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Compliance to Mothers' Instructions with Medical Treatment

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Abstract

Atopic dermatitis is a chronic skin disease with unknown etiology and high incidence in childhood. Although the response of following medical recommendations is an important behavior to control the symptoms, there are high rate responses of nonfollowing prescriptions, described as noncompliance. This study evaluated, in a brief direct assessment, the control exerted by direct and indirect instructions, verbalized by mothers, in compliance with medical treatment. Four girls, ages 9, 12, 13 and 14, diagnosed with atopic dermatitis and theirs mothers. They were scheduled outpatients at the dermatology department of a tertiary university hospital. The behavioral assessment was conducted according to a brief multielement experimental design in three phases. The use of direct instructions increased the probability of compliance behaviors, especially when associated with physical guide and praise. The results of this study can be important to identify the most important variables in the treatment of children with atopic dermatitis and to develop group or individual intervention programs.

Keywords: Instructions, compliance, behavioral assessment, atopic dermatitis.

Obediência às Instruções Maternas em Situação de Tratamento Médico

Resumo

A dermatite atópica é uma doença crônica de pele com etiologia desconhecida e alta incidência na infância. Embora a emissão de respostas para o seguimento de recomendações médicas seja um importante comportamento para o controle dos sintomas, existe elevadas taxas de respostas de não seguimento das recomendações médicas, compreendida como desobediência ou não adesão. O presente estudo avaliou, em uma breve avaliação direta, o controle exercido por instruções diretas e indiretas, verbalizadas pelas mães, no comportamento de obediência às em situação de tratamento médico. Participaram do estudo quatro meninas, com idades entre 9 e 14 anos, diagnosticadas com dermatite atópica e suas mães. Elas foram recrutadas no departamento de dermatologia de ambulatório de especialidades de um hospital escola. A avaliação comportamental foi realizada por meio do delineamento experimental de multielementos, realizado em três fases. O uso de instruções diretas aumentou a probabilidade de emissão de comportamentos de obediência, especialmente quando associados ao uso de condução física e elogios.

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Os resultados deste estudo podem ser importantes para identificar as variáveis mais importantes no tratamento de crianças com dermatite atópica e para desenvolver programas de intervenção individuais ou em grupo com esta população.

Palavras-chave: Instruções, obediência, avaliação comportamental, dermatite atópica

Obediencia a las Instrucciones Maternas para el Tratamiento Médico

Resumen

La dermatitis atópica es una enfermedad crónica de la piel con etiología desconocida y de alta incidencia en la infancia. Aunque es importante seguir las recomendaciones médicas, hay altas influencias para no seguir las recomendaciones médicas, descriptas como desobediencia. Este estudio evaluó, en una breve evaluación directa, el control ejercido por las instrucciones directas e indirectas, verbalizada por las madres durante la situación de tratamiento médico. El estudio evaluó a cuatro niñas con dermatitis atopica, entre nueve y catorce años, y a sus madres. Las evaluaciones ocurrirán con pacientes reclutado en el departamento de dermatología de un hospital-escuela. Las evaluaciones ocurrirán en tres etapas según el delineamiento experimental de multielementos. El uso de instrucciones directas e indirectas aumentó la probabilidad de conductas de obediencia, especialmente asociada con la conducción física y el elogio. Los resultados de este estudio pueden ser relevantes para identificar las variables más importantes para el tratamiento de niños con dermatitis atópica y para el desarrollo de programas de intervenciones individuales o grupales.

Palabras clave: Instrucciones, obediencia, evaluación conductual, dermatitis atópica.

Atopic dermatitis is a chronic skin disease with unknown etiology and high incidence in childhood (almost 15% to 30% of all children). The main characteristics are prurigo, inflammation, and crusted injuries, especially in joints (Bieber, 2010). The treatment involves the application of topical medicines, such as ointments, oils and moisturizer creams. Moreover, the prevention of some environmental factors, such as excessive cold or hot weather; wool or artificial textile clothes; and some foods is an important step in the treatment (Willians, 2005).

Because atopic dermatitis is a chronic health condition, compliance with medical treatment is extremely important in decreasing and controlling the symptoms. This control must occur daily and be conducted by patients and/or their caregivers. However, high rates of noncompliance with medical treatment are observed in this population (between 40% and 50%; Krejci-Manwaring et al., 2007). Studies of treatment adherence have pointed to the communication between caregivers and child and/or adolescents as an important factor of compliance in any phase of treatment (Luciano & Herruzo, 1992; Oliveira & Gomes, 2004). These authors suggest that those caregivers' systematic verbalizations about the disease or treatment are necessary for the gradual transition from health care provided by the caregiver to self-care (e.g., the child or adolescent apply by himself some ointments to the skin or prevent some environmental risk factors, such as cold weather or specific food).

