

ORIGINAL ARTICLE

Adherence to oral anticancer agents: Healthcare providers' perceptions, beliefs and shared decision making in Belgium and the Netherlands

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ABSTRACT

Background Little is known about healthcare providers' (HCPs) perceptions of adherence management of oral anticancer agents (OACA). The study aims to explore HCPs perceptions of OACA and adherence.

Methods A cross-sectional, multi-center observational study among HCPs in hemato-oncology settings in Belgium and the Netherlands was conducted. Physicians, nurse practitioners, nurses and pharmacists were asked to complete questionnaires on their perception of patient adherence and its management (PAMQ) and their beliefs about OACA (BMQ-Specific). Physicians were also asked to complete a questionnaire on their perception of shared decision making (SDM-Q-Doc).

Results The sample consisted of 254 HCPs. Variations were found between HCPs on the PAMQ: 56%, 50%, 28% and 23% of, respectively, physicians, nurse practitioners, nurses and pharmacists reported to know the level of adherence of their patients and 59%, 53%, 43% and 10% of, respectively, physicians, nurse practitioners, nurses and pharmacists think that patients discuss adherence with them. 70%, 82%, 63% and 62% of, respectively, physicians, nurse practitioners, nurses and pharmacists reported to have knowledge of causes of non-adherence, while 78%, 87%, 76% and 80% of them reported to have knowledge of consequences of non-adherence. 81%, 92%, 83% and 67% of, respectively, physicians, nurse practitioners, nurses and pharmacists felt able to influence adherence. Lower concerns beliefs were associated with a higher total score on the PAMQ [β (SE) = -0.85 (0.24); CI -1.33--0.38]. Physicians scored a mean of 75 on the SDM-scale.

Conclusions A considerable part of the HCPs states they do not know the adherence of their patients, nor do they think patients discuss adherence with them. However, they feel to have knowledge of adherence and perceive to be able to influence adherence of their patients.

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Non-adherence to oral anticancer agents (OACA) is complex and determinants are interrelated [1]. For OACA treatment effectiveness, optimal adherence is considered important (e.g. better clinical response, survival) [2–4]. A patient is considered optimally adherent (100%) to the agreed prescribed therapy when no doses have been missed, no more doses have been taken than prescribed, and doses have not been taken at the wrong time or in the wrong quantity [5,6].

The framework suggested by the World Health Organization [7] is frequently used to describe the multidimensional phenomenon of medication adherence. It includes five interacting dimensions influencing adherence: social and economic factors, condition-related factors, therapy-related factors, patient-related factors, and healthcare provider (HCP) and system-related factors. In patients with breast cancer on chronic endocrine therapy and in patients with chronic

myeloid leukemia (CML) on long-term imatinib, HCP-related factors were found to influence (non-)adherence, e.g. a poor physician's explanation of treatment effects [8], and feedback from physicians that seems to reinforce the belief that 'occasional' non-adherence does not matter [9]. Shared decision making was found to influence persistence to OACA in breast cancer patients in a prospective cohort study [8]. Women who were satisfied about the role they played in the OACA therapy decision making process, were more likely to continue their therapy (81%) as compared to patients playing a more (73%) or less expanded role (59%) than wanted regarding the decision making process [8]. Studies on HCP-related factors influencing non-adherence in patients treated with short-term OACA (e.g. erlotinib, sunitinib) are scarce [10,11].

Studies exploring adherence issues have predominantly focused on the patient's perspective [12]. Beliefs about

medicines have previously been shown to influence adherence in patients taking OACA [13,14]. However, insight into HCPs beliefs about OACA and perceptions of OACA adherence are also important because perception and beliefs may influence HCPs behavior and care [15,16]. In turn, this may influence patients' adherence behavior [9,17]. Until now, HCPs perceptions of OACA adherence, HCPs beliefs about OACA and the physicians' perceptions towards the shared decision making process in OACA therapy have hardly been explored. Insight into these topics may inform the development of interventions targeted to HCPs capacity to counsel patients taking OACA.

The present study aims to: 1) explore HCPs perceptions of OACA adherence management and beliefs towards OACA; 2) explore physicians' perceptions towards shared decision making process; and 3) report on factors influencing HCPs perceptions of OACA adherence management.

