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TITLE OF INVENTION

INFANT BOWEL MOVEMENT FORECAST DEVICE

DESCRIPTION:

THE FIELD AND BACKGROUND OF THE INVENTION

Taking care of an infant is a very heavy duty, especially when a baby is under the age of one. Nowadays there are some products to help people to release such heavy pressure, such as baby walk-learn wheels, sweep bed, etc. However, there still is not much products to do such jobs. Therefore, this invention is trying to develop a product to help people take care baby more easily. Especially consider the baby aged before two years old has a bowel movement uncontrollable completely and also without language report before 1 year old. So this device is mainly focus to solve this problem and allow parent to help baby form a health habit easily. In addition, it may could suitable to take care some of the disable people.

THE FUNCTION OF THE INVENTION

The said invention is developed for easily take care infant aged before two years old or disable persons. It acts as an event forecast and reporter. First of all, the main function of this device can report by voice to the parent/guardian before infant needs a bowel movement it is based on the initial data input and empirical formula that has set up in the device. Secondly, it can remind parent or guardian that it is time for prepare food to baby or a person who need take care, this is an optional function based on guardian's need. At beginning to use this device, people need input a few initial data based on the baby's individual situation such as age (month), weight (kg), and general diet ability. The device can also store and display other health related information for parent's reference. These functions need input or set up by manufactory such as geographical feature, weather character, seasons and average humility etc the environmental parameters if possible.

THE DEVICE'S PRINCIPLE AND STRUCTURE

The said device is a small electrical product of the event forecast and reporter to the parents or gradients. Which is that we remember to feed baby three to six times per day regularly, but what time baby need a bowel movement? We usually don't know. This device can calculate and estimate the bowel movement time based on baby's age, weight, how much food have feed (means the infant diet ability), the length changes of the belly line of infant between the morning breakfast and lunch/supper. And considering other several factors such as body health individual condition, environmental condition etc.

For a human, every day the body excrete system will generate certain organic waste. In which feces about 75%, Urine about 20%, Sweat about 3%, Nail 1%, hair 1%. [3]. It was reported that the food pass by the human digestion system has different time by different sorts of food. , for adults, ordinary it will take 6 to 7 second in esophageal, 3 to 6 hours in stomach, 4 to 5 hours in small intestines and 9 to 16 hours in the large intestine [1]. Consider infant is before one year old, his/her is very small, and digestion system has not developed very well. He/she basically only drinks milk, so the said empirical formula will be mainly established by this kind of food. To measuring the change of the belly line is because the eaten food stays here at most of time. Based on the collected data by survey, a health baby (age from 10 days to 1 month), can drink 6 to 8 times per day. The bowel movement time average 5 - 8 times, or 2-4 hours per times; for a baby around 10 month, the bowel movement times decrease significantly, usually 1-2 times per day. Basically, a baby's bowel movement times depends on the age, digest ability of individuals and how much milk that parent feed etc, as well as related to the intervals that parent feed milk. A child could not completely control self bowel movement before one and half or two years old. So this device is used only by this group of ages' baby.

With the time passed, baby grows and the baby' body weigh rise up obviously during this time, Usually a baby need 150 ml per kg weight per day or 110 – 120 kilo-calorie per kg weight per day [2]. Therefore measuring weight monthly is essential to adjust the feeding quantity. Though the survey data, knowledge and experiment which are designed to modify initial data for the individual condition, the said invention device has a ROM (Read-only memory) store the above factors' average data, related guiding data, and an

application specific IC (integrated circuit). For example, when input the infant age and weight, the device will generate and display a scope of the food quantity reference (volume of the milk and other solid food, the average specific weight of milk set as 1.125 gram per ml), then parent can chose a suitable one or input the individual food quantity. The next similar step is set the time interval of feeding food. That is the device display reference scope based on the age and weight, then parent chose a properly one as a reference and do the best to following the certain time feeding daily. After finish initial setting. The parent only need input infant weight monthly and belly line change weekly to the device which related bowel movement time, the said device can store above data, calculate the average bowel movement time and report it daily based on such input progress by the parents (figure2). Therefore, the accurate of the estimated time is mainly depends on parent's carefully input correct data. Without carefully measurement, the device may only give an average roughly estimated time of bowel movement. But it is still have a reference value. It can provide amount of information to guide parent to take care baby as well as allow baby form a good health habits.

