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A COMPARISON OF DRY-BED TRAINING AND STANDARD URINE-ALARM CONDITIONING TREATMENT OF CHILDHOOD BEDWETTING

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Summary—Two experiments examined the significance of patient–therapist contact in the treatment of childhood nocturnal enuresis by behavioural methods. The first involving 45 enuretic children compared the effectiveness of the standard urine-alarm conditioning procedure when it is closely supervised as opposed to not supervised after the initial description of training. Results showed that adequate patient–therapist contact is necessary for the effective use of the standard conditioning treatment. One hundred and twenty children took part in the second experiment which compared standard conditioning with Dry-Bed Training (DBT) (Azrin *et al.*, 1974) administered under four different conditions—by the child's parents at home, by a professional trainer at home, by a professional trainer in hospital and by the child's parents without the adjunct of a conventional bed-buzzer device. DBT was superior to standard conditioning in terms of the proportion of bedwetters successfully treated and in terms of the speed of treatment. DBT was equally effective under all conditions of administration except where it did not have the adjunct of a machine, in which case it was only marginally better than no treatment at all.

A COMPARISON OF DRY-BED TRAINING AND STANDARD URINE-ALARM CONDITIONING TREATMENT OF CHILDHOOD BEDWETTING

Azrin *et al.* (1974) have reported a procedure called Dry-Bed Training (DBT), claiming this to be a more effective and rapid treatment of nocturnal enuresis in children than previously described treatments, including the standard urine-alarm conditioning method (Mowrer and Mowrer, 1938). DBT employs the traditional urine-alarm apparatus but adds such features as training in rapid awakening, practice in withholding urination, self-correction of toileting accidents and increased social motivation to become non-enuretic. The training is done in an all-night intensive programme conducted by an outside trainer in the child's home. A post-training supervision programme is then conducted by the child's parents until the child becomes continent. Subsequent studies (Bollard and Woodroffe, 1977; Doleys *et al.*, 1977; Hart *et al.*, 1980; Nettelbeck and Langeluddecke, 1979) have supported the overall effectiveness of DBT in arresting bedwetting. Bollard and Woodroffe (1977) further showed that it is still very effective when the child's parents are taught to administer the whole procedure, thereby eliminating the expense and inconvenience of having an outside trainer conduct the initial intense training night, as was the case in the original programme.

DBT is based on the conception of enuresis as a learning problem involving such diverse and complicated factors as motivation, degree of voluntary control over urination, parental concern, the strength of alternative responses and the ease of arousability from sleep. The role of the urine-alarm device in training is seen as a means of producing these social and motivational events, rather than direct conditioning of the bladder, as is held in the original Mowrer and Mowrer (1938) description of the standard urine-alarm procedure. Nevertheless, the urine-alarm apparatus appears to be an important adjunct to DBT. Bollard and Woodroffe (1977) showed an apparent reduction of bedwetting frequency using the Dry-Bed programme without a bed-buzzer device, although this method did not result in the complete arrest of bedwetting in any of the 10 children treated. However, as pointed out by Nettelbeck and Langeluddecke (1979) this study

contained a fundamental weakness in the collection of prospective baseline measurements and control data which doubtless exaggerated the effectiveness of the no-machine treatment. When more accurate baseline and control measures were established by Nettelbeck and Langeluddecke (1979), the Dry-Bed procedure without an enuresis machine was not found to be significantly better in curing nocturnal enuresis than no treatment at all. More recent studies by Azrin and Thienes (1978) and Azrin *et al.* (1979) have shown that with some modifications to the Dry-Bed procedure, bedwetting can be eliminated effectively without a machine, although the results are not as good as the original method (Azrin *et al.*, 1974) which had included the bed-buzzer device.

In the light of evidence attesting to the effectiveness of DBT, this had recently become the usual procedure for treating bedwetters referred to the Psychiatry Department of the Adelaide Children's Hospital. However, after using the method for several months in a clinical setting, the rate of success dropped significantly below that established in the experimental trial (Bollard & Woodroffe, 1977). It was speculated that this was due to less time being available to administer and follow up the procedure in normal clinical practice and/or that follow-up often involved a person other than the person who had established initial contact with the patient. Experimenters and clinicians have long been aware of the importance of patient–therapist contact in the treatment of bedwetting (Collins, 1973; Dische, 1973; Doleys, 1977; Lovibond, 1964). It seemed possible that the relative success of DBT over the standard conditioning approach was because the former involves more therapist time, resulting in higher motivation on the part of parents and child that was directed towards correct alarm useage.