However, this transition is likely only if following instructions, observed through self-care responses, can be controlled by rules. Preschool-aged children are less susceptible to respond by control of instructions than adolescents or adults (Bentall & Lowe, 1987). With these young children, caregivers frequently conduct the medical treatment. On the other hand, primary school-aged children and adolescents are more compliant in following instructions or rules to specific tasks, as observed by Wysocki (2006) in patients with diabetes. For that reason, caregivers often assign these older children and adolescents the

responsibility of conducting their own medical treatment. According to Luciano and Herruzo (1992), health-care repertoires are a type of rule-governed behavior, involving both immediate and delayed contingencies. By complying with treatment immediate consequences are always likely to control the child's behavior. Later, after a modeling process conducted by caregivers or health-care professionals, it may be more likely that delayed consequences, control the child's compliance with the treatment (e.g., better skin health status).

In many cases, nonfollowing prescriptions could be understood as a function of prior compliance history or, in other words, a type of problem behavior (Reitman & Gross, 1996). Commonly, caregivers and health professionals describe noncompliance with medical treatment as a problem behavior. They usually use dualistic words to describe these problems and identified them in a wider class, such as internalizing (e.g., cry, ignore caregiver's instructions, fear, nervous, worry) and externalizing behavior (e.g., scream, beat people or things, break rules, run away; Achenbach & Edelbrock, 1979). In the case of pediatric atopic dermatitis, some studies correlate the disease with internalizing and externalizing behavior problems (e.g., Dennis, Rostill, Reed, & Gill, 2006; Fontes et al., 2005; Pauli-Pott, Darui, & Beckmann, 1999; Wamboldt, Schmitz, & Mrazek, 1998).

However, behavior-analytic researchers have demonstrated that different types of instructions (e.g., direct or indirect) change the likelihood of a child's compliance independently of the child's behavioral profile (Bouxsein, Tiger, & Fisher, 2008; Braam & Mallot, 1990; Harding, Wacker, Cooper, Millard, & Jensen-Kovalan, 1994; Reitman & Gross, 1996; Roberts, McMahon, Forehand, & Humphreys, 1978). Roberts et al. investigated the effects of direct parental instruction giving and time-out on their children's compliance. Twenty-seven mothers were randomly assigned to three parent-training groups: command training, command plus time-out training, and placebo. After the training, all mother-child interactions were assessed directly in structured situations. The results indicate higher frequencies of compliance behavior among children where mothers were assigned to command training and command plus time-out training than those of the placebo group.

Bouxsein et al. (2008) and Braam and Mallot (1990) investigated varying statements concerning the probability of reinforcement. However, they indicate, in general, the importance of clear, objective, and direct instructions, which describe target behaviors and likely result in an increase in the likelihood of compliance. Harding et al. (1994) investigated in a brief assessment some variables that controlled appropriate child's behavior. The study evaluated seven children in interaction with their caregivers, in a brief multielement design, and assessed general and specific instructions as antecedent variables. The main results extend the previous studies of direct assessment procedures and suggest that clear and objective instructions (i.e., specific instructions) are important in increasing the likelihood of compliance.

In the present investigation, the following were taken into consideration: (a) high incidence of atopic dermatitis in childhood, (b) low rates of following medical recommendations among children with atopic dermatitis, (c) higher incidence of children with atopic dermatitis diagnosed with behavior problems than children without the disease, (d) higher control exerted by verbal instructions over the behavior of elementary school-aged children and adolescents than over preschool-aged children, and (e) the effect of direct and indirect instructions on compliance. We investigated, in a brief direct assessment, the control exerted by direct and indirect instructions, verbalized by mothers, in compliance with the treatment.

Method

Participants

Four girls, ages 9, 12, 13 and 14, diagnosed with atopic dermatitis and theirs mothers. They were scheduled outpatients at the dermatology department of a tertiary university hospital. The selection criteria were as follows: (a) having a atopic dermatitis diagnosis, (b) being in medical

treatment during the study, and (c) being classified as "clinical for internalizing and/or externalizing problem behavior" through the results of the CBCL-6/18 (Achenbach & Rescorla, 2001), which was taken by their respective mothers.

Settings and Materials

The procedures were conducted in the Department of Dermatology at a tertiary university hospital and in a Psychology Clinical School. The participants' recruitment was taken in the Department of Dermatology, where the mothers were interviewed by the first author and completed the CBCL-6/18 (Achenbach & Rescorla, 2001) about their children. The materials used during this phase was a digital audio recorder and some blank sheets.