Methods

Design

A cross-sectional, multi-center observational study among HCPs working in hemato-oncology settings in Dutch speaking Belgium and the Netherlands was performed. This paper reports on one part of a larger study. The other paper describes usual care activities in adherence care provided in the same settings (Adherence to OACAs: HCPs perceptions and usual care in Belgium and the Netherlands).

Setting and sample

The study was conducted between April and October 2014. HCPs were included if they met the following criteria: being a medical oncologist, hematologist, nurse, nurse practitioner, or pharmacist; working in a hemato-oncology setting, in Dutch speaking Belgium or the Netherlands.

Data collection procedure

Participants were informed about the study by their professional associations in Belgium and the Netherlands. An e-mail with information and an invitation to complete the online questionnaire was sent to all members of professional associations involved. After the initial invitation, one or two reminders were sent. Additional recruitment took place by distributing the online questionnaire within the authors' network, and by handing out a paper version of the questionnaire at a scientific meeting where HCPs from the targeted groups were present.

Measurements

A composite electronic questionnaire in Dutch starting with demographic characteristics like profession, number of years employed, gender, type of hospital, and specialization (hematology or medical oncology) was used.

Five items on HCPs perceptions of management of adherence [Perceptions of Adherence Management Questionnaire

(PAMQ)] were developed by a team consisting of a medical oncologist, hematologist, three pharmacists, and three researchers (nurse, psychologist, health scientist) with experience in the field of medication adherence in oncology and hematology. The five items were: I know the level of adherence of all my patients, I think that patients discuss non-adherence with me, I am able to influence the adherence behavior of my patients, I have sufficient knowledge about the consequences of non-adherence, and I have sufficient knowledge about the causes of non-adherence to discuss this with patients. Each item was scored on a five-point Likert scale, ranging from strongly disagree (1) to strongly agree (5). The scores agree (4) and strongly agree (5) were dichotomized into yes (1) and the other scores (1–3) into no (0). A total score (ranging from zero to five) was calculated by summing the five dichotomized items.

The Shared Decision Making Questionnaire-physician version (SDM-Q-Doc) was used to assess the shared decision making process in medical consultation from the physician's perspective. The SDM-Q-Doc has shown to be a well accepted and reliable instrument [18]. Items were rated on a six-point Likert scale from zero (completely disagree) to six (completely agree). A sum score of the nine items was made (range 0–45). This sum score was standardized using a linear transformation into a scale from 0 to 100 as recommended by Scholl et al. [18], in order to facilitate interpretation. A higher score on the SDM-Q-Doc indicated perceptions of more shared decision making. Data for the SDM-Q-Doc was only collected from physicians because treatment-decisions primarily occur at the physicians' level.

Beliefs about OACA were assessed by using the Beliefs about Medicines Questionnaire (BMQ-Specific) [19]. The BMQ-Specific has been validated in different populations including patients with a chronic disease or a malignancy [19,20]. The BMQ-HCP version was translated in Dutch following the inverse translation method [21] by CB and LT and authorized by R. Horne, the principal author of the BMQ-Specific [19]. The BMQ-Specific consists of two scales: a five-item necessity-scale assessing beliefs about the necessity of the medication to control the disease and a five-item concerns-scale assessing concerns about the potential negative impact of the medication [19]. Items were rated on a five-point Likert scale ranging from strongly disagree to strongly agree. Individual scores obtained from each five-item scale were summed (range 5–25). Higher scores on the BMQ-necessity indicate stronger beliefs in the necessity of OACA to control the disease, higher scores on the BMQ-concerns indicate stronger concerns about the potential negative impact of OACA [19,20]. A cut-off score of 15 or above was used to determine low/high necessity or concerns [22]. Four profiles of HCPs representing HCPs beliefs were created based on scores of the BMQ-Specific necessity/concerns scales [22–24]: indifferent (low necessity, low concerns), skeptical (low necessity, high concerns), accepting (high necessity, low concerns), and ambivalent (high necessity, high concerns). A necessity-concerns differential score was calculated to assess the relative importance of the medication by subtracting the concerns-scale from the necessity-scale (range –20–20). A positive differential score indicates stronger necessity beliefs than concerns.