Two experiments were conducted in order to examine the significance of patient–therapist contact in the treatment of bedwetting by behavioral methods. The first involved a comparison of two groups of children who underwent the standard urine-alarm procedure—one with close supervision and follow-up and the other without supervision. In the second experiment, six groups were compared. Four of these underwent variants of DBT: (a) by a professional trainer in the child's home; (b) by a professional trainer in hospital; (c) by the child's parents at home; (d) by the parents at home but without the adjunct of an enuresis machine. The fifth group was treated by the standard urine-alarm procedure and the sixth served as a no-treatment control. These comparisons permitted: (i) a comparison of DBT with the standard urine-alarm procedure; (ii) examination of whether the apparent superiority of DBT is significantly due to greater patient–therapist contact; (iii) consideration of the relative importance of various situational variables which could be controlled more effectively in the hospital ward than in the home; (iv) examination of the relative effectiveness of machine vs no-machine treatments.

EXPERIMENT 1

Method

Subjects. Forty-five children who were outpatients of the Adelaide Children's Hospital referred for treatment of nocturnal enuresis. All subjects had undergone a thorough medical examination by a paediatrician to rule out the possibility of underlying organic pathology and all were of apparently normal intelligence. The sample consisted of 32 males and 13 females. Age ranged from 5 to 14 years (mean age = 9 years 8 months). All children had a regular bedwetting frequency of at least one wet night per week. While many of the parents had previously sought medical assistance with respect to the child's enuresis, none of the children was undergoing any form of drug or psychotherapy at the time of the present study.

Apparatus. The urine-alarm apparatus consisted of a response electrode pad available from Ramsey-Coote Instruments (Australia) and described by Coote (1965). The alarm units were constructed at the Adelaide Children's Hospital in accordance with the requirements of the British Ministry of Health Performance Specifications for Enuresis Alarms. Details of the alarm's circuit are described in Pfeiffer and Lloyd (1978).

Table 1. *Experiment 1.* Sample characteristics of subjects assigned to treatment and control groups

Variables	Group		
	Standard urine-alarm with follow-up	Standard urine-alarm without follow-up	No-treatment
Number	15	15	15
Mean age (years and months)	9–10	9–9	9–5
Ratio males to females	11:4	11:4	10:5
Mean wet nights per week	5.3	5.4	4.2

Procedure. Children were selected from a waiting list in accordance with hospital policy that those waiting longest should be treated first and that older children be given priority. They were assigned at random to one of three groups of 15 children; two were experimental (treatment) groups and the remaining group a no-treatment (control) group. Sample characteristics of the three groups are presented in Table 1.

(i) *Treatment Group 1*

Mothers of children in this group all attended an initial individual interview at the hospital. Fathers were also invited to attend but in many cases did not, presumably because of employment commitments. A detailed history of the child's bedwetting was taken, along with information relating to the family history of the problem, previous treatment attempts and attitudes towards the problem. A brief explanation of the treatment was given but it was explained that before treatment could commence, a detailed record of the child's bedwetting frequency would need to be established for at least one month. The parent was then given a calendar on which to record the nightly wetting frequency and a further appointment was arranged for 4 weeks hence. The parents were instructed not to alter their method of managing the child's bedwetting during the baseline period.

At the second interview the child attended with the parent. The equipment was demonstrated and the standard urine-alarm procedure was described in detail. Written instructions for the procedure were issued together with a calendar to continue recording bedwets. The procedure involves placing the urine-alarm device in the child's bed such that when the loud alarm is triggered by a wetting accident the child is awakened and required to go quickly to the toilet in order to finish voiding. After returning to the bedside the wet sheet is removed, the detector pad dried thoroughly and the alarm re-set. Then the child gets back into bed and returns to sleep. Parents are required to assist the child through this process if he is unable to manage alone.

The parent (or child if old enough) was required to contact the first author weekly by telephone and report on progress and a specific time for reporting was arranged. Parents were encouraged to make contact immediately if difficulties arose before the designated weekly time. Any cases not reporting at the designated time were contacted by telephone or letter if they were not on the telephone.