The behavioral assessments were taken in a Psychology Clinical School and were observed through mirrors and recorded via closed-circuit television. The materials used during the assessments included a desk, two chairs, two camping mattresses, skin's medicines, and leisure items. Leisure items included toys (e.g., blocks, Legos®, dolls, toy kitchens, coloring books, crayons, color pencils, blank and color sheets, etc.), some games (e.g., puzzle, chess, cards, etc.), and a computer with internet access. Skin medicines included ointments, moisturizing cream, and skin oils.

Instruments

Child Behavior Checklist for Ages 6/18 (CBCL-6/18; Achenbach & Rescorla, 2001). The CBCL-6/18 consists of 118 items for emotional and behavioral problems and 20 items concerning to activities, sociability and academic activities in children aged 6-18 years. Children are rated by their mothers for on a checklist for competences and on a 3-point scale for total problems. The scale classifies the children as clinical, non-clinical or borderline for social competence, behavioral problems and syndromes.

Instructions Guide for the Study. The guide was used as a support guide to instruct the mothers about how to behave in each study phase and to describe operational definitions for compliance behavior, noncompliance behavior, direct and indirect instructions.

Checklist to Verify Mothers' Understanding of the Procedure. The checklist was used after mothers' training and rehearsal. The main objective of the checklist was to verify her understanding of the procedure (e.g., differences between compliance and noncompliance with treatment, differences between direct and indirect instructions, and how to request the child during the assessment), and how to interact with children during the following phases.

Data Collection Checklist. The checklist was used to collect data according to categories of the child's behavior and of the mother's behavior.

Measurement

Child Behavior Checklist for Ages 6/18 (CBCL-6/18; Achenbach & Rescorla, 2001). For emotional and behavioral problems the results are aggregated into a total problems score in two broadband scores (internalizing and externalizing), and all raw scores were converted to T- Scores, as follow: T-score < 63 are in the non-clinical range, T-score between 60 to 63 are in borderline range and T-score > 63 are in the clinical range. For competences the children could be classified in broadband scale for total competence, and in narrowband scales for activities, social and scholar. All raw scores were converted to T- Scores, as follow for broadband scale: T-score < 31 are in the clinical range, T-score between 31 to 35 are in borderline range and T-score > 35 are in the non-clinical range. For narrowband scale (i.e., activities, social and scholar) the T-scores are T-score < 37 are in the clinical range, T-score between 37 to 40 are in borderline range and T-score > 40 are in the non-clinical range.

Response Definitions. There were three categories of dependent variables for the child's behavior: compliance with treatment, noncompliance with treatment, and inappropriate behavior. *Compliance with treatment* was to initiate all on-task behaviors within 5 s of the end of the mother's request (e.g., taking the topical medicines, applying topical medicines on the skin, closing

the tube of ointment, keeping it in the purse, and others). *Noncompliance with treatment* was the failure to initiate on-task behaviors requested by mothers within 5 s or failure to complete them. *Inappropriate behavior* was identified as high-intensity or disruptive behavior that functioned to allow the client to escape or avoidance compliance with the treatment (e.g., swearing, hitting, kicking, throwing objects, displaying temper tantrums, climbing on furniture, attempting to leave the room, actively refusing to perform the mothers request, playing with other objects, involving in other tasks).

Procedural Integrity. In addition to the dependent variables, the experimenters recorded five categories of mothers' interactions with the child, based in Cooper et al. (1992), Hupp, Reitman, Forde, Schiver, and Kelley (2008), and Reimers et al. (1993): direct instruction, indirect instruction, praise, reprimand, and physical guide. *Direct instruction* was a simple, direct, and clear command, request, or instruction verbalized by mothers in a declarative form. This instruction was nominally sufficient and specific in indicating the behavior expected from the child and that would enable the child to complete the task alone (e.g., "Put the tube on the table," "Apply the ointment on the knee,"). *Indirect instruction* was an ambiguous, indirect, and unclear order, command, or instruction verbalized by mothers in a nonspecific way to something the child did. This instruction could be stated as a question (e.g., "Do you need some ointment on your arms?"). *Praise* consisted of positive responses about a child's behavior and included a labeled praise, in a manner that described what the child did (e.g., "I like the way you apply the ointment on your face," "You did a good job of working on your skin today"); unlabeled verbal praise, which is not descriptive (e.g., "Nice," "Very good," "Good work"); and nonverbal praise (e.g., high five, a hug, a pat on the back). *Reprimand* consisted of corrective feedback about the child's behavior with verbal statements (e.g., "Don't do this again," "You are a bad girl"). *Physical guidance* included attempt to physically prompt the child to comply the task (e.g., holding the child by the hand, bringing her next to the table and applying the ointment, putting the ointment in child's hand and helping her apply the ointment).