In order to form a health habit, parent need consciously fix a certain time to let baby has a bowel movement daily after six months years old. This need a good time arrangement for infant's eating time at early age time. For instant, if parent generally fix the eating time and quantity of the food. In health situation, the baby's bowel movement should be at certain around time during one month period. With the time of growth by month, baby's digestion system grows too, the time of bowel movement may different with last month but it should be at certain around time too. So, except initially age (months), infant weight, digest capable data input by parent press keyboard enter, the infant weight change monthly and belly line change weekly measurement and input are also necessary for the parent. For example, a baby aged seven month and weighted ten kg, feed 425 gram solid food per day and the feed interval time is 4.5 hour. When the belly line change is about 42mm, baby can have bowel movement around at seven to nine am clock every day. The belly line measurement need gently and carefully measure without banding tightly and pressure force because the flexible of skin may cause the error of measurement. Consider health

individual situation, the device only give a scope, with parent's help and carefully measurement, the estimated time can be more accurate. And more easily form good habit. Previously it has described several factors to effect the device calculation. The other factors, such as the sensors for ambient temperature, humility are assist optional choose based on cost and manufactory situation, because they can manually input such as seasons, ambient temperature, humility etc.

_Generally, the empirical formula is as follow: The time of baby bowel movement is proportional with the baby's eating food weight, and the change of the belly lines which depends on the individual situation. It closely related with infant ages (months), weight, feeding time interval. For example, the ROM has following reference data like this

Age (months)	baby weight (Kg)	feed interval time (hours)	solid food weight (gram/day)	belly line change (mm)	bowel movement times and time (times/day)	(am/pm)
0-1	3.5 -	2 -3	120 -	20-	1 time/2-3h	
:	:	:	:	:	:	:
:	:	:	:	:	:	:
7 -8	8-10	3-4	425	42	1time/day	8-10am
:	:	:	:	:	:	:
23	13	3-4	450	32	1time/day	8 am

Etc.

Notice: the milk liquid specific weight set as 1.125g/ml, based on volume can calculate the solid weight. For those mother feeds baby naturally, can consider use feeding time per times and measure the volume of milk per minute. The feed interval time not include the main night sleep time. The belly line change is measured between morning breakfast and lunch/supper. Other health information also can store in ROM for parent's reference. All those can help parent to forecast the time of bowel movement as well as let baby gradually form a health habit.

The said device has double soft, flexible belt with a small display, solar cell and a keyboard, like a mini calculator with a belt (figure 1). The device can be placed in different places, such as set it at the milk bottle or other places. (Figure2). But the size and shapes will be satisfied by safety consideration and better keep in parent/guardian's hand. The detail of the structure will descript as follow drawings.

DRAWINGS DESCRIPTION

Figure 1: The outlet view of the invention. The reference sign as follows: 1-skin sensors probes (possible develop function, option) 2-soft belt 3-keyboard 4-solar cells 5-display. 6-flexible belt 7, 8-connecter 9-sensor lines 10- replace battery place 11-environmental sensor probe 12- the frame of the device. 13- The pocket for holding soft length measurement ruler.

The sensor's measurement includes ambient parameters such as temperature, air humility etc. for those possible development functions: like measure skin temperature and humility. The sensor's material had better choose soft organic material to increase the comfortable level of the interface between probe and skin.

Figure 2: the designed device can be placed in different places, such as put at milk bottle, parents' hand wrist etc.

Figure 3: the diagram of the principle electronics parts in this invent device. It includes a specific application integrated circuit with internal or external ROM (Read-only memory) and RAM (Random-access memory) and accessory component, a LCD and its driver, fixed voice recorded IC (voice integrated electrical circuit board), speaker, skin temperature & humility sensor probes (optional) ambient temperature and humility sensor probe (optional). Solar cells power supply, data input keyboard or buttons. The input manner can use standard keyboard or simple press buttons. Every button separately represents 100ml, 500 ml liquid food (fix solid food weight, and change it monthly based on baby's weight), 100g, and 500g mixed solid food. seasons/temperature, etc. LCD –refer to Liquid crystal display)

Figure 4: the diagram of the data handling process.