Treatment continued until the child achieved 14 consecutive dry nights, at which time the machine was returned to the hospital. The parents were encouraged to contact the hospital if the child relapsed, i.e. if he resumed wetting the bed more than once per week during a 4 week period. In order to monitor relapse more thoroughly, the first author contacted the family at 3-month, 6-month and 12-month intervals after the success criterion had been reached.

(ii) *Treatment Group 2*

This group underwent the same procedure as Treatment Group 1, except that no weekly follow-up was arranged after issuing the machine. That is, the parent and child attended the two initial sessions receiving the same instructions, but thereafter were not required to make weekly reports. Instead, they were instructed to return the machine after the child achieved 14 consecutive dry nights. Relapses were monitored in the same way as for the previous group.

(iii) *Control Group*

Mothers of children in this group were interviewed individually and a detailed history of the child's bedwetting taken in the same manner as for the two treatment groups. The mother was informed that it would be some time before her child's bedwetting could be attended to (at the time of the experiment the waiting period was 6–12 months). She was asked to keep a daily record of the child's bedwetting on the calendar provided. During this period parents were instructed not to alter their method of managing the child's bedwetting in any way. To ensure a good response, a return paid envelope was sent to the parents each month. The record was kept throughout a five month period, after which these children were treated as soon as a machine became available.

Results

Figure 1 shows the mean number of wet weights per week for each group of children over the 20 week experimental period. Two curves have been plotted for Group 2 (standard urine-alarm procedure without supervision). This was done because three subjects discontinued after 5 weeks, 6 weeks and 8 weeks respectively. In curve (a) the average bedwetting frequency of the three children at the point of dropping out was retained in the calculation of mean scores for the remainder of the 20 week experimental period. Curve (b) represents the group's average bedwetting frequency when these children are excluded. Since the dropouts were among the poorest responders to treatment, excluding their scores from subsequent data, as in curve (b), obviously exaggerates improvement in this group. It can be seen from the curve (a) that when adjustment for dropouts is made this group did not do as well.

When data from the three dropout subjects were excluded (curve (b)), the three groups differed significantly both with regard to the number of wet beds at the end of the 20 week experimental period ($F(2,39) = 18.55$, $P < 0.0001$) and the number of days taken to reach the dryness criterion ($F(2,39) = 18.34$, $P < 0.0001$). Planned comparison between the two treatment groups did not yield a statistically significant difference, either with respect to wet beds or the treatment time ($t(39) = 0.71$, $P > 0.05$; $t(39) = 0.99$, $P > 0.05$ respectively). However, when average data for dropout subjects were retained, as described above, planned comparison between the two treatment groups revealed that they differed significantly in respect of the number of wet beds ($t(42) = 1.99$, $P = 0.05$) and the difference just failed to reach significance in respect of days taken to dryness ($t(42) = 1.90$, $P = 0.06$).

None of the 15 children who underwent the standard procedure with supervision dropped out of treatment during the 20 week experimental period, whereas 3 out of 15 undergoing the standard urine-alarm procedure without supervision failed to persist with treatment. In other respects also the standard procedure with supervision produced marginally better outcomes, as shown in Table 2, but differences were not statistically significant.

EXPERIMENT 2

Method

Subjects. One hundred and twenty children referred to the Adelaide Children's Hospital for treatment of nocturnal enuresis served as subjects. As in Experiment 1 they had all

