

Bridging the Patient Education Gap in Oral Chemotherapy Through AI-Generated QR Code Video: A Quality Improvement project

Experience from a specialized cancer hospital in a low- and middle-income country (LMIC)

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BACKGROUND AND OBJECTIVES

Oral chemotherapy shifts medication management into the home. At SKMCH ambulatory pharmacy, high patient volume, limited consultation time, variable health literacy and the absence of a revisitable, language-appropriate aid created an education gap for patients receiving oral anticancer therapy.

Primary objective

To evaluate the development and workflow integration of a QR-code-based, AI-generated video counselling system for oral capecitabine in the ambulatory pharmacy at SKMCH&RC.

- Develop a standardized Urdu video counselling series from approved patient-education content.
- Ensure traceability to source materials and HOPA best practices.
- Create a reproducible production workflow for future medicines.
- Assess feasibility of QR integration into the dispensing workflow and staff orientation.

METHODS

DESIGN	Descriptive quality improvement project
SETTING	Ambulatory pharmacy, SKMCH&RC — tertiary cancer hospital, Lahore, Pakistan (LMIC)
PERIOD	1 March – 30 June 2026
POPULATION	Predominantly Urdu-speaking patients prescribed oral chemotherapy such as capecitabine
TOOLS	ChatGPT® (persona/prompting) · Seedance® (video generation) · CapCut® (editing)

7-STEP REPRODUCIBLE WORKFLOW

- 1 Persona generation

2 Prompt construction

3 Video generation

4 Post-production
- 5 QR generation

6 Workflow integration

7 Staff orientation

Three-layer prompt: fixed pharmacist persona + behavioural cue + Roman-Urdu narration.

INTERVENTION

Eight core counselling domains were represented in the final 23-clip series:

Introduction	Indication
Administration	Adherence
Missed dose	Overdose
Adverse effects	Handling / safety

Largest shares: adverse-effect education (30.4%) and administration guidance (26.1%).

CONTENT DEVELOPMENT

1	DECOMPOSE	Break the approved leaflet into manageable learning points.
2	BIND	Pair each learning point with narration, visuals, actions and prompts.
3	COMPOSE	Edit generated scenes into a coherent standardized video with voice-over, text and transitions.
Prompt architecture: fixed pharmacist persona + English behavioral/gesture cue + verbatim Roman-Urdu narration with paced pauses.		

RESULTS

77 AI-generation prompts	23 finalized 720p clips	142 s total finalized video
8/8 counselling domains	92.3% content fidelity	
From 77 AI-generation prompts, 23 finalized clips were produced, spanning all eight counselling domains and traceable to the approved leaflet and HOPA best practices.		

COUNSELLING DOMAIN COVERAGE (n = 23 clips)

Adverse effects	30.4%
Administration	26.1%
Handling / safety	13.0%
Introduction	8.7%
Indication	8.7%
Overdose	4.3%
Missed dose	4.3%
Adherence	4.3%
56.5% of clips addressed adverse-effect education + administration guidance combined.	

PROMPT ENGINEERING & ITERATIVE REFINEMENT

4 / 18 unique concepts required ≥2 renders → 21.7% iterative re-run rate	
Tone	41.54%
Contextual priming	29.23%
Role assignment	16.92%
Zero-shot	12.31%
Re-runs were driven by Roman-Urdu spelling/transliteration, pause placement and camera framing—not clinical-content errors; core messaging remained stable across iterations.	

VIDEO MICRO-LEARNING CHARACTERISTICS

Mean clip duration	6.2 ± 1.9 s
Longest domain	Handling / safety: 7.7 s
Mean prompt length	33.2 ± 11.8 words

POINT-OF-DISPENSING INTEGRATION

Finalized counselling video was linked to QR code and mock-integrated into dispensing-leaflet template. Staff orientation was included to support consistent use within routine counselling.



CLINICAL INTERPRETATION

The intervention was designed as an adjunct to pharmacist counselling— not a replacement.

- QR delivery makes standardized capecitabine counselling immediately revisitable after dispensing.
- Urdu audio-visual delivery reduces dependence on written reading ability while retaining visual demonstration.
- Adverse effects and administration received the largest share of clips, reflecting their importance to safe home self-management.
- The reusable persona, prompting structure and workflow assets provide a foundation for extension to other oral oncolytics.

STANDARDS & CONTENT FIDELITY

92.3% HOPA domains fully/partially addressed	84.6% applicable MASCC MOATT elements covered
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The project reports alignment with the approved institutional patient leaflet, MASCC MOATT and HOPA best practices. Key safety domains were fully represented in the developed counselling content.

LIMITATIONS

- Single-centre, single-drug, development-phase project with Urdu-only narration.
- Single-arm design with no comparator; causal or comparative effectiveness conclusions cannot be drawn.
- No patient-level outcomes (comprehension, adherence, satisfaction or clinical outcomes) were measured in this phase.
- Formal readability instruments were not applicable to Roman-Urdu narration.
- Prompt drift may occur as underlying AI models change, requiring ongoing monitoring.

FUTURE DIRECTIONS

- Develop an English master script and apply validated readability/quality instruments.
- Prospectively assess patient comprehension, satisfaction and adherence with a comparator where feasible.
- Pilot QR codes in routine dispensing and measure scan/engagement rates.
- Create a scheduled content-review cycle aligned with leaflet and guideline updates.
- Extend the workflow to additional oral oncolytics, languages and LMIC sites.

CONCLUSION AND DISCUSSION

Oral chemotherapy is self-administered at home, patients need **accessible, revisitable medication information** beyond dispensing. Our QR-linked video extends this principle by providing standardized, on-demand capecitabine counselling while complementing pharmacist-led education. The intervention covered **84.6% of MASCC MOATT elements and 92.3% of HOPA domains**, with emphasis on adverse effects (30.4%) and administration (26.1%), consistent with established education priorities. Building on evidence for electronically integrated medication education and QR-based microlearning this project demonstrates the **feasibility of embedding AI-generated video into routine pharmacy workflow**. Structured prompting supported reproducible content generation, while spoken Urdu and visual microlearning offer a potential strategy to overcome readability barriers. The resulting resource provides **standardized, repeatable, and extensible counselling support** in an LMIC oncology setting.