

Education Scenario

Phoenix ABPM Story

Autorhythmometry of blood pressure and heart rate, among other physiological functions, has been introduced in schools, in the home and in the clinic since the 1960s. Instruments available at the time had obvious limitations, notably when schoolchildren had to learn how to use a mercury sphygmomanometer to measure blood pressure. Several difficulties had to be overcome, such as the correct placement of the cuff on the arm, learning how to rapidly inflate the cuff but release the cuff pressure only gradually, how to listen for the first and last Korotkoff sounds corresponding to systolic and diastolic blood pressure, and then accurately record the values indicated on the manometer when the cuff pressure reached these points. Nightly readings also posed the problem that interrupting sleep to take a measurement greatly affected blood pressure, values taken awake or asleep being markedly different. Not only in Minnesota but in other States such as Arkansas and Connecticut, as well as abroad, notably in Italy and Portugal, slumber parties were organized during which schoolchildren were taught how to measure their blood pressure and pulse, and then proceeded with the taking of self-measurements every 2 hours during waking and once during the night for a couple of days.

Studies such as the Regione Toscana project in Florence, Italy, showed that children as young as 9 years can yield useful data for population studies. One major dividend of this endeavor was the demonstration that children with a positive family history of high blood pressure and related vascular disease had a larger extent of circadian variation in blood pressure as compared to children with a negative family history. This finding was later extended to newborns and replicated in the experimental laboratory on the stroke-prone rat. Subsequent clinical trials firmly established the risk associated with CHAT (Circadian Hyper-Amplitude-Tension), a condition characterized by an excessive circadian variation in blood pressure.

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The major aim of studies in the school system was to introduce chronobiologic literacy as part of science literacy. The need to instill responsibility for self health care early in life was concluded to be cost-effective, notably since the development of healthy behaviors at the earliest possible time has the greatest chance of multiple positive reinforcements throughout life.

Whereas sampling for two days is clearly superior to a single 24-hour span, a weeklong profile is greatly preferred. Sampling by night is necessary in order to obtain reliable estimates of the circadian characteristics. The major limitations remain those associated with the correct handling of the mercury sphygmomanometer, the need to rely on good hearing of the Korotkoff sounds, and the accurate recording of the measurements. These limitations are readily resolved by the availability of simple and affordable automatic digital devices with a memory for data storage. To solve the problem of obtaining nightly measurements without disturbance, a fully automatic monitor that can be programmed to take scheduled measurements is needed.