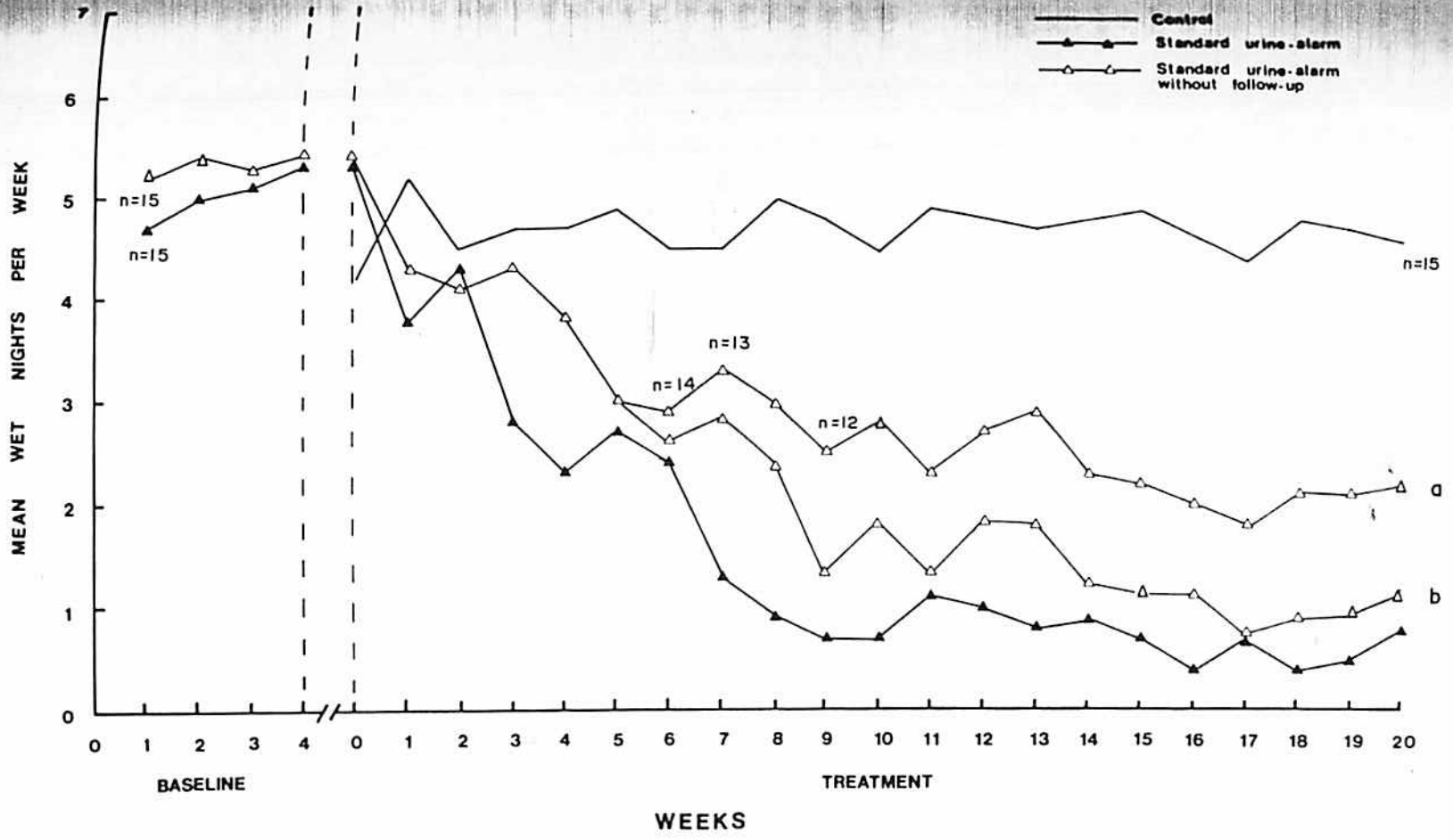

Fig. 1. *Experiment 1.* Mean wet nights per week for three groups throughout 4 weeks of baseline and 20 weeks of treatment: (a) average bedwetting frequency of three drop-out cases retained, (b) three drop-out cases excluded.

Table 2. *Experiment 1.* Summary of results from three groups in terms of subjects attaining dryness, number of relapses during follow-up, average time to last wet night and mean number of wet nights

Group	*N*	Cases reaching dryness criterion	Relapses during 12-month follow-up	Mean number of days to last wet night	Mean number of wet nights
Control	15	0	not applicable	not applicable	94
Standard urine-alarm with supervision	15	12	4	66	28
Standard urine-alarm without supervision	15	9	5	80	37

undergone a thorough medical examination and were of apparently normal intelligence. At the time of the study none of the children was undergoing any form of drug or psychotherapy for bedwetting. The sample consisted of 82 males and 38 females whose ages ranged from 4 to 15 years with a mean age of 9 years. All children included in the study had a regular bedwetting frequency of at least one wet night per week.

Apparatus. The urine-alarm apparatus was as described for Experiment 1.