Data Collection and Interobserver Agreement

The participants' recruitment and selection was conducted with structured interview and CBCL. All checklists completed by mothers were verified with a specifically software (ADM 7.2; Achenbach, 2007). Data were described in a table, classified as clinical, non-clinical or borderline for social competence and behavioral problems.

The behavioral assessment was conducted in a Psychology Clinical School in a one-way mirror room. The room was equipped with two video cameras, microphones, and one-way mirrors. The investigator stayed during the procedure in another room, which was equipped with a video monitor, headsets, and microphones. Two independent observers watched the recorded sessions. The observers were trained to collect data according to the three categories of the child's behavior and five categories of the mother's behavior, using a 6 s partial-interval recording procedure. Interobserver was assessed by having both raters scoring either the occurrence of mother and child behavior categories. Agreement was calculated separately for the observations of mother and child based on an interval-by-interval and minute-by-minute basis. Agreement was computed by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. For all participants, the occurrence of agreement ranged from 80% to 97% (average of 85%).

Design

The behavioral assessments occurred in three phases: free-play, according to a brief multielement experimental design, across rapidly changing assessment conditions, based on Cooper et al. (1992) and Reimers et al. (1993).

The first phase, free play, consisted of free play between mother and her child, with toys, academic tasks, materials, and games. This phase

was important for controlling the effects of different place, person, or toys on the child's behavior during other evaluation phases. The second phase, the baseline, consisted of assessing the interaction between mother and child during a treatment situation without any manipulation of antecedent or consequent variables. During this phase, the mother was trained implement the medical treatment as she did in her home, requesting the child to apply all topical medicines and administer other medications by herself. The third phase, the treatment, consisted of assessing the effect of specific antecedent variables on the child's compliance with treatment in an outpatient situation. This phase had four uninterrupted conditions, in which the type of instructions as an antecedent variable was manipulated: two conditions each of direct and indirect instructions. During this phase, the order of conditions was counterbalanced according to the mother's instruction during baseline. In all assessments, the consequences of responding were not manipulated.

Procedure

All participants were invited to participate the study by the dermatologists during the doctors' appointment and referred to Psychology Clinical School. The participants' recruitment was conducted during two months (between September and November of 2010), and only patients with selection criteria were invited to participate in the study.

The researcher conducted the first interview which the mothers were informed by the study. Those who agreed to participate signed the terms of consent. After this, the behavioral assessments were conducted during two months (between November of 2010 and January of 2011). These assessments consisted of three phases session (i.e., free-play, baseline, and treatment). All the phases occurred in the same session

Free Play. The researcher gave the mother a sheet that said: "Interact with you daughter as you do at home. There are toys, a computer with internet access, pencils, pen, blank sheets, and other things to play with her. Be yourself! I will be back soon." When the mother entered the room, the interaction with the child was observed through a one-way mirror and recorded via closed-circuit television. The mother remained alone in the room with the child for 5 min. Immediately following this 5 min of free play, the mother left the room and received additional instructions about the baseline condition. During this period, the child played with a second researcher. The researcher did not provide feedback to the mother or child during or following this phase.

Baseline (BL). This phase consisted of assessing the mother-child interaction during a treatment situation. During this phase, the researchers did not manipulate direct antecedent or consequent variables. Before the mother reentered the room, the researcher gave her a sheet that said:

> Interact with your daughter as you do at home. Now, beside the toys, computer and task materials, there are some skin medicines in the room. In the beginning, you should start playing with your child and, after that, try to conduct the treatment as you do at home, when you should apply some skin medicines. Be yourself.

The researcher observed the mother-child interaction through one-way mirror. During baseline, the mother requested that the child comply with the treatment tasks ten times. Immediately following baseline, the mother left the room to receive additional instructions regarding the treatment phase, and the child again played with a second researcher. In terms of the free-play phase, during the baseline, the mother remained alone in the room with the child. The researcher did not provide feedback to the mother or child during or following this phase.

Treatment. This phase involved assessing the effect of direct and indirect instructions given by the mother, as an antecedent variable, in the child's compliance with treatment during their interaction in an outpatient treatment situation. After the baseline, the mother left the room and received additional instructions from the researcher about the treatment phase. The researcher gave the mother a sheet that described the differences between compliance and non-

compliance with treatment and some examples of each one. After that, the researcher instructed the mother on how to behave during this phase and conducted a rehearsal with her using some example situations. At the end of this training, the mother completed a checklist to verify her understanding of the procedure (e.g., differences between compliance and noncompliance with treatment, differences between direct and indirect instructions, and how to request the child during assessment). If the mother did not answer correctly 90% of the checklist, the rehearsal and the training were conducted again with her. After this mothers were instructed to complete a similar checklist to verify her understanding of the procedure.