Validation of the questionnaire

The questionnaire was pilot-tested by nine HCPs in the Netherlands and Belgium (i.e. three pharmacists, three nurses, a hematologist, a medical oncologist, and a general practitioner). The HCPs were asked to give feedback on the clarity of the questions (e.g. questions not ambiguous), applicability within the Belgian or the Dutch context, and structure. The HCPs gave written comments on the questionnaire and hereafter the written comments were discussed during an individual interview. After processing the comments, the final version of the questionnaire was defined.

Ethics

The study was approved by the Ethical Review Committee of the Ghent University Hospital (Belgium) and assessed as not governed by the Dutch Medical Research Involving Human Act by the Medical Ethics review board of the VU University Medical Center in Amsterdam (the Netherlands).

Statistical analysis

Descriptive data were presented as frequencies (percentages) and means [standard deviations (SD)] for normally distributed data and medians [interquartile range (IQR)] for not normally distributed data. Differences between groups were tested by means of the Pearson's χ^2 -test, the unpaired *t*-test, and one-way ANOVA test. Pearson's correlation coefficient was used to test the association between continuous data. For statistical analyzes, the professions hematologists and medical oncologists were merged into the group 'physicians'.

To identify associated factors of HCPs perceptions of adherence management, linear regression analysis was performed with the total PAMQ-score as dependent variable and potential predictors as independent variables. Variables with a value $p < 0.25$ were entered in a multiple linear regression model to evaluate the associations' independency. SPSS 22.0 (SPSS Inc., Chicago, IL, USA) was used to perform statistical analyzes.

Results

Demographic characteristics

In total, 329 HCPs initiated the online questionnaire, of which 236 completed the demographic characteristics and at least one section with questions. Recruitment at the conference yielded 18 additional questionnaires. In total, 254 questionnaires were used for the analysis. Demographic characteristics of participants are shown in Table I. The median number of years employed was 14 years (IQR = 7–25). Most participants were female (73.2%) and 51.2% worked in the Netherlands. The sample consisted of 23.6% pharmacists, 29.9% nurses, 15% medical oncologists, 16.5% hematologists, and 15% nurse practitioners working in 106 different hospitals. The majority of the HCPs worked in the field of medical oncology (70.5%) in a non-academic hospital (67.6%).

Table I. Demographic characteristics of participants.

		Total <i>n</i> = 254 (%)	Median (IQR)
Number of years employed			14 years (7–25 years)
Gender	Male	68 (26.8%)	
	Female	186 (73.2%)	
Profession	Medical oncologist	38 (15%)	
	Hematologist	42 (16.5%)	
	Nurse	76 (29.9%)	
	Nurse practitioners	38 (15%)	
	Pharmacist	60 (23.6%)	
Country	Belgium	124 (48.8%)	
	The Netherlands	130 (51.2%)	
Specialization	Hematology	70 (29.5%)	
	Medical oncology	167 (70.5%)	
Type of hospital	Academic	81 (32.4%)	
	Non-academic	169 (67.6%)	

IQR, interquartile range.

HCPs perceptions of adherence management

In total, 254 HCPs completed the PAMQ. An overview of the perceptions of adherence management according to profession, gender, country, type of hospital, and specialization is presented in Table II. Slightly more than half of the physicians and half of the nurse practitioners indicated to know the level of adherence of their patients (56% and 50%, respectively) and perceived that patients discuss adherence with them (59% and 53%, respectively). Most HCPs [especially physicians (81.3%), nurse practitioners (92.1%) and nurses (82.9%)] indicated to be able to influence adherence behavior of their patients. Most HCPs thought to have sufficient knowledge about the consequences of non-adherence (79.1%), less HCPs indicated to have sufficient knowledge about the causes of non-adherence to discuss this with patients (67.7%).

For the total PAMQ-score, both physicians and nurse practitioners scored significantly higher than nurses (unpaired *t*-test; $p = 0.022$ and $p = 0.008$, respectively) and pharmacists (both $p < 0.001$). No significant difference was found between physicians and nurse practitioners.