Procedure. Subjects were selected from a waiting list according to their time of referral and assigned at random to one of six groups numbering 20. Of the five treatment groups, four underwent variants of DBT, as described in detail by Azrin *et al.* (1974). The initial training night for Dry-Bed groups was carried out under four different conditions: by a professional trainer in the child's home; by a professional trainer in hospital; by the child's parents at home; by the child's parents at home but without the adjunct of a urine-alarm device. The remaining treatment group underwent the standard urine-alarm conditioning procedure, described in Experiment 1, while the sixth group served as a no-treatment control. Sample characteristics of the six groups are presented in Table 3.

In all cases undertaking treatment the parents presented at the hospital for an initial interview at which time a detailed history of the child's bedwetting was taken. They were then required to keep a record of the child's bedwetting frequency for the next month, after which treatment began. The need to keep regular contact during treatment was emphasized and a specific time was arranged for the parent or child to call weekly and report on progress. Treatment continued until the child achieved 14 consecutive dry nights at which point the apparatus was returned. Progress was monitored at 3 months, 6 months and 12 months after reaching the success criterion, although parents were advised to contact immediately if the child had clearly relapsed beforehand.

Table 3. *Experiment 2.* Sample characteristics of subjects assigned to treatment and control groups

Variables	Treatment groups					
	DBT (home)	DBT (hospital)	DBT (parents)	Dry-Bed procedure without machine	Standard urine-alarm procedure	Control
Number of subjects	20	20	20	20	20	20
Mean age (years and months)	9–3	8–11	9–7	8–6	8–8	8–10
Ratio males to females	14:6	13:7	16:4	14:6	14:6	11:9
Mean bedwetting frequency per week	5.8	5.2	6.0	5.7	6.0	4.7

A. Group 1—DBT by a trainer in the child's home

After baseline data were obtained, the first author visited the home, arriving about 2 hours before the child's usual bedtime. After explaining the full procedure he conducted the initial all-night training programme. The procedure calls for hourly awakening on the first night which the trainer did until about 1.00 am at which time the parents took over. Detailed instructions were left for the post-training supervision phase of treatment which the parents conducted.

B. Group 2—DBT administered by training in hospital

After establishing baseline bedwetting frequency, children in this group were admitted to hospital overnight for the all-night training programme. Children came into the hospital with their parents after school, being met by the first author who explained the procedure in detail. After a brief examination by the Ward doctor, the children had a meal and played until bedtime. At bedtime the first author began the all-night procedure, continuing the hourly awakenings until about 1.00 am, at which point a nurse took over. The child was discharged the next morning and progress was monitored weekly.

C. Group 3—DBT administered by the child's parents at home

Children in this group underwent DBT at home but had their parents administer the all night schedule rather than a professional trainer. After the preliminary interview and collection of baseline data, children and their parents met in the first author's office to discuss the treatment. The urine-alarm apparatus was demonstrated and the Dry-Bed procedure was then described in detail including the rationale for each step. Great care was taken to ensure that the procedure was understood by the parent and child during this session. The room was equipped with a bed to enable the steps to be role-played. An instruction sheet outlining the sequence of steps was given to the parent to take home for reference. It was suggested that the training be commenced on a Friday or Saturday night so that the parents and child had the following day to recover from the all-night session. Both parents were encouraged to share the responsibility of supervising training. The importance of following the instructions closely was emphasized as was the need to maintain regular contact with the first author during the post-training night phase of treatment.

D. Group 4—DBT by the parent without use of a urine-alarm device

This group underwent the same procedure as Group 3, except that no alarm was used at any stage and reference to the enuresis machine was deleted from instructions. Some modification of the original Dry-Bed procedure was necessary in order to manage bedwetting accidents. Without the alarm parents could not know exactly when wettings occurred. Bedwetting could only be detected in this group at the time of a scheduled awakening by the parents or the next morning or if the child happened to wake himself during the night. In these situations the procedure that followed an accident was: (i) fully awakening the child to finish voiding in the toilet; (ii) cleanliness training and positive practise trials as soon as the wet bed was detected. In all other respects Group 4 followed the same procedure as Group 1.

E. Group 5—Standard conditioning

Children in this group underwent the standard urine-alarm conditioning treatment with supervision, described in Experiment 1. The parents attended an initial interview, established a baseline for one month and returned with the child for a detailed description of procedure. Regular weekly contact was required until the success criterion had been reached. Follow-up occurred at 3-month and 6-month intervals to monitor relapse.

