significant. Although women in both groups have decrease in their QOL score, women in the intervention group had statistically significantly less deterioration in two domains of QOL, including functional status, and increased symptom burden.

Conclusions: Mobile symptom management app has the potential to mitigate symptoms burden and functional status among breast cancer patients receiving chemotherapy.

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CN7 Prediction of onset timing of breakthrough pain using deep learning model

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Background: Breakthrough cancer pain (BTcP), a transitory flare of pain that occurs on a background of relatively well-controlled baseline pain, is a challenging clinical problem in managing cancer pain. We hypothesized that the breakthrough pain could be predictable according to the patients' previous observed patterns. In this study, we propose a deep learning model that predicts a patient's level of BTcP per hour.

Methods: We defined the BTcP as the pain with numerical rating scale (NRS) score 4 or above and developed models predicting the onset time of BTcP with the temporal resolution of 1 hour. The dataset contains only 20 or more measured records obtained from patients admitted to the hematological oncology ward of Samsung Medical Center from July 2016 to February 2020. The model used the time windows of 3 days to predict NRS scores over the next 24 hours. To capture irregular pain patterns, we created the sequence of average pain patterns over 24 hours from the previous 3 days and used it for normalization. We trained a Bi-directional long-short term memory based deep learning model. The model was validated using the holdout method with 20% of the datasets. Its performance was assessed with the receiver operating characteristic curve (AUROC) and the precision-recall curve (AURPC).

Results: We included pain log data containing 4,660 admissions from 3,258 patients with cancer in the analysis. The median age was 57[interquartile range (IQR), 47-64], the most frequent type of cancer was lung cancer (18.0%), and most patients had stage 4 (60.7%). Among the 103,948 hours from patients in whole datasets, 1,091 (4.7%) hours were labeled as the period of BTcP. The patients have the records of NRS score with a median of 3(IQR, 2.0-4.5) and BTcP with a median of 1.1 (IQR, 0.5-2.0) per day. We allocated approximately 20% of patients (653 patients with 932 admissions) to the holdout test dataset. Our model showed AUROC of 0.719 and AUPRC 0.680 for predicting the BTcP in the test dataset.

Conclusions: Our study showed that cancer pain could be predictive by using a deep learning model. Though our exploratory study has limitation of generalization, future warranted subgroup analysis and verification research could make our model more applicable in a real-world setting.

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CN8 The feasibility and utility of a mobile app in supporting Vietnamese children with cancer

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Background: Caregivers of children with cancer in Vietnam often have limited knowledge about diseases, treatment options and side effects, which may lead to insufficient home care and worse clinical outcomes. We created a mobile app called HBU to provide accurate information about cancer and cancer treatments in Vietnamese language. The aim of this study was to investigate the feasibility, acceptability, and preliminary efficacy of the app in public hospital settings.

Methods: A 3-month intervention was delivered at the Department of Oncology-Hematology-Stem cell Transplantation, Peadiatric Center of Hue Central Hospital, Vietnam via HBU app providing cancer-related articles and symptom-oriented articles. The inclusion criteria were caregivers of children with cancer receiving treatment at this tertiary hospital who aged 18 and above with no impairment in reading comprehension and cognitive abilities. Furthermore, participants must use a smartphone and agreed to participate with a written informed consent. This single-arm clinical study used mixed methods to evaluate the intervention. Acceptability and feasibility were examined via tracking of implementation process and post-intervention satisfaction survey. Preliminary efficacy was assessed via a specific questionnaire and the E-FACT-G scale to compare knowledge and distress management before and after intervention.

Results: From June 2020 to December 2020, 61 caregivers were included in this study. Mean age was 33.5 years (SD 6.5, range 21-49); 65.6% were females and 75.4% had low-income (<130 USD/ month). The mobilde app was used by 59% of the caregivers on a daily basis. Via a multidimensional evaluation, 95.1% of caregivers were satisfied with the app. On linear mixed models, knowledge about cancer ($\hat{\beta}$= 1.33; SE=0.15, $p < 0.05$) and distress management ($\hat{\beta}$= 5.48; SE=0.35; $p < 0.05$) were significantly improved after the intervention.

Conclusions: The HBU app could ensure equitable access to appropriate information about cancer and cancer treatments, with significant 3-month improvements in knowledge and distress management in caregivers of children with cancer in Vietnam.

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