Introduction

Early intervention leads to the best outcomes for children with a diagnosis of ASD. There is growing interest in using robots in autism—one such robot is Kaspar. A child plays games with a therapist using Kaspar as a mediator: All games contain elements of joint attention, turn-taking and imitation i.e. building blocks for social success.

Feasibility Aim

To test the practicality of running a definitive RCT within NHS settings on the effectiveness of robot mediated interaction for social skills development.

Method

Design/Setting

A mixed design, single blind feasibility RCT with two parallel groups. Participants were recruited from one NHS Trust (HCT) over an 11-month period. Children were randomised to receive an intervention with Kaspar and a therapist (KG), or the same intervention but with a therapist only (TODG).

Participants

42 children recruited from Communication Difficulties Assessment Clinic at HCT in Watford, UK

Eligibility criteria

Children aged 5-10 years, diagnosed within the past year. Able to speak and/or understand English. With an IQ>70. The Parent/carer to be able to understand written English. The child not receiving any communication intervention not usual NHS care.

Procedure

Children randomly allocated into one of two groups:

- Kaspar group
  - Therapist only group (offered Kaspar sessions once their involvement in the study finished)
- Intervention
  2 familiarisation sessions followed by six therapy sessions of 20 minutes each.

Outcome measures

Completed at Baseline, 10 weeks after baseline and 12 weeks later:
- Social Skills Improvement System.
- Social Communication Questionnaire.
- Parenting Stress Index – 4.
- Child Health Utility 9D.
- Child and Adolescent Service Use Schedule (amended version).

Qualitative Analysis

Semi-structured interview with 50% of families.

Results

Table 1: Feasibility results

<table>
<thead>
<tr>
<th>Feasibility Criteria/data required</th>
<th>Outcome</th>
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<tbody>
<tr>
<td>More than 40% recruitment rate. Recruitment target – N=80.</td>
<td>Feasibility criteria met: 40% of those who were sent details of the study were randomized. 40-44% gave consent. Recruitment target met: 42 families were randomized.</td>
</tr>
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<td>Rate of attrition in each arm of the study less than 35%.</td>
<td>Feasibility criteria met: 18% of participants withdrew from the intervention (16% KG and 10% TODG).</td>
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<td>Completion of at least 80% of the questionnaires.</td>
<td>Feasibility criteria met: 96% of questionnaires completed.</td>
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Table 2: The mean treatment effect (Therapy Only vs Kaspar) of the SSIS

<table>
<thead>
<tr>
<th>Timepoint</th>
<th>Therapy Only</th>
<th>Kaspar Mean</th>
<th>SSIS</th>
<th>N</th>
<th>N</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>56.58</td>
<td>56.43</td>
<td>15.14</td>
<td>18</td>
<td>13</td>
<td>15.43</td>
</tr>
<tr>
<td>10 Weeks</td>
<td>56.17</td>
<td>57.65</td>
<td>13.65</td>
<td>17</td>
<td>18</td>
<td>10.43</td>
</tr>
<tr>
<td>22 Weeks</td>
<td>53.35</td>
<td>60.63</td>
<td>12.04</td>
<td>15</td>
<td>15</td>
<td>26.53</td>
</tr>
</tbody>
</table>

Conclusion

All feasibility criteria were met. Some issues with the technology – these can be addressed. Possible to make games more complex, so engaging for older and more able children. Effect sizes indicate that the children showed improvements in their behaviour. Possible to run a definitive study to investigate whether using Kaspar in this way will improve children’s social skills.

References


References

Figure 1. CONSORT diagram

Study to investigate the effectiveness of using a humanoid robot (Kaspar) to improve the social skills of children with an Autism Spectrum Disorder: a randomised controlled feasibility trial


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