

Evaluation of the use of a Pleo robot at a child consultation clinic

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Abstract. This paper describes an explorative study to evaluate the use of a Pleo baby dinosaur robot with two toddlers in the waiting room of a child consultation clinic in The Netherlands. Research was done by observations of both caregiver and children. Findings indicate that application of Pleo is very useful in this specific environment to decrease anxiety and to facilitate treatment. However, anticipation of the caregiver on Pleo's behavior and the child's response to it is essential.

Keywords: Social robots, anxiety treatment, children

INTRODUCTION

A consultation clinic visit may not be a potentially traumatic experience as a hospital treatment, it still has a more or less similar setting and can be associated with pain, stress and anxiety. Recently some research has been done, on the possibilities of play in general and robots specifically to decrease the severity of these feelings [1, 2]. Also robot Pleo (see Figure 1) has been used in these projects. Pleo is a commercially available robot in the shape of a baby dinosaur, that develops its behavior and increasingly does so if it receives petting and nurturing in the form of plastic food (mainly leaves). The assumption is that distraction, increased by the feeling of care, is the main cause of this decrease [3-5]. This assumption derives from the notion that the design of pet like robots is mostly inspired by real animals who are known to often have a stress reducing effect on people. The fact that animals are mostly not allowed in clinical settings for hygienic reasons, leads researchers and health professionals to explore the effects of a robot with animal like qualities that could meet the hygienic standards.



Figure 1. Pleo

Results of the above mentioned studies show positive indications, but of course we have to be critical before generalizing and much research still has to be done, but results indicate that these robots may have a potentially beneficial effects in a health care environment. Based on these outcomes it is assumed that social robots can lead to a decrease of stress and anxiety and possibly of pain in a way that is similar to play materials and animals in a health care related environment.

The study described in this paper addresses this assumed effect on children visiting in a Dutch consultation clinic for vaccination. The study includes both observations and interviews, but in this paper only the observations are described in detail.

SETTING

During the toddler consultations with vaccinations at the clinic, the child is usually personally prepared by a assistant or the parent for the vaccination. After this, the youth assistant prepares the actual vaccination and gives the vaccinations, sometimes with a countdown.

In this study a Pleo wearing patches was introduced to the child with the phrase 'Look at this is Pleo, he lives here at the clinic' by the assistant, while a student researcher was observing. Subsequently the child was taken to other parts of 'Pleo's house' an Pleo was also included in weighing and measuring.

The assistant subsequently gave an explanation of vaccination procedures, explaining that Pleo helps all children here and gives them a good feeling. Questions like 'What do you like best?' (open question) or 'Do you like X too?' (closed question) were used to associate with positive feelings and empathize with the child's perception: 'Do you enjoy eating ice cream / swimming? You will also enjoy playing with Pleo'.

Pleo could also receive a sample test, viewed by the child and the child (or parent) was free to choose whether to hold Pleo or to leave him on the table.

The observant focused on (1) the reaction of the child when seeing Pleo for the first time, (2) behavior and utterances of the child, (3) the dynamics of the environment (e.g. other parents / children, toys, sounds), (4) interaction during consultation and vaccination between (a) child and Pleo, (b) assistant and Pleo and (c) parent(s) and Pleo

OBSERVATIONS

Child 1 (girl, 3 years, 9 months)

Environment: Waiting room. Present are just the girl, her father, the assistant and the observer. There is a play kitchen, a chest with toys, a cupboard with booklets and several tables with changing cushions.

Reaction to Pleo: Walks to the father while looking at Pleo.

Behaviors: The girl is told that Pleo is the doctor's pet and that he is now asleep and very sweet. When asked if she wanted to pet Pleo, she walked to Pleo and the observer to quickly pet Pleo and subsequently resumed playing in the play kitchen.