A supplementary analysis was performed to determine significant differences between the subgroups of physicians (medical oncologists vs. hematologists). More medical oncologists than hematologists indicated to know the level of adherence of all their patients [Pearson χ^2 ; n (%) = 27 (71%) vs. 18 (43%); $p = 0.011$] and thought that patients discussed non-adherence with them [n (%) = 28 (74%) vs. 19 (45%); $p = 0.01$].

Beliefs about OACA

The BMQ-Specific was completed by 222 HCPs. An overview of the necessity and concerns-scale and the differential score according to profession, gender, country, type of hospital, and specialization, is presented in Table II. The necessity-scale and the concerns-scale were normally distributed. The mean score on the BMQ-necessity was 18.3 (SD = 2.94), the mean score on the BMQ-concerns was 13.5 (SD = 2.57). The strongest necessity beliefs were found for the items "My patients' health, at present, depends on these medicines" [Mean (SD) = 3.97 (0.49)], "The future health of my patients will depend on these medicines" [Mean (SD) = 3.9 (0.77)], and "These medicines protect my patients from becoming worse" [Mean

Table II. Results on the perceptions of adherence management questionnaire (PAMQ), beliefs about medicines questionnaire (BMQ-specific) and Shared Decision Making Questionnaire (SDM-Q-doc) according to profession, gender, country, type of hospital, and specialization.

	PROFESSION			GENDER		COUNTRY		TYPE OF HOSPITAL		SPECIALIZATION	
	Physician N=80	Nurse N=76	Pharmacist N=60	Male N=68	Female N=186	The Netherlands N=130	Belgium N=124	Academic N=81	Non-academic N=169	Hematology N=70	Medical oncology N=167
PAMQ	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
I know the level of adherence of all my patients	45 (56.3%)	21 (27.6%)	14 (23%)	31 (44.9%)	68 (36.6%)	54 (41.2%)	45 (36.3%)	32 (39.5%)	65 (38.2%)	27 (38.6%)	66 (39.3%)
I think that patients discuss non-adherence with me	47 (58.8%)	33 (43.4%)	6 (10%)	30 (44.1%)	76 (40.9%)	57 (43.8%)	49 (39.5%)	30 (37%)	74 (43.8%)	31 (44.3%)	69 (41.3%)
I am able to influence the adherence behavior of my patients	65 (81.3%)	63 (82.9%)	40 (66.7%)	59 (86.8%)	144 (77.4%)	110 (84.6%)	93 (75%)	67 (82.7%)	133 (78.7%)	60 (85.7%)	129 (77.2%)
I have sufficient knowledge about the consequences of non-adherence	62 (77.5%)	58 (76.3%)	48 (80%)	51 (75%)	150 (80.6%)	99 (76.2%)	102 (82.3%)	66 (81.5%)	132 (78.1%)	53 (75.7%)	132 (79%)
I have sufficient knowledge about the causes of non-adherence to discuss this with patients	56 (70%)	48 (63.2%)	37 (61.7%)	51 (75%)	121 (64.7%)	88 (67.7%)	84 (67.2%)	56 (68.3%)	113 (66.9%)	44 (62.9%)	117 (70.1%)
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
	3.44 (1.39)	3.63 (1.26)	3.63 (1.26)	3.25 (1.23)	3.01 (1.45)	3.13 (1.39)	3.01 (1.39)	3.10 (1.39)	3.05 (1.39)	3.07 (1.39)	3.07 (1.43)
	75.53 (19.26)	75.53 (19.26)	n/a	80.06 (14.29)	72.64 (21.47)	73.50 (21.61)	80.15 (11.36)	77.68 (17.82)	74.73 (20.02)	76.73 (18.59)	73.82 (20.85)
	ANOVA F (p-value)	ANOVA F (p-value)	ANOVA F (p-value)	t-test (p-value)	t-test (p-value)	t-test (p-value)	t-test (p-value)	t-test (p-value)	t-test (p-value)	t-test (p-value)	t-test (p-value)
	3.07 (1.39)	2.93 (1.33)	2.4 (1.28)	<0.001	0.22	0.48	0.48	0.12	0.53	0.81	0.98
Total PAMQ-score^a	18.30 (2.94)	17.69 (3.33)	17.52 (2.90)	18.65 (2.91)	18.16 (2.95)	17.83 (2.84)	18.81 (2.97)	18.28 (2.85)	18.29 (2.96)	18.97 (2.73)	17.94 (2.99)
SDM-Q-Doc^b	13.50 (2.57)	13.14 (2.88)	13.17 (2.44)	13.35 (2.67)	13.56 (2.54)	13.06 (2.60)	13.96 (2.47)	13.87 (2.62)	13.33 (2.56)	13.97 (2.77)	13.37 (2.42)
BMQ-Specific	4.82 (3.66)	5.71 (3.49)	4.63 (3.82)	5.30 (3.33)	4.62 (3.78)	4.81 (3.72)	4.84 (3.61)	4.41 (3.47)	4.99 (3.76)	5.00 (3.68)	4.59 (3.65)
Specific-Necessity ^c	18.86 (2.50)	17.69 (3.33)	18.96 (3.00)	18.65 (2.91)	18.16 (2.95)	17.83 (2.84)	18.81 (2.97)	18.28 (2.85)	18.29 (2.96)	18.97 (2.73)	17.94 (2.99)
Specific-Concerns ^d	13.50 (2.57)	13.14 (2.88)	13.17 (2.44)	13.35 (2.67)	13.56 (2.54)	13.06 (2.60)	13.96 (2.47)	13.87 (2.62)	13.33 (2.56)	13.97 (2.77)	13.37 (2.42)
NC/diff ^e	4.82 (3.66)	5.71 (3.49)	4.63 (3.82)	5.30 (3.33)	4.62 (3.78)	4.81 (3.72)	4.84 (3.61)	4.41 (3.47)	4.99 (3.76)	5.00 (3.68)	4.59 (3.65)
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
	3.07 (1.39)	3.44 (1.39)	3.63 (1.26)	3.25 (1.23)	3.01 (1.45)	3.13 (1.39)	3.01 (1.39)	3.10 (1.39)	3.05 (1.39)	3.07 (1.39)	3.07 (1.43)
	75.53 (19.26)	75.53 (19.26)	n/a	80.06 (14.29)	72.64 (21.47)	73.50 (21.61)	80.15 (11.36)	77.68 (17.82)	74.73 (20.02)	76.73 (18.59)	73.82 (20.85)
	ANOVA F (p-value)	ANOVA F (p-value)	ANOVA F (p-value)	t-test (p-value)	t-test (p-value)	t-test (p-value)	t-test (p-value)	t-test (p-value)	t-test (p-value)	t-test (p-value)	t-test (p-value)
	3.07 (1.39)	2.93 (1.33)	2.4 (1.28)	<0.001	0.22	0.48	0.48	0.12	0.53	0.81	0.98

