

Summary Results Overview

Study population and participant flow:

A total of 104 children aged 6–12 years who were scheduled for elective surgery were enrolled in the study. Participants were allocated in a 1:1 ratio to either the virtual reality intervention group (n=52) or the routine preoperative care control group (n=52). Based on the final analyses, 52 participants in each group were included in the outcome analysis.

Baseline characteristics:

The study and control groups were comparable at baseline. No statistically significant differences were identified between the groups regarding age, gender, educational level, residence, birth order, family size, mothers' educational level, mothers' employment status, or monthly income (all $p>0.05$). The mean age was 10.31 ± 3.24 years in the intervention group and 10.06 ± 3.01 years in the control group. There were also no significant baseline differences in pulse rate, respiratory rate, oxygen saturation, or body temperature.

Primary outcome — preoperative anxiety:

Before the intervention, there was no statistically significant difference in total preoperative anxiety between the intervention and control groups ($p=0.055$). In the virtual reality group, the mean total mYPAS anxiety score decreased from 74.59 ± 4.39 before the intervention to 51.50 ± 4.77 after the intervention. In the control group, the corresponding scores were 73.39 ± 3.59 and 71.80 ± 4.00 . The post-intervention difference between the two groups was statistically significant ($p<0.001$), and the reduction within the virtual reality group was also statistically significant ($p<0.001$).

Secondary outcome — pediatric distress symptoms:

No significant baseline difference was observed between the groups in total Pediatric Symptom Checklist scores ($p=0.553$). In the virtual reality group, the mean total pediatric symptom score decreased from 30.23 ± 2.35 before the intervention to 24.75 ± 2.25 after the intervention. In the control group, the corresponding scores were 30.75 ± 2.34 and 29.92 ± 1.59 . The virtual reality group had significantly lower post-intervention symptom scores than the control group ($p<0.001$), with significant improvements in attention, internalizing, externalizing, school-related, and other behavioral symptoms.

Parental satisfaction:

Among mothers in the virtual reality group, the overall satisfaction score was 28.57 ± 2.03 , corresponding to 52.9%. Communication received the highest satisfaction percentage at 55.3%, followed by general satisfaction at 54.7% and interpersonal manner at 52.2%.

Adverse events:

No adverse events or complications related to the virtual reality intervention were reported during the study.

Conclusion:

The virtual reality intervention was effective in significantly reducing preoperative anxiety and distress symptoms among children undergoing elective surgery compared with routine preoperative care.