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A cost-utility analysis of the "MyPal" eHealth application, an ePRO intervention aiming to foster palliative care of cancer patients: Results from a randomized clinical trial in 4 European countries

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Background & Objective

According to WHO's definition "improves the quality of life for patients and their families, who are facing the problems associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and correct assessment and treatment of pain and other problems, whether physical, psychosocial or spiritual" [1]. In this context, the MyPal project aims to foster palliative care of adults and children with cancer through advanced patient reported outcome (ePRO) systems [2]. The objective of the present study was to assess the cost-effectiveness of MyPal, under the third-party payer perspective.

Methods

The MyPal randomized clinical trial (RCT) was conducted in 4 European countries: Czech Republic, Greece, Italy and Sweden. The study sample consisted of adult patients with chronic lymphocytic leukaemia/small lymphocytic lymphoma (CLL/SLL) or myelodysplastic syndrome (MDS). Intervention arm patients used the MyPal intervention and wore a smart wristband, while control arm patients were offered general palliative care. Health-related quality of life was assessed with the EQ-5D-3L tool, at baseline and once every 4 weeks for a total follow-up of 6 months. Costs included healthcare resource use, healthcare professional (HCP) time and the wristband. Cost data were acquired from all 4 participating countries and refer to year 2022. A multinational analysis of costs (expressed as PPPs) was performed, under the third-party payer perspective. The Incremental Cost-Utility Ratio (ICUR) was estimated and a non-parametric bootstrapping analysis was conducted.

Results

Overall, 171 patients participated in the RCT; however, only 31 in the intervention and 35 in the control arm, 66 patients in total, had complete EQ-5D and cost data and, thus, were eligible to be included in the analysis.

Overall, 93.5% of the intervention arm patients and 82.8% of control arm patients had a diagnosis of CLL. Moreover, the majority of the sample consisted of male gender (67.7% in the intervention and 68.6% in the control arm). The mean age of the intervention arm was 63.8 years old (SD=9.78), and of the control arm 66.4 years old (SD=8.39).

Table 1. Mean QALYs per patient for each trial arm, within the 6-month participation period.

		Total sample (n=66)	Intervention arm (n=31)	Control arm (n=35)
Gender	Male	68.2%	67.7%	68.6%
	Female	31.8%	32.3%	31.4%
Diagnosis	CLL	87.9%	93.5%	82.8%
	MDS	12.1%	6.5%	17.2%

Over the 6-month period of observation for the study patients, QALYs were estimated at 0.403 (95%CI: 0.380, 0.425) for intervention arm patients and at 0.388 (95%CI: 0.366, 0.409) for control arm patients (Table 2).

Table 2. Mean QALYs per patient for each trial arm, within the 6-month participation period.

	Sample size (n)	QALYs (mean)	St. Dev.	95% CI	
				Lower	Upper
Intervention arm	31	0.403	0.064	0.380	0.425
Control arm	35	0.388	0.066	0.366	0.409

Overall, the mean cost of the resources (CR) used per patient during his/her 6-month participation in the clinical trial was estimated at 101.25 PPPs (95%CI: 27.29, 175.20) for the intervention arm and at 284.37 PPPs (95%CI: 75.02, 493.72) for the control arm. The mean cost of resource use in the control arm was 1.8 times higher than that of the intervention arm (Table 3).

Table 3. Mean cost of resource use (CR) per patient for each trial arm (in PPPs)

	Sample size (n)	C_R - Resource use costs (PPPs) (mean/patient)	St. Dev.	95% CI	
				Lower	Upper
Intervention arm	31	101.25	213.44	27.29	175.20
Control arm	35	284.37	658.44	75.02	493.72

Regarding HCP time costs, for the control arm of the study, the HCPs only spent time to guide the patients to use the web app, in order to complete the required questionnaires, and for regular patient visits. Accordingly, for intervention arm patients, the most time consuming task for HCPs was reviewing patient data and patient visits (Table 4).

Table 4. Mean cost of HCPs (CHCP) per patient for each trial arm (in PPPs)

Categories of HCP time costs (C_{HCP})	Intervention arm Mean C_{HCP} per patient (PPPs)	Control arm Mean C_{HCP} per patient (PPPs)
Training	54.49	-
Patient setup (guidance)	57.14	25.67
Patient data review & patient visits	616.25	67.48
Technical issues (contact with technical support and/or patients)	332.81	-

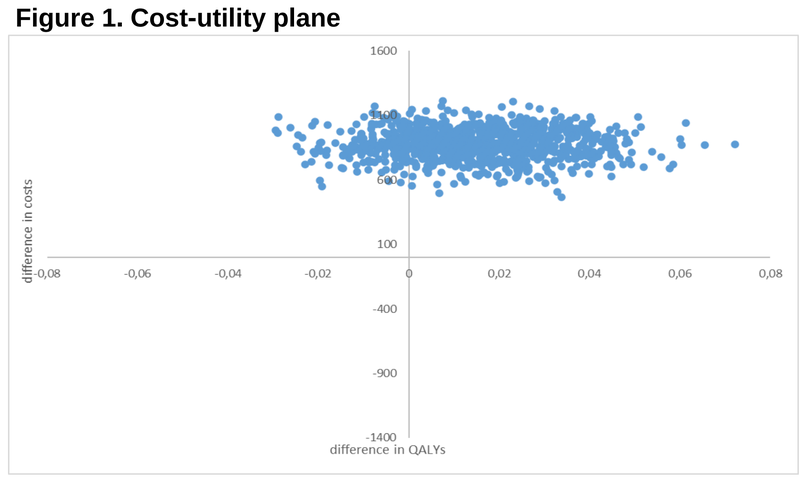
Based on the above, total mean costs were estimated at 1,261.94 PPPs and 377.52 PPPs, respectively, for intervention and control arm patients (Table 5).

ICUR was calculated at 57,522.09 PPPs/QALY, while the bootstrapping analysis showed that, in 82.4% of the pairs, MyPal was both more effective and more costly than usual care (Figure 1).

Table 5. Cost-utility results for MyPal (CT - base case)

	Intervention arm (MyPal)	Control arm	Incremental (Intervention – Control)
QALYs (mean/patient)	0.403	0.388	0.015*
Total Costs (C_T) in PPPs (mean/patient)	1,261.94	377.52	884.42
ICUR (PPP/QALY)		57,522.09	

Figure 1. Cost-utility plane



Conclusions

Based on the study results, the MyPal intervention incurred higher costs than standard palliative care, mainly due to the required time of HCPs, although usual care patients had significantly higher resource use costs. However, still there is potential for MyPal to be cost-effective, since, in a real-world scenario, HCP training, patient data review and technical issues will be standardized and managed more effectively over time. Previous studies have indicated that digital health interventions in palliative care have the potential to be cost-effective or, at least, cost-saving [3-5].

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