When told that she would receive injections later, the girl has tears in her eyes, crawls against her father and says she doesn't want that. She is told Pleo also had injections: 'You see? That's why he has patches. Pleo wants to help all children here with the injections because he makes them very happy and they can give each other kisses and hugs'. The girl says yes and pets Pleo intensively. When she wants to give him food, Pleo does not want to eat. It is suggested to her that she perhaps has to cook it for him. She goes to the kitchen with Pleo, puts leaves it in a pan and says 'just cook', brings the food to Pleo and says 'Here you go, Pleo' after which Pleo accepts.

During consultation: The girl pets Pleo. Pleo moves with his head. The specialized nurse says 'I think Pleo wanted to give you a kiss'. The girl nods.

The nurse explains the eye test, gives the girl a stick associated with it. The girl touches Pleo's leg with the stick and just at that moment he raises his leg. The nurse says: 'He wants to give you a high five'. The girl tries several times with the stick to get his leg up again. It does not work. She no longer listens to the nurse, who decides to stop this eye test and try another one. During this test, exactly at the moment the girl named a picture accurately, Pleo made a sound. The nurse says 'Pleo says you're doing well'. Later in the consultation Pleo turns his head to the girl when she is scared. The nurse says: 'Oh, he gave you a kiss'. The girl says: yes, we are going to cuddle nicely together.'

The nurse says: 'Pleo has also received a shot on his back and head. And you also get a shot in your arm'. When the girl says she does not want this, the nurse says 'Pleo also does not want a shot, but sometimes it needs a moment'. The girl cries a few seconds after the injection and gave Pleo a high five, stays with her father for a moment and then says: 'Now I will play again'.

Child 2 (boy, 3 years, 9 months)

Environment: The consulting room. Present are just the boy, his mother, the nurse and the observer.

Reaction to Pleo: Immediately says 'hello' to Pleo, and asks: 'But how is he going to walk?'. He looks at Pleo, strokes him, laughs at him, tries to give him food, but Pleo does not open his mouth to eat.

He starts building with cubes. The nurse says laughing: 'you have almost constructed Pleo'. He looks at Pleo and asks: 'how does his mouth open?' Nobody responds.

While playing with the blocks, the child says: 'he (Pleo) is tired'. He looks at Pleo and says 'open your mouth'. Just at that moment Pleo roars. He gives Pleo a piece of plastic food. The nurse says to the boy: 'I just want to listen to your heart, do you think that Pleo also has a heart?' 'YES!' the boy calls out. The nurse allows the child to listen to Pleo's heart, he says: 'I hear something'. The nurse then listens to the boy's

heart. He asks: 'may I?' She gives the boy the stethoscope and he listens to his own heart.

When the boy says: 'I also must blood', she asks if he means he needs to have an injection. He says yes. 'Pleo also had injections' told the nurse and she asks: 'What do you like to do?'. The boy says 'ride my bicycle veeeery fast.'. 'Oh', she says, 'Pleo also likes to watch people cycling. Mother and child watch Pleo and laugh. The boy says: 'we do not count to 5'. Mother tells that they had agreed upon this at home. The nurse explains that she is going to count to 5 and that it is already done before the 5. The boy says 'yes, but I do not get any pain and I do not cry'. The nurse then says: 'Okay, but when Pleo got a shot he shouted *auch!* and then it was done. 'Yes', the boy says. I think Pleo is hungry', and he tries to give Pleo food. He observes the injection and shouts 'auch' after which the nurse says 'Finished, like Pleo, you said that very loudly. The boy laughs and says it did not hurt. Mother looks at him and says 'I am proud of you.' and later 'Pleo also thinks it's cool. The child says: I want to give Pleo a high five. He gives Pleo a high five and laughs.

CONCLUSION

The sessions concerning the two children illustrate the possibility to help a child feel more relaxed, and . However, it also shows that children respond differently and that it demands a nurse's flexibility, creativity and improvisation skills to function properly. The session with the girl who did not listen to the caregiver during the eyetest anymore, demonstrates the downside of being distracted.

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