Before the mother re-entered the room, the researcher installed a microearphone in which he spoke, every 35 s, the phrase "give an instruction," if it was an indirect instruction, or "give an order," if was a direct instruction. During this additional instruction to the mothers, the child stayed in the room and played games with a second researcher.

The treatment phase had four different uninterrupted conditions: two direct instructions (DI_1 and DI_2) and two indirect instructions (II_1 and II_2). In each condition, the mother gave one or the other type of instruction every 35 s until a total of 10 instructions had been given. Thus, this phase consisted of a total of forty instructions, distributed as noted. The treatment phase ended with the 10th instruction of the fourth phase.

Results

Participants' Characterization

Carrie was rated in narrowband scores as clinical for scholar (T= 27), sociability (T=42) and normal for activities (T=44). In broadband scale, Carrie was classified as clinical for total competence (T=35). For problem behavior Carrie was rated as clinical for internalizing problem behavior (T=68) and for externalizing problem behavior (T=53).

Anna was rated in narrowband scores as clinical for scholar (T= 27), borderline for sociability (T=35) and normal for activities (T=47). In broadband scale, Anna was classified as clinical for total competence (T=34). For problem behavior Anna was rated as clinical for internalizing problem behavior (T=68) and for externalizing problem behavior (T=71).

Jenny was rated in narrowband scores as normal for scholar (T=50), sociability (T=39) and activities (T=40). But Jenny was classified as clinical in broadband scale for total competence (T=37). For problem behavior Jenny was rated as clinical for internalizing problem behavior (T=69) and borderline for externalizing problem behavior (T=60).

Pippa was rated in narrowband scores as normal for scholar (T=50), and borderline for sociability (T=35) and activities (T=32). In broadband scale, Pippa was classified as clinical for total competence (T=34). For problem behavior Pippa was rated as clinical for internalizing problem behavior (T=75) and for externalizing problem behavior (T=68; See Table 1).

Assessments' Results

Carrie complied with 75% of the instructions in the baseline phase. During II_1 and DI_2 conditions, lower percentages of compliance (43% and 66%, respectively) were observed. During DI_1 condition, the highest percentage of compliance behavior (100%) was observed. During all assessment conditions, Carrie exhibited high percentages of inappropriate behaviors (average 42%). Carrie's mother requested compliance with treatment with only direct instruction and engaged in physical guidance about 50% of the time on 50% of the trials during baseline. In treatment conditions, Carrie's mother used 100% direct instructions in the DI_1, DI_2, and II_2 conditions. She used indirect instruction only in II_1, and then on only one of the two trials (50%). She praised in the DI_2 condition (20%) and reprimanded Carrie's behavior in the DI_2 and II_2 conditions (20% and 30%, respectively; see Figure 1).

Anna had the highest compliance with treatment in baseline (100%). The compliance's percentage decreased to 38% in II_1 and increased

Table 1
Profiles for Competence and Problem Behavior of all Participants According to CBCL-6/18

Children	Competence			Problem behavior		
	Narrowband scale		Broadband scale	Broadband scale		
Carrie	Activities	NC	CL	Externalizing	NC	CL
	Sociability	NC				
	Scholar	CL		Internalizing	CL	
Anna	Activities	NC	CL	Externalizing	CL	CL
	Sociability	BL				
	Scholar	CL		Internalizing	CL	
Jenny	Activities	NC	BL	Externalizing	BL	CL
	Sociability	NC				
	Scholar	NC		Internalizing	CL	
Pippa	Activities	BL	CL	Externalizing	CL	CL
	Sociability	BL				
	Scholar	NC		Internalizing	CL	

Note. CL = Clinical; NC = Nonclinical; BL = Borderline.

in subsequent conditions (DI_1 = 75%, DI_2 = 80%, and II_2 = 75). During all assessment conditions, Anna had low percentages of inappropriate behavior. Anna's mother instructed her with a high percentage of direct instruction and physical guidance during baseline (100% and 66%, respectively). In treatment conditions, she requested Anna's compliance with treatment using 80% direct instruction in DI_1 and 100% in DI_2. In II_1 and II_2, she requested Anna's compliance with treatment using indirect instructions on 50% of the trials Anna's mother did not praise her during the treatment phase (see Figure 1).

Jenny demonstrated a low percentage of treatment compliance during all conditions, especially in the baseline (13%) and II_2 condition (0%). She showed a high percentage of compliance with the treatment only in DI_2 (66%). During baseline and treatment conditions, Jenny showed high percentages of inappropriate behavior, especially in II_2 (DI_2 = 80%). During baseline, Jenny's mother used only indirect instructions and a low percentage of physical guidance (13%). In DI_1 and DI_2, Jenny's mother used direct instructions a high percentage of the time (80% and 100%, respectively), and in II_1 and II_2, she used a high percentage of indirect instructions (66% and 100%, respectively). The mother did not use praise of the child's compliance in the Treatment phase and gave no reprimands for inappropriate behavior or noncompliance with treatment (see Figure 2).