BMQ-Specific, Beliefs about Medicines Questionnaire (necessity and concerns about medicines); PAMQ, Perceptions of Adherence Management Questionnaire; SDM-Q-Doc, Shared Decision Making Questionnaire – physician version.

^aScores range 0–5;

^bScores range 0–100;

^cScores range 5–25;

^dNecessity-concerns differential score (range -20–20).

*The bold values indicate statistical significance at the $p < 0.05$ level.

(SD) = 3.79 (0.76)]. The strongest belief about concerns was found for the item "I sometimes worry about the long-term effects of these medicines" [Mean (SD) = 3.34 (0.98)].

The BMQ-necessity score was significantly higher among physicians than nurses (unpaired *t*-test; $p = 0.005$) and nurse practitioners ($p = 0.046$); pharmacists scored significantly higher than nurses ($p = 0.010$). Necessity beliefs and concerns about OACA scores were significantly higher among Belgian HCPs than among Dutch HCPs. The BMQ-necessity was significantly higher among HCPs in hematology than HCPs in oncology. The association between the differential score and number of years employed was found to be significant ($r = -0.13$, $p = 0.045$), indicating the longer HCPs are employed, the higher concerns compared to necessity beliefs. When considering HCPs profiles, 56.8% are accepting, 33.3% ambivalent, 7.7% indifferent, and 2.3% skeptical towards OACA. No significant differences between professions, gender, countries, number of years employed, and types of hospital were found.

