# From hospital to home: Developing and evaluating PiccoCare, a mobile applet for PICCs Self-Care among cancer patients in China

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## ABSTRACT

**Introduction:** Peripherally inserted central catheters (PICCs) are critical for cancer chemotherapy. Current patient education has created a gap in equipping patients with sustained self-management capabilities, necessitating evidence-based digital health interventions to provide better patient education. **Aims:** To develop and validate an home care-based education applet (PiccoCare) and evaluate its efficacy among cancer patients in the Sun Yat-sen University Cancer Centre (SYSUCC), China. **Materials and Methods:** The research employed a mixed-methods approach involved 2 phases. Phase 1 involved developing and validating PiccoCare by Delphi expert consultation. Phase 2 was a intervention study at SYSUCC, enrolling 138 patients randomised into intervention (n=69) and control (n=69) groups. **Results:** The developed PiccoCare contains 3 domains: catheter care, self-care, and resource support. Delphi consultation confirmed high content validity (mean CV=0.0331) and expert consensus (Kendall's W=0.255, p<0.01). The intervention showed PiccoCare had good usability (SUS score=73.46). Compared to the control group, the intervention group had significantly lower rates of objectively confirmed complications: infection (11.8% vs. 25.0%, p=0.046), thrombosis (8.8% vs. 25.0%, p=0.012), and catheter dislocation (10.3% vs. 25.0%, p=0.024). Self-management ability total scores increased in the intervention group (p<0.001), with improvements in subdomains like daily catheter observation (p=0.001) and maintenance compliance (p=0.008). Quality of life scores showed higher satisfaction (median=9 vs. 7, p=0.002) and reduced psychosocial distress, such as embarrassment (p<0.001) and illness reminders (p=0.003). **Conclusion:** PiccoCare is a valid, user-friendly intervention that effectively reduces PICC-related complications, enhances self-management ability, and improves quality of life. Future research should focus on multicenter trials, long-term outcomes, and integrating intelligent features to further optimize patient-centered PICC management.

Keywords: Peripherally Inserted Central Catheters (PICCs), Cancer Patients, Mobile Applet, Self-Management Ability, Continuity of Care