Pippa showed a high percentage of compliance during baseline (100%). However, compliance decreased in treatment conditions, especially in II_2 (20%). Pippa exhibited inappropriate behavior only in DI_2 and II_2 conditions (14% and 17%, respectively). Pippa's mother used a high percentage of direct instruction (100%) and physical guide (66%) in baseline. During indirect instructions' condition, Pippa's mother used indirect instructions more frequently (II_1 = 67% and II_2 = 80%), and in the direct instructions conditions, she used direct instructions more frequently (DI_1 = 71% and DI_2 = 67%). There was neither praise nor reprimands during all assessment conditions (see Figure 2).

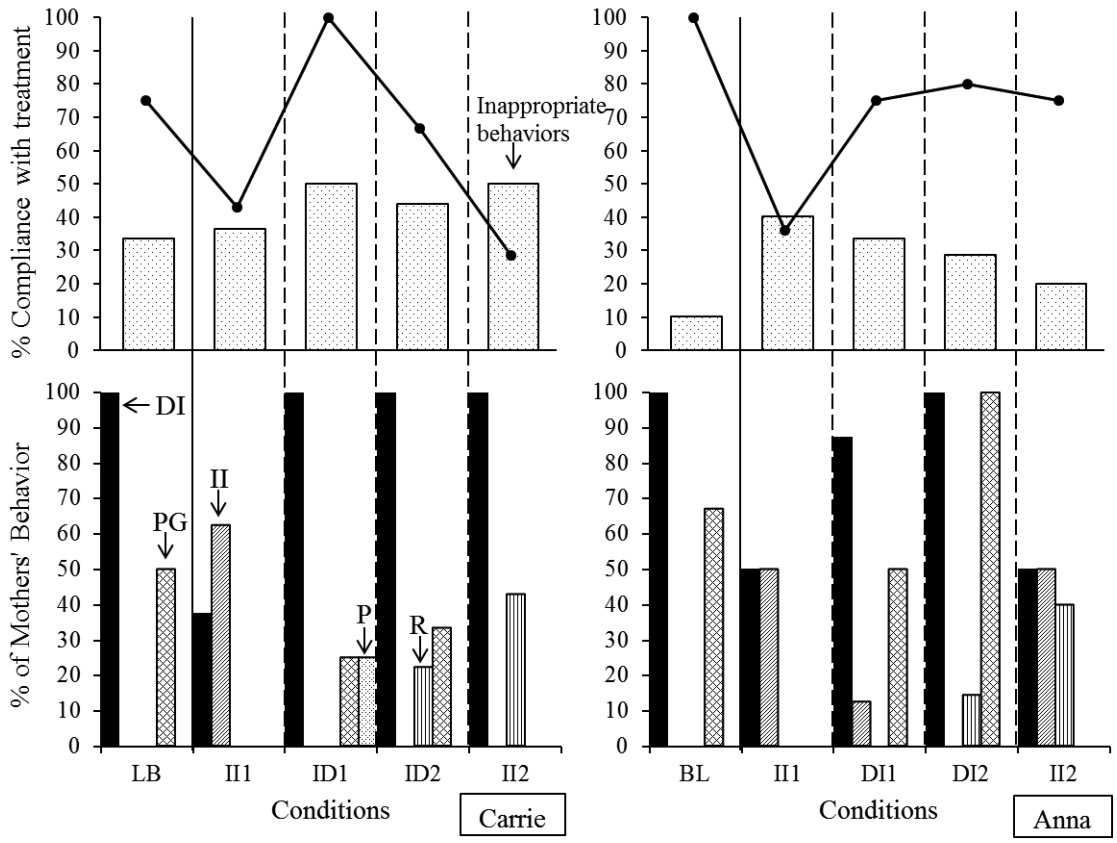

Figure 1. Occurrence of behaviors during mother-child interactions, for Carrie and Anna. II – Indirect instructions, DI – Direct Instructions, R – Reprimands, P – Praise, PG – Physical Guiding.