Shared decision making

In total, 95 of the 99 physicians completed the SMQ-Q-Doc. Table II shows the SDM-Q-Doc scores according to gender, country, type of hospital, and specialization. The mean sum score (scale 0–100) was 75.53 (SD = 19.26). The lowest scores on item level were found for the items "I wanted to know exactly from the patient how he/she wants to be involved in making the decision" [Mean (SD) = 3.39 (1.21)] and "My patient and I selected a treatment option together" [Mean (SD) = 3.36 (1.41)]. The highest scores were found on the items "I precisely explained the advantages and disadvantages of the treatment options to my patient" [Mean (SD) = 4.15 (1.07)], "I helped my patient understand all the information" [Mean (SD) = 4.11 (0.79)], and "My patient and I reached an agreement on how to proceed" [Mean (SD) = 4.08 (1.13)]. No significant differences were found for profession (hematologists vs. oncologists), gender, country, specialization, and type of hospital. No significant association was found for the number of years employed.

Factors influencing HCPs perceptions of adherence management

The independent associations between the total PAMQ-score and other factors are presented in Table III. No multicollinearity was observed among the independent variables (Spearman's $\rho < 0.60$). Univariate analysis showed that being a nurse or pharmacist, and having higher concerns beliefs was associated with lower total PAMQ-scores. The multivariate analysis showed that being a pharmacist was associated with lower total PAMQ-scores.

No significant associations were found between BMQ-Specific profiles and total PAMQ-score. When comparing the two most common profiles (accepting vs. ambivalent) at PAMQ item level, more accepting HCPs thought to know the level of adherence of all their patients [Pearson's χ^2 ; n (%) = 58 (46%) vs. 22 (30%); $p = 0.028$] and felt able to influence adherence behavior of their patients [n (%) = 110 (87%) vs. 53 (73%); $p = 0.009$].

A higher sum score on the SDM-Q-Doc (more shared decision making) was independently associated with a higher

total PAMQ-score [$p = 0.019$; β (SE) = 0.017 (0.007); 95% confidence interval: 0.003–0.031].

Discussion

The results of the present study showed that only slightly more than half of the physicians thought to know the level of adherence of their patients and supposed that patients discussed non-adherence with them. In line with these results, patients have reported that physicians do not always discuss OACA (non-)adherence issues [9]. Underlying reasons may be the assumptions that patients are highly adherent due to the severity of the disease and that the relationship of confidence physicians have with their patients naturally leads to adherence [26]. Talking about non-adherence has also been considered detrimental to the unspoken contract of trust in the therapeutic relationship [25].

An interesting finding was that all HCPs felt able to influence adherence of their patients and to have sufficient knowledge of causes and consequences of non-adherence. This finding may offer a point of departure for outlining the aspects of adherence support programs. In the second part of this study, which will be published separately, the actual adherence care provided by HCPs will be reported.

Pharmacists had lower scores on the perceptions of adherence management. A likely explanation is that pharmacists have generally less contact with patients taking OACA and also have a less active role in counseling these patients. Few pharmacists indicated items implying face-to-face contact with patients (i.e. know the level of adherence and think that patients discuss non-adherence with them), while most of them indicated to have sufficient knowledge about the consequences of non-adherence and the causes to discuss this issue with patients.

Scores on beliefs about the necessity of OACA were higher than scores on concerns about the potential negative impact of OACA among all professions (positive necessity-concerns differential scores). HCPs are perhaps indeed quite aware of the necessity of OACA treatment and its effectiveness or may be, despite the increasing attention for quality of life, more focused on survival and the continuation of treatment until there is no more treatment to offer [26].

Comparing HCPs beliefs about OACA with patients' beliefs reported in literature, the mean necessity-concerns differential score in the present study was lower than a comparable score of patients taking the OACA capecitabine (4.8 vs. 7.8) [14]. However, in both studies the necessity-concerns differential scores were positive indicating that on average the beliefs of patients and HCPs in necessity outweigh concerns about the potential negative impact of OACA treatment.

Nurses scored lower on the necessity-concerns differential than physicians, nurse practitioners and pharmacists. Nurses appear to express more worries about the use of OACA than physicians, nurse practitioners and pharmacists. Nurses have more frequent and intense contact with patients taking OACA when they are hospitalized, mostly as a result of severe and intense side effects or disease progression. Seeing patients suffering is confrontational and may be emotionally demanding [27]. This might have shaped nurses' views.