F. Group 6—Control

Children in this group received no treatment for their bedwetting and were managed in the same way as described for Experiment 1.

Results

Figure 2 shows the mean number of wet nights per week throughout the 20 week experimental period for each group of children. Altogether, 12 of the 20 children undergoing DBT without the adjunct of an enuresis machine discontinued treatment at the points indicated on curve (a) in Fig. 2. In curve (a) the average weekly bedwetting frequency of the 12 dropout subjects at the time of ceasing treatment has been retained when calculating means for the remainder of the 20 week experimental period. As in Experiment 1, this was done because the dropouts tended to be children whose response to treatment was poorest. Curve (b) excludes data from the dropouts from the calculation of mean weekly bedwetting frequency after the point at which treatment was discontinued.

It can be seen from Fig. 2 that DBT with the adjunct of an enuresis machine was very effective in eliminating bedwetting, irrespective of whether it was administered by parents, by a trainer in the child's home or by a trainer in hospital. The standard urine-alarm procedure was also effective in reducing bedwetting frequency although not as successful as DBT. On the other hand, the Dry-Bed procedure without a urine-alarm device was markedly less effective. The control group's bedwetting frequency remained virtually unchanged throughout the 20 week experimental period.

Data from the six groups at the end of eight weeks of treatment (i.e. before any subject had discontinued) were examined by oneway analysis of variance together with a number of planned comparisons. Groups differed significantly with regard to the number of wet nights ($F(5,114) = 25.92$, $P < 0.0001$) and the number of days taken to achieve dryness ($F(5,114) = 10.07$, $P < 0.0001$). The Dry-Bed procedure without an enuresis machine and the control group differed significantly in terms of the number of wet nights ($t(114) = 2.22$, $P < 0.05$), but not in terms of the number of days to dryness. Comparison between all four groups receiving machine-based treatments and the two no-machine groups confirmed the effectiveness of machine treatment in respect of wet nights ($t(114) = 11.05$, $P < 0.001$) and days to dryness ($t(114) = 6.73$, $P < 0.001$). The difference between the standard conditioning group and the sum of the DBT groups using a machine was not statistically significant for either the wet nights factor or the days to dryness factor. The three DBT groups with machine did not differ significantly from one another on either factor ($P > 0.05$ in all instances).

At the end of 8 weeks of treatment significantly more children in DBT groups with a machine were dry, when compared with the standard urine-alarm group ($X^2 = 7.91$, $P < 0.01$) or the group treated by the Dry-Bed procedure without a machine ($X^2 = 35.45$, $P < 0.001$). However, the success rate in the standard conditioning group was higher than in the group trained by the Dry-Bed method without a machine ($X^2 = 6.66$, $P < 0.01$).

Similar analyses of data were carried out at the end of the 20 week experimental period, but excluding the Dry-Bed procedure without a machine because of the large attrition rate in this machine group. Groups again differed significantly with regard to wet nights ($F(4,95) = 55.09$, $P < 0.0001$) and with regard to days taken to dryness ($F(4,95) = 26.88$, $P < 0.0001$). Planned comparison of the three remaining DBT groups with the standard conditioning group established that DBT was more effective, both with respect to the number of wet nights ($t(95) = 2.21$, $P < 0.05$) and the number of days to dryness ($t(95) = 2.99$, $P < 0.01$).

Of the 60 children consigned to DBT with a machine, all achieved the success criterion. The combined average number of wet nights was 13 and the combined average time taken to the last wet night was 35 days. There was a total of 15 relapses over a 12-month follow-up period. These results attest to the greater success of DBT with a

