken 2-hourly. They were turned, records taken of the degree of redness at pressure points and rubbed, every 2 hours for a period of 2 weeks. We refer to this treatment as 'treated after two hours'. Apart from the 2-hourly treatment this procedure was extended to 3-, 4- and 8-hourly treatments. The 8-hour treatment was thought to be too severe on the patients and was not administered to all patients for the full period of time. Afterwards, the treatment was changed by making observations on patients without supplying them with medical sheepskins and turning every 2 hours in the usual manner.

RESULTS

The results of these experiments have been summarized in a previous report.[2] The distribution of I-values under the different conditions in each patient is shown in Table I.

TABLE I. FREQUENCY WITH WHICH VARIOUS VALUES OF THE INDEX OF REDNESS OCCURRED IN 3 PATIENTS TOGETHER

	Index of redness					
Method of treatment	*0*	*1*	*2*	*3*	*4*	*Total*
2-hourly without sheepskin	31	123	167	49	14	384
2-hourly with sheepskin	127	224	21	0	0	372
3-hourly with sheepskin	95	209	27	0	0	331
4-hourly with sheepskin	87	135	18	0	0	240
8-hourly with sheepskin	11	28	17	0	0	56

Table II shows the weighted percentage occurrence of values of I (weighted with the proportion of observations made per patient).

These two tables indicate that a definite improvement has taken place when patients were supplied with sheepskins. From a medical point of view the 8-hour treatment is not advisable and too few observations were done to be sure of the results. However, from the results of Table II one is tempted to recommend the 4-hourly treatment on a medical sheepskin. The pressure points are in a much better condition after 4 hours on a medical sheepskin than after 2 hours without one. Also, the 4-hourly treatment will bring about a considerable saving in labour.

TABLE II. PERCENTAGE OCCURRENCE OF VARIOUS VALUES OF INDEX OF REDNESS

	Index of redness				
Method of treatment	*0*	*1*	*2*	*3*	*4*
2-hourly without sheepskin	8	32	43	13	4
2-hourly with sheepskin	34	60	6	0	0
3-hourly with sheepskin	29	63	8	0	0
4-hourly with sheepskin	36	56	8	0	0
8-hourly with sheepskin	20	50	30	0	0

Illustrative Case

One of the 3 cases which we have studied may serve to indicate the dramatic effect which the medical sheepskin may have. This patient was taken from an isolation ward in an unconscious state; a slight pressure sore was in the early stages of development. The usual treatment of rubbing and turning the patient was applied. On the second day of treatment the improvement was quite marked, due to very good treatment. So much so that the skin was getting better and the redness index was given as I–3. For the next 4 days this pressure point kept showing an index value of I–3. On the seventh day the patient was placed on a medical sheepskin for the first time. The very first observation, i.e. 2 hours after the patient was placed on the sheepskin, showed a redness index value of I–0. It remained as such and during the whole period of experimentation never took on an index value higher than I–1—not even in the cases of 3- or 4-hourly treatments.

CONCLUSIONS

Three patients were preselected and observations of the degree of redness of pressure points on their skins were recorded. These patients were not randomly selected and accordingly it cannot be claimed that they are representative of all types of patient which should be considered (the type of patient which we should have preferred). However, we conclude, on the basis of observations taken of the degree of redness of pressure points on their skins, that the use of medical sheepskins is advantageous for the prevention of pressure sores in bedridden patients. In general it appears that results obtained by rubbing and turning a patient every 4 hours while he rests on a medical sheepskin is at least as effective as the conventional treatment, every 2 hours, without a sheepskin. Due to the small number of patients involved in the experiment, and also due to the statistical dependence introduced by using the same patients in each phase of the experiment, the data are difficult to analyse statistically. Some further attempts at

analysis have been made in the original report.[2] Fortunately, as can be seen from the data in the tables presented here, our decisions are clearly indicated and need not rest on the testing of complicated statistical hypotheses. The percentages of improvements are convincing, despite the limited size of the trial.

Further experiments should be conducted to confirm and supplement our findings, but from available figures it appears that medical sheepskins should be strongly recommended on the basis of our experiment and also on other experiences.[1,3]

Further Research

Another aspect of medical sheepskins is to establish their healing effects on open pressure sores. An experiment is at present being conducted at Baragwanath Provincial Hospital, outside Johannesburg, where the random variable measured is the area of pressure sores at various points in time. A sample of 7 persons with medical sheepskins and a control group of 7 persons without sheepskins are under observation at the moment. We see in these results possible application of the methods of quality control (cusum charts) to arrive at definite results. It is hoped to report the results of this experiment at a later stage.

I should like to thank the South African Wool Board who sponsored and coordinated the research on this project, and in particular Mr. G. Geertsema, who was responsible for the liaison work; Dr. A. P. Burger, Director of the National Research Institute for Mathematical Sciences, for his invaluable advice and guidance; the hospital authorities, for permission to undertake the experiment, and especially the nurses who meticulously recorded the observations; and Miss V. J. C. van Kersen, of the Division of Statistics of the National Research Institute for Mathematical Sciences, who was responsible for the analysis of the statistical data.

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