Table III. Regression analysis with the perceptions of adherence management questionnaire (PAMQ) – total score as dependent variable and potential predictors as independent variables.

Variable	Univariate			Multivariate		
	β (SE)	95% CI	<i>p</i> -Value	β (SE)	95% CI	<i>p</i> -Value
Profession ^a						
Nurse practitioner	0.19 (0.26)	−0.32–0.71	0.46	0.33 (0.28)	−0.22–0.88	0.24
Nurse	−0.50 (0.21)	−0.92–−0.085	0.019*	−0.38 (0.24)	−0.84–0.09	0.11
Pharmacist	−1.04 (0.23)	−1.48–−0.59	<0.001	−0.85 (0.24)	−1.33–−0.38	<0.001
Gender ^b	0.25 (0.20)	−0.14–0.63	0.22	0.26 (0.20)	−0.14–0.66	0.20
Number of years employed	−0.008 (0.01)	−0.024–0.007	0.30			
Country ^c	0.12 (0.18)	−0.22–0.47	0.48			
Type of hospital ^d	0.05 (0.19)	−0.32–0.42	0.81			
Specialization ^e	0.006 (0.20)	−0.39–0.40	0.98			
Necessity-scale	0.006 (0.03)	−0.056–0.068	0.86			
Concerns-scale	−0.08 (0.04)	−0.15–−0.011	0.024	−0.07 (0.03)	−0.13–−0.003	0.060
NC/diff ^f	0.046 (0.025)	−0.003 (0.096)	0.066			

CI, confidence interval; SE, standard error.

^aReference category is physician;

^bReference category is female;

^cReference category is Belgium;

^dReference category is non-academic hospital;

^eReference category is medical oncology;

^fNecessity-concerns differential score.

*The bold value indicates statistical significance at the $p < 0.05$ level.

We also found that HCPs who were accepting (high necessity beliefs, low concerns) considered themselves more able to influence adherence and thought to have a better notion of patient adherence than HCPs who were ambivalent towards OACA (high necessity, high concerns). Patients with a chronic non-oncological disease being accepting towards medicines were previously found to have the highest adherence levels [28]. In future research, the association between: 1) HCPs perceptions of OACA adherence management, beliefs about OACA, and usual care; and 2) patients' adherence levels should be studied.

Particularly the SDM scores of items with regard to giving patients a good knowledge base about their treatment options (explaining advantages and disadvantages of the treatment options and helping to understand all information), were high. The high score on the item "My patient and I reached an agreement on how to proceed" indicates that physicians are willing to give patients a role in the decision making process. However, the lowest mean score was found for the item regarding involvement of patients in the final decision making ("my patient and I selected a treatment option together"). This is very likely, as in current practice the physician is often the person to finally select the treatment option. As patients who were assigned a more extensive role than wanted in the decision making process, appeared to be less adherent to their OACA [8], physicians should first discuss whether patients want a role in the decision making process and second, discuss which role would be fitting.

Limitations and methodological considerations

This study is the first to explore perceptions of adherence management and beliefs about OACA of different HCPs involved in the care for patients taking OACA in Belgium and the Netherlands. Despite the strengths, some limitations need to be acknowledged. One limitation is the method of recruitment. The questionnaire was sent out by several professional associations and distributed in the authors'

network. Therefore, response rates could not be calculated. Furthermore, it was assumed that particularly HCPs affiliated with the research topic would have completed the questionnaire. This may have influenced the results. Nevertheless, the present study provides an interesting insight in HCPs views upon adherence to OACA. Another limitation is that the questionnaire is not specific to certain patient groups. HCPs might have kept in mind patients treated with long- or short-term OACA. It is possible that differences between hematologists and medical oncologists (e.g. the perception of knowing the level of adherence of all patients) could be partly explained by specific properties associated to one of both groups of OACA (long- and short-term OACA), such as the severity of side effects.

Conclusion

A considerable number of the HCPs stated that they did not know the adherence of their patients, nor did they think their patients discuss adherence with them. However, they felt to have knowledge of adherence and perceived to be able to influence adherence of their patients. There appears to be a good basis for adherence supportive care. HCPs statements about the adherence care they provide will be published separately.

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Declaration of interest

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