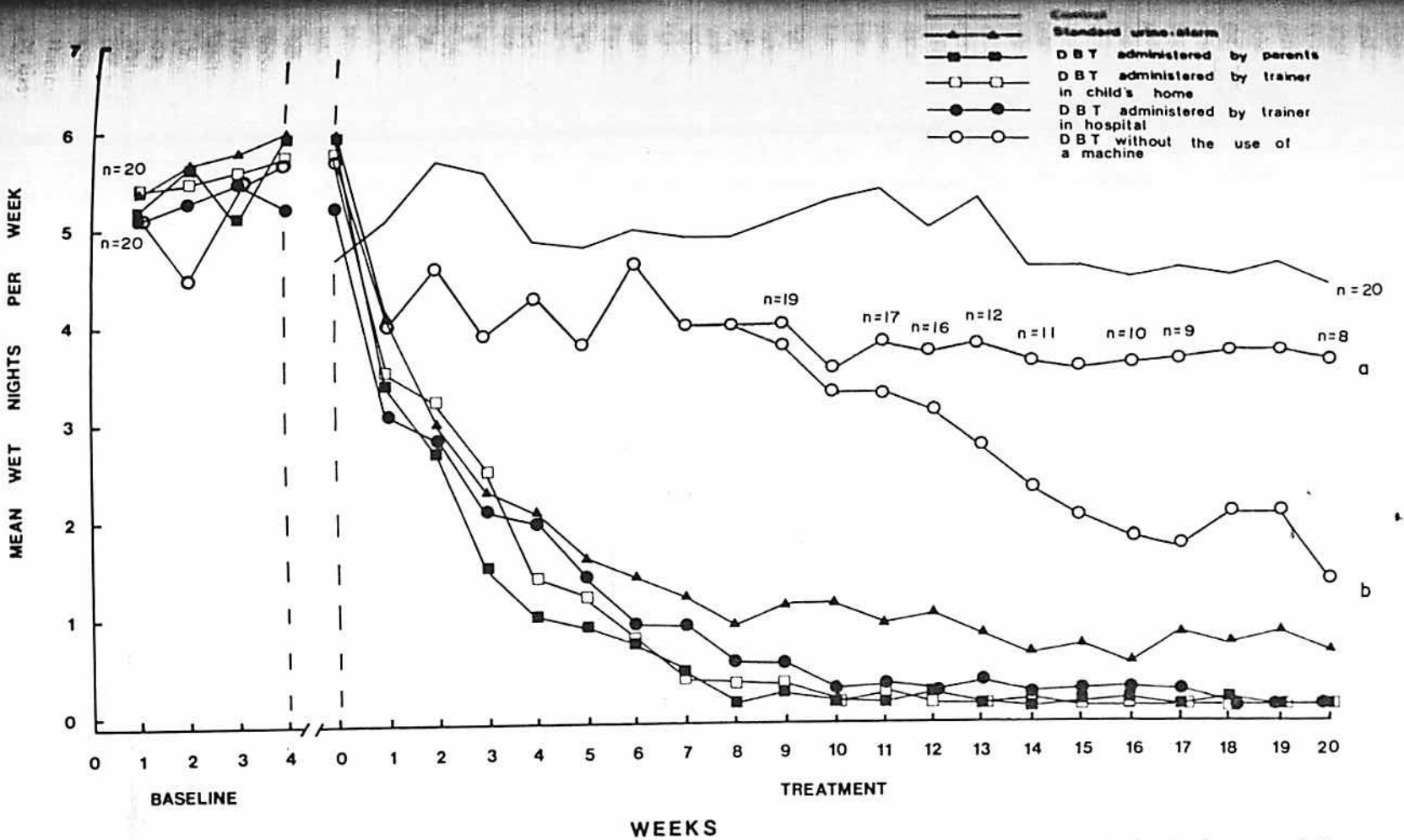

Fig. 2. *Experiment 2.* Mean wet nights per week for six groups throughout 4 weeks of baseline and 20 weeks of treatment: (a) average bedwetting frequency of all drop-out cases retained; (b) drop-out cases excluded.

Table 4. *Experiment 2.* Summary of results for six groups in terms of subjects attaining dryness, number of relapses during follow-up, average time to last wet night and mean number of wet nights

Group	*N*	Cases reaching dryness criterion	Relapses during 12-month follow-up	Mean number of days to last wet night	Mean number of wet nights
Control	20	2	2	129	96
DBT by therapist in home	20	20	5	32	14
DBT by therapist in hospital	20	20	6	40	14
DBT by parents at home	20	20	4	34	11
Dry-Bed procedure without machine	20	5	2	116	78
Standard urine-alarm	20	16	6	63	26

machine, when compared with the alternative procedures examined. Thus, only 5 of the 20 children trained by the Dry-Bed method without a machine reached the success criterion of 14 consecutive dry nights and 12 dropped out of treatment during the experimental period. Of the five successful subjects, three relapsed subsequently. Sixteen of the 20 children in the standard conditioning group reached criterion, the average number of wet nights being 26. The average number of days spent in treatment was 63 and 6 cases relapsed during the 12-month follow-up. Two of the 20 children in the control group were dry for 14 consecutive dry nights during the course of recording. Both subsequently resumed wetting the bed at about their initial frequency. A summary of these results is presented in Table 4.

