

Early Morning Temperatures ?

There are certain circumstances, of course, in which the usual twice-a-day temperature routine should be adhered to. But there are many other situations in which the nurse's clinical judgement might well determine the need—especially when the routine calls for awakening the patient almost before the break of day.

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NURSES today are identifying increasing numbers of situations in which nursing judgments and decisions are significant influences in patient-care. This goes hand in hand with current emphasis on the use of problem-solving techniques in nursing practice. Often, however, existing hospital routines preclude the exercise of nursing judgment.

One such routine is the twice-daily temperature determination: in the early morning and mid-afternoon. The early morning temperature taking often disturbs patients, especially if they have to be awakened for this ritual, and it is also costly in nursing time. Is this routine essential? Do the known facts regarding early morning temperatures support the continuation of this practice? Might this not be a matter for nursing judgment?

A person's temperature reflects the balance between his body's heat gain and loss. If an individual's rate of heat production is equal to the rate of heat loss, he is said to be in heat balance. Body metabolism is the most important factor in heat production, with muscular activity, thyroxine, sympathetic stimulation, and body temperature all inter-related.

Once the body temperature begins to rise, more and more heat is produced in a cyclic fashion. As the temperature rises, it becomes increasingly difficult for the body's heat loss mechanisms to operate effectively; consequently, a high temperature tends to become higher. The body may also gain heat by absorbing heat radiated or reflected from surrounding objects with higher than body temperatures. Body temperature may also rise as a result of the ingestion of hot food.

The processes involved in heat loss are radiation, conduction, convection, and evaporation. The amount of heat loss from each of these mechanisms varies with atmospheric conditions.

The regulation of body temperature has been studied by many investigators. Banzinger, for instance, comments:

Experiments employing (gradient calorimetry) have now located the sensory end-organ at which the body "takes" its own temperature when it becomes too warm... The body's "thermostat" must now be included in the short list of major sensory organs adapted to the primary reception and measurement of physical or chemical quantities. Moreover, it now becomes possible to measure the characteristic response of the thermostat and perhaps to produce or to suppress those responses artificially. Such investigation will lead to a better understanding not only of the aberration of fever but also of the precise regulation of internal temperature that is so important to the vital function of the body, particularly to the function of the delicate nervous system.

The "human thermostat" to which Benzinger refers is the regulating mechanism located in the hypothalamus.

In the normal person there is a diurnal variation in temperature sometimes as much as 3°F. over a 24-hour period. The temperature is lowest between 2:00 A.M. and 6:00 A.M. and highest between 4:00 P.M. and 8:00 P.M.

The reason (or reasons) for this normal variation is unknown. One authority states that the diurnal curve of body temperature "stems from being born into, and living in, a family and community run according to alternations of light and darkness, resulting from the period of rotation of the earth around its axis." (3) The effect of food, climate, exercise, positioning, activity-sleep, and light darkness routines on temperature has also been studied.

One physiologist sums up the problem in expressing his opinion that "both the physiological and psychological processes of man are influenced by recurrent biological phenomena. The true nature of rhythms, cycles, and periods is a mystery and remains a challenge to future scientific investigations." (7)

Nurses are becoming interested in this problem, too. Schmidt, for instance, has reported a study which indicates that many early morning temperatures could be safely omitted. She conducted her research for a 21-day period on three services—medical, surgical, and neurological. During this time a total of 1,876 temperatures were taken, requiring 97 hours of nursing time. Of the 1,876 temperatures, 1,744, or over 90 per cent, were normal; of the 132 elevated temperatures, only 53 were over 99.4.

As a result of this information, each of the services adopted a modified temperature-taking routine, and the amount of nursing time spent on this procedure was reduced to 35 hours. At the time of the report, the plan had been working effectively for two years. The patients were allowed to sleep longer, and nurses had more time to give essential patient care.

In the report of a study carried out in a hospital in Great Britain the investigating physician comments on the nursing and clerical time consumed by the twice-daily taking and recording of temperatures, pulses, and respirations. The study revealed that, of 13 patients whose temperatures were elevated above 99°F. at 6 A.M., eight had also had elevated temperatures at 6 P.M. the previous day. The records indicated that medical action was seldom taken unless the temperature was elevated for several recordings, and that omission of an early morning temperature resulted in no delay in instituting medical treatment.

The investigator concludes that many valuable hours of nursing time could be saved by a more rational plan for taking temperatures.