THE OPTIONAL FUCTIONS AND POSSIBLE DEVELOPMENT

If possible by cost, the said device also can be integrated some mini-sensors to monitor the baby's healthy situation and ambient environmental parameters such as body temperature, skin humility, ambient temperature, air humility etc. Considering baby's skin is delicate, the device is packaged by soft clothing material. The device can provide related health information to parents' reference (figure 3). The principle of this method can also apply to development of other products such as for taking care some type's disable person.

REFERENCES

[1] ***Science study Guide in Cartoon-the secret of the human body.*** Published by International Juvenile in 1998. The popular book co Ltd in 1999. ISBN 957-651-356-1

[2] ***Infant feed,*** China food magazine, China food publication ISBN 7-800 44 -107 -5/TS-108 Published by 1988

[3] ***Excrete useless, unnecessary dements from body.*** Writers: The friends of homemaker association. Translator: Hui Zhi Tian Cheng. China pictorial publication Published in 2006. ISBN 7-80220-059-8.

I CLAIMS

1. a method to invent a device which can forecast and inform parents/guardian to take care of baby aged around one months to two years old for estimating the bowel movement time, It includes an empirical formula, which integrated in the device ROM; A application specific integrated circuit (IC), solar cells for power supply, ambient temperature and humility sensors (option), a keyboard (or a few buttons for input) and a speaker for output, a LCD display for key enter display and memory /choose optional display. All of this integrated into a small device and the double layer soft flexible belts.

2. The said empirical formula is based on research, survey and collection data from other published books. The formula is as follow: The time of baby bowel movement is proportional with the baby's eating food weight, and the change of the belly lines which depends on the individual situation. It closely related with infant ages (months), weight, feeding time interval. For example, the ROM has following reference data like this

Age	baby weight	feed interval time	solid food weight	belly line change	bowel movement times and time	
(months)	(Kg)	(hours)	(gram/day)	(mm)	(times/day)	(am/pm)
0-1	3.5 -	2 -3	120 -	20-	1 time/2-3h	
:	:	:	:	:	:	:
:	:	:	:	:	:	:
7 -8	8-10	3-4	425	42	1time/day	8-10am
:	:	:	:	:	:	:
23	13	3-4	450	32	1time/day	8 am

Etc.

Notice: the milk liquid specific weight set as 1.125g/ml, based on volume can calculate the solid weight. For those mother feeds baby naturally, can consider use feeding time per times and measure the volume of milk per minute. The feed interval time not include the main night sleep time. The belly line change is measured between morning breakfast and lunch/supper. Other health information also can store in ROM for parent's reference. All those can help parent to forecast the time of bowel movement as well as let baby gradually form a health habit. Consider individual situation, parents need measure and input own data for correct and accurate estimate time.

CLAIMS AMENDMENT

1. a device which can forecast and inform parents/guardian to take care of baby aged around one months to two years old for estimating the bowel movement time, it is characterized in that includes an application specific integrated circuit (IC) act as a microcontroller, an empirical formula and other necessary baby taking care reference are stored in the device's ROM for calculation and output when needed; solar cells for power supply, ambient temperature and humility sensors (option), a keyboard (or a few buttons) for input and a speaker for output, a LCD display for key enter display and memory /choose optional display; all of these and other necessary components described in drawings are integrated into a small device and the double layer soft flexible belts.

2. a technique method of using combination empirical formula in claim 1 to forecast and suggest guardian to take necessary action, the said empirical formula is based on research, survey and collection data from other published books, the_combination empirical formula is as follow: the time of infant bowel movement is proportional with the infant's eating food weight, and the change of the belly lines which depends on the individual situation, it closely related with infant ages (months), weight, feeding time interval; it is characterized in that the survey and collected reference data will record in the ROM that has showed an example in the description, the survey parameters are age, baby weight, feed interval time, solid food weight, belly line change, bowel movement time and the number of times per day; parents can choose or revise a properly reference data in the ROM (Read-only memory), set own feeding schedule daily and input own infant's survey data in the RAM (Random Access Memory), after that only need input infant weight monthly and belly line change weekly to the device, notice the feed interval time not include the main night sleep time for over 10months aged baby, the belly line change is measured between morning breakfast and lunch/supper, then the device will base on initial data, input data calculate the average bowel movement time and report it daily, other health information also can store for parent's reference; all those can help parent to forecast the time of bowel movement as well as let infant gradually form a health habit, consider individual situation, guardian need measure and input own data for correct and accurate estimate time.