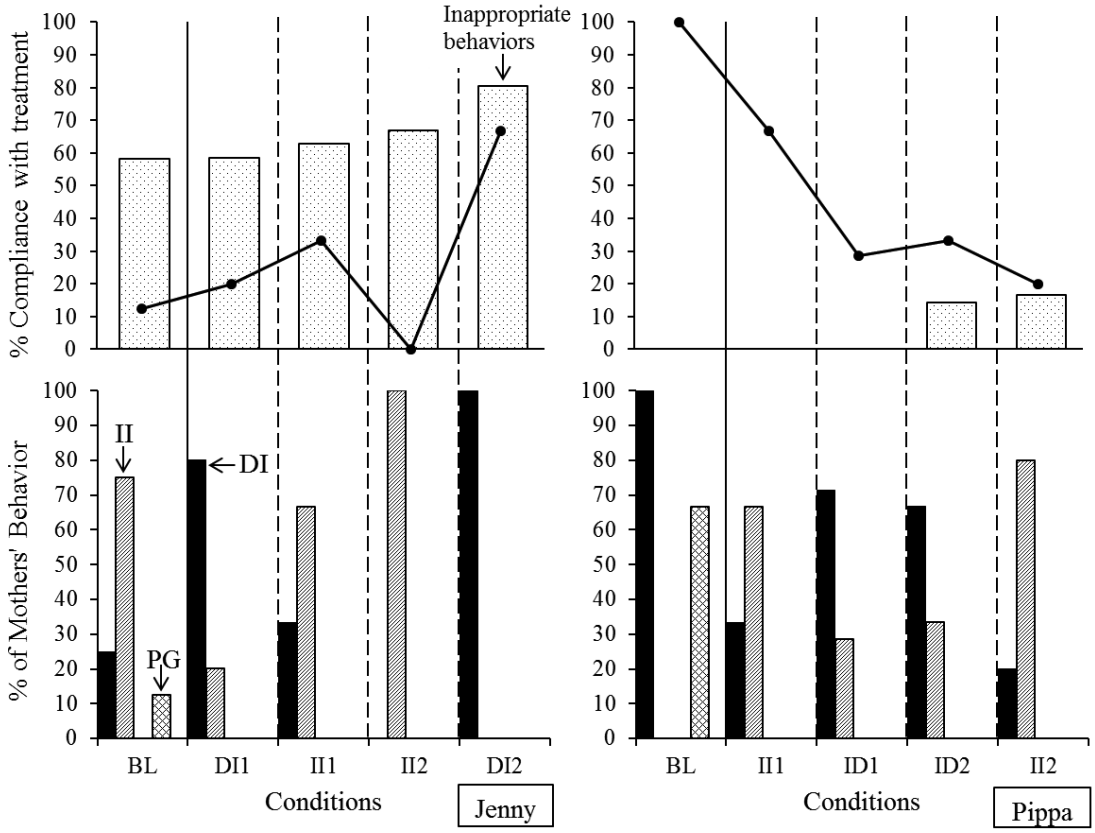

Figure 2. Occurrence of behaviors during mother-child interactions, for Jenny and Pippa. II – Indirect instructions, DI – Direct Instructions, PG – Physical Guiding.

Discussion

The results rated from CBCL-6/18 (Achenbach & Rescorla, 2001) demonstrated that Carrie, Anna and Pippa were classified as clinical and Jenny were classified as borderline for total competence. All children were classified as clinical for problem behavior, specially internalizing. According Anthony, Gil, and Schaberg (2003), children diagnosed with chronic diseases frequently presented low scores for competences than children without chronic diseases. It occurs because the limits and restrictions of the outcome treatment. The most common restrictions are in daily activities and relationships with other children.

On the other hand, during all outpatient behavioral assessments, in direct observations, high levels of compliance with treatment during direct instruction conditions occurred. For example, during DI_1 for Carrie and DI_2 for Jenny, their mothers used 100% direct instructions and the children complied on 100% and 66% of the trials during these conditions, respectively. When mothers requested most frequently with indirect instructions, the children demonstrated low percentages of compliance behaviors. During II_2 condition, when Jenny's mother demonstrated 100% of indirect instructions, Jenny did not show compliance.

Independently of the scores rated in CBCL, direct instructions increase the likelihood of child's compliance with treatment. Roberts et al. (1978) suggested that parents' requesting training increases the likelihood of child's compliance behavior during tasks. Bouxsein et al. (2008) and Harding et al. (1994) described similar results to Roberts et al. (1978). Both studies concluded that specific, direct, and clear instructions increase the likelihood of compliance. The outcomes suggested that the instructions, verbalized by caregivers, are an important antecedent variable and could increase the likelihood of child's compliance with treatment, such as atopic dermatitis.