My own investigation was concerned with the value of the early morning temperature determination. In undertaking it, I was influenced by the fact that nurses today are constantly assessing patient's needs for nursing care, planning patient care, and coordinating or implementing this care. As a result of a nurse's ability to analyse a situation critically and arrive at a nursing judgment based on scientific principles, she does not have to depend on intuition, habit, and routines to guide her actions.

Nursing should include only those procedures which are significant for patient care and those which will add valuable clinical information regarding the patient. The temperature of a patient, of course, is an important vital sign. Walker has stated, however, that the challenge to nursing associated with an elevation in temperature in an earlier era is today perhaps lessened by the knowledge of methods available to combat infections and dehydration. In addition, there are probably fewer elevations as a result of prophylactic therapy, intravenous fluids, and the nature of hospitalized illnesses.

Nevertheless, it remains important that significant temperature elevations be detected promptly. But, to do this, is it necessary to take at least twice-a-day temperatures on every patient? It seemed to me that if routine temperatures were taken only once a day, preferably in the early evening between the hours of 4:00 P.M. and 8:00 P.M. when the temperature reaches its highest peak, the benefits would be significant. The patients could sleep longer, and everyone would save time.

There would, of course, remain circumstances in which the temperature should be taken in the morning: (1) when the temperature was elevated above 99.5°F on the preceding evening; (2) on the operative day; and (3) on the first post-operative day. Other times when an early morning temperature might be called for would be when a patient is critically ill, chilling perspiring profusely, or receiving peritoneal dialysis or hypothermia. The nurse would be expected to exercise her judgment in these and similar circumstances.

In relation to this proposed plan wherein morning temperatures would be taken only in accordance with the three criteria listed above, I surveyed a cross-sectional sample of 717 adult medical and surgical patients. The purpose was to ascertain under what conditions determination of an early morning temperature provided clinically valuable information.

This was a retrospective study which used previously taken and recorded temperatures. The assumption was made that while the recorded temperatures might not always have been accurate, the errors would have occurred randomly and would not produce systematic biases.

Since elevated temperatures were more likely to occur during the first week of hospitalization or the first week after surgery, I sampled the first, third, fifth, and seventh days after admission or after surgery. A day's "sample" included the 4:00 P.M. temperatures. I studied these temperature records to see how many elevations would have been "missed" had morning temperatures been taken only in accordance with my

proposed criteria would have affected the total number of temperatures taken.

Only 16, or 2.23 per cent of the patients had an elevated temperature at 7:00 A.M. that had not been preceded by an elevation at 4:00 P.M. the previous day. In other words, in only this small number of patients would an elevation present at 7:00 A.M. have gone undetected until the afternoon, had my plan been in operation.

If the small percentage of patients (2.23) whose elevated temperatures would have been "missed" represented patients whose safety would have been endangered by the delayed recognition of their elevations, the proposed plan would not be feasible. However, the study of these 16 patients did not indicate that this would have been the case.

Five of the 16 had fever due to an inflammatory process. These five patients were critically ill, on peritoneal dialysis, presenting signs of phlebitis and/or dehydration, and one had a possible head injury. Good nursing judgment would certainly indicate the need for temperatures to be taken more than once a day on patients with fever due to an inflammatory process.

Three of the 16 patients were admitted with fever of undetermined origin. In this type of situation, too, the need for temperatures to be taken more than once a day is also obvious, and one would expect the nurse to act accordingly. Until a patient's diagnosis is established and treatment is started, the temperature would be important in planning patient care.

The data from this and other temperature studies indicate, in my opinion, that hospital temperature-taking policies for medical and surgical patients be as follows:

1. Patients' temperatures should be taken routinely once a day between the hours of 4:00 P.M. and 8:00 P.M.—and preferably, closer to 8:00 P.M.
2. Early morning temperatures should be taken on all patients whose temperatures were elevated above 99.5 F. the preceding evening.
3. Early morning temperatures should be taken on all surgical patients on the operative and first post-operative day.

Over and above the morning temperatures called for by these criteria, there will be other patients whose conditions may indicate a need for morning or other temperatures, in addition to the routine early evening one. This should be a matter of judgement on the part of the nurse—a judgement she is qualified to make and which she should see as a nursing responsibility.

The adoption of liberal temperature policy such as the one proposed would free many patients from the often annoying and unnecessary procedure and, at the same time, reduce the amount of nursing and clerical time involved in the collection of meaningless data. Think how much time this would allow for additional patient care.

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