At the end of the 20 week experimental period the three DBT with machine groups achieved significantly greater success with respect to arrests of bedwetting than was the case in the standard urine-alarm group ($X^2 = 4.21$, $P < 0.05$) or in the group undergoing the Dry-Bed procedure without a machine ($X^2 = 55.39$, $P < 0.001$). The standard procedure was in turn superior to the Dry-Bed procedure without a machine ($X^2 = 26.46$, $P < 0.001$). Examination of the relapse rates revealed no significant differences between any of the treatment groups.

DISCUSSION

There are several possible reasons to account for the finding from Experiment 1, that supervised training enhanced the effectiveness of treatment. Psychologists have long been aware of placebo effects in psychological therapies and such an effect is commonly thought to be an appreciable component in the effective treatment of bedwetting, although usually not sufficient to result in a cure. It seems probable that greater patient–therapist contact increases the family's motivation to persist with the urine-alarm procedure, thereby increasing the likelihood of correct alarm usage. It became apparent that some parents in the no-supervision group were not always checking that the machine was switched on at night and that some were lax in supervision of the toileting regimen following the detection of wet beds. Thus, adequate patient–therapist contacts appears to be an important factor in the effective treatment of nocturnal enuresis in children when the treatment is based on the use of a urine-alarm device.

Results of the second experiment showed that DBT when used in conjunction with an enuresis machine was consistently more effective than standard conditioning in arresting

bedwetting, both in terms of the proportion of children who can be treated successfully and the overall speed of treatment. Furthermore DBT appears to be equally effective, whether the initial all-night training programme is administered by the child's parents or by a professional therapist in the child's home or in hospital. The group given DBT by parents did not have more therapist contact that the standard conditioning group. The other two DBT groups had significantly more therapist contact but did no better than the parent trained DBT group. Indeed, results for all three DBT groups were very similar. Thus, while a certain degree of patient–therapist contact is essential for effective treatment by these methods, increasing the amount of the therapist time beyond this level does not result in a commensurate improvement in the child's response. A more salient point, however, is that the success of the parent-administered group indicates that the superiority of DBT over the standard urine-alarm procedure cannot simply be attributed to increased therapist time. Presumably the reasons for the effectiveness of DBT are related to the additional training features such as the practice and cleanliness training following accidents and the nightly waking schedule. Further experiments are currently underway to attempt to delineate the components of the programme which are more effective than others.

The hospital trained DBT group was included because it seemed possible that any placebo effects during the initial training night might be maximized in this condition. However, the results for this group were not significantly different from the other two DBT groups and indeed the response of children in this group was marginally poorer. This may have been due to the anxiety evoking effects of hospitalization, as noted in several previous studies (Belmont, 1976; Fagin, 1969; Vernon *et al.*, 1965), since some of the children admitted to hospital for training were observed to suffer mild anxiety reactions.

The Dry-Bed procedure without a machine was only partially effective in reducing bedwetting frequency. While the reduction in the number of bed wets was statistically significant after 8 weeks of training, it resulted in only 5 out of 20 children obtaining the success criterion of 14 consecutive dry nights. If one accepts that the major goal of treatment is to achieve complete arrest of the symptoms then this outcome is not satisfactory. Furthermore, 12 of the 20 children in this group discontinued treatment before the 20 week experimental period had expired. The major reason given for discontinuing was discouragement as a consequence of the child's lack of progress, coupled with the demands of the complicated procedure. Another possible reason for this group's poorer response is that without a machine accidents could only be detected at the time of a scheduled awakening by the parents or the next morning or if the child awakened during the night. There was no way of detecting bedwettings that occurred more than once during these intervals. Thus the procedure with a machine may have been more successful because it enabled the detection of more bedwetting accidents and consequently provided more opportunities for social reinforcement. In addition, the alarm enables the outcome of bedwetting (e.g. positive practise, cleanliness training) to be immediate rather than delayed as in the no-machine situation. Thus, the enuresis alarm appears to be a necessary component in DBT.

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