However, during some conditions, the mothers did not follow all researchers' instructions. Anna's, Carrie's and Pippa's mothers requested their children with direct instructions during indirect instruction conditions. Carrie's and Anna's mothers reprimand their children, and only Carrie's mother praised compliance or adequate behaviors during the assessment. One possible explanation for this result was the difficulty to distinguish direct and indirect instruction, as demonstrated by Jenny's mother. She demonstrated high percentages of direct instruction during DI_1 and DI_2 conditions and high percentages of indirect instruction during II_1 and II_2 conditions. However, she had high percentages of direct instructions during II_1 and II_2 conditions and indirect instructions during DI_1 and DI_2 conditions. One another possibility of low integrity procedure was the mothers' previous reinforcement history. It could be identified in three mother-child interactions during baseline. Anna's, Carrie's, and Jenny's mothers demonstrated high percentages of direct instructions during baseline. As future researches, more accurate training and rehearsal between baseline and assessment conditions need to be investigated.

Another important antecedent variable was the physical guidance. During baseline, three mothers (i.e., Anna, Carrie, and Pippa) exhibited high percentages of physical guidance. The use of physical guidance in association with instructional strategies is effective in teaching many skills (Cuvo, Leaf, & Borokova, 1978). It increases the likelihood of compliance behavior since it decreases the level of requirement to finish the task (Harding et al., 1994). In addition, studies suggested that the use of physical guidance, in association with verbal instructions, increases compliance (Kern, Delaney, Hilt, Bailin, & Elliot, 2002; Neef, Shafer, Egel, Cataldo, & Parrish, 1983; Roberts, Tingstrom, Forehand, & Humphreys, 2008). For that reason, could learn this functional relation between child's compliance with medical treatment and physical guidance. It could be an important strategy to increase compliance with treatment and modeling new health-care repertories.

On the other hand, functions of physical guidance need to be analyzed. For both, compliance behavior with medical treatment could be

maintained as avoidance behavior. For example, for mothers, physical guidance could be negatively reinforced by decreasing the likelihood of immediate consequences (e.g., mother reprimand the child worsening of atopic dermatitis symptoms) and late consequences (e.g., explain to the physician or other people the occurrence of child's symptoms, skin's scars, etc.). For children, physical guidance could be an antecedent event (as an establishing operation), which evokes compliance with treatment. According to Sartor, Gon, and Zazula (2016), children and their mothers described the following of medical prescriptions and treatment situation are aversive for them. They need to present daily high costs responses, as use topical medicines or prevention of some environmental factors. In some cases, the treatment increases the likelihood of scratching and the children could cry or complain about the treatment or the medicines. All participants exhibited inappropriate behaviors during the study. It could be understood as a way to avoid or escape to the treatment.

For that reason, in some cases another function for physical guidance is to briefly suppress or inhibit the occurrence of noncompliance or inadequate behavior and increase adherence to medical recommendations. The physical guide served as a positive reinforcer of child's noncompliance behaviors and increased their occurrence. According to Kern et al. (2002), physical guide was recommended only when noncompliance's behavior served as an escape function.

Conclusion

The atopic dermatitis medical treatment limits the child's behavior (e.g., outdoor physical exercises, swimming, food intake) and changes the family's interaction. Children with atopic dermatitis need to demonstrate high frequencies of health-care behaviors continuously and for long periods (e.g., days, months, and maybe, years). However, atopic dermatitis treatment is, for most children, an aversive condition, as observed during the study. The main characteristic of atopic dermatitis treatment is the high response cost and low likelihood of immediate reinforcing consequences. For that reason, the intensity and the frequency of compliance and noncompliance with treatment and inadequate behaviors should be analyzed.

Another important variable was the mothers' behavior, as antecedent and consequence variables. During all assessments, the children's behavior was related to that of their mothers and not to their mothers' evaluations. During initial assessments with CBCL-6/18, all children were evaluated by their mothers as clinical for behavior problems. These results suggest that operant function is more important than diagnostic variables or caregivers' reports. In these cases, the antecedent and consequence variables could explain the occurrence of compliance and noncompliance with treatment and inappropriate behaviors. For that reason, we suggest other strategies during initial assessments (especially direct assessment) to identify more accurately the main function of compliance and noncompliance with treatment and inappropriate behaviors. Moreover, the identification of antecedents and consequents in treatment situations will be important to plan more specific medical and behavioral interventions with this population and their caregivers, focusing on specific target behaviors.

The main objective of this study was to assess the role of direct and indirect instructions on compliance and noncompliance behaviors during medical treatment. Several studies highlight the communication between caregivers and child and/or adolescents as an important factor of compliance in any phase of treatment. It could be observed in this study. But there are other significant variables related to treatment adherence. The main environmental variables, communication doctor-patient, consequences of the treatment, age of the patients, type of medicines, and others. It could be studied with patients with atopic dermatitis. For future researches suggests to study the effect of other significant variables related to increase or decrease treatment adherence with this population.

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