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Usability and added value of the Value@WORK-Q23: insights from user testing of a standard set of key work-related outcomes for patients with cardiovascular diseases in real-life consultations

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Abstract

Background This study explored the usability and added value of the Value@WORK-Q23 (V@W-Q23) in real-life consultations with working-age patients diagnosed with cardiovascular diseases (CVD), examining the experiences with the usability and added value by both patients and healthcare professionals and identifying potential barriers and facilitators to its use.

Methods An exploratory mixed-methods design was employed, evaluating the usability and added value when testing the V@W-Q23 in real-life consultations. The V@W-Q23 was tested in three steps: (1) the patient completing the V@W-Q23 independently before the consultation, (2) the healthcare professional reviewing the results, and (3) using the insights during the consultation. These user tests took place in consultations across four healthcare settings: occupational medicine, social insurance medicine, general practice, and cardiology. Nationwide purposive sampling was used. Data collection included observation of consultations and semi-structured interviews with both the participating patients and healthcare professionals. Quantitative data were analysed using frequencies and percentages; qualitative data underwent content analysis.

Results The usability of the V@W-Q23 was tested in 16 consultations involving 12 healthcare professionals and 15 patients. The V@W-Q23 was primarily used to discuss items of interest to the patient or those deviating from the professional's expectations. Both patients and professionals found the items relevant, easy to understand, and manageable within limited time. The tool enhanced understanding of personal circumstances, increased attention to work-related topics, and improved interpersonal communication. Its added value was particularly notable for patients on temporary sick leave or those facing work-related challenges. Barriers included limited time, competing priorities, and unclear roles in work-focused healthcare. Facilitators included repeat measurements, a more appealing layout,

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clearer responsibilities for sending, receiving, and processing the V@W-Q23, and integration into electronic health records. The tool was also suggested for use in other chronic conditions.

Conclusions The V@W-Q23 was well-received by both patients and healthcare professionals, promoting in-depth discussions about work-related issues during consultations. Its use improved understanding and attention to work-related factors, highlighting the potential for broader application in healthcare settings.

Keywords Patient reported outcome measures, Cardiology, Patient-centered care, Occupational health services, Cardiovascular diseases, Primary health care

Background

Patient-reported outcomes (PROs) offer a standardized approach to capture the patient's perspective on their own health status [1]. The use of PROs, at either an individual or aggregate level, can improve patient-centeredness in healthcare provision [2]. At an individual level, healthcare professionals can use PROs to focus on the patient's individual goals and guide diagnostics and treatment decisions [3]. At an aggregated level, PROs can be used to guide benchmarking of performance between healthcare institutions, promote quality improvement and facilitate learning across organizations [4].

In recent years, the adoption of disease-specific patient-reported outcome measures (PROMs) and patient-reported experience measures (PREMs), as outcome measures for the PROs, have seen a notable increase in clinical settings [5, 6]. This development reflects the growing emphasis on value-based healthcare, which focuses on improving outcomes that matter to patients while ensuring efficient use of resources [7]. The integration of PROs, alongside clinician-reported outcomes (CROs) based on medical expertise and diagnostic findings, provides complementary perspectives. This combined approach ensures that both the patient's subjective experiences and the clinician's objective findings inform care delivery and health system performance. Consequently, we are experiencing a transformative phase in healthcare - shifting from a narrow focus on merely curing disease and achieving clinical recovery to a broader, more comprehensive approach that emphasizes health, well-being, and overall functionality [8, 9]. As a result, employment status, which is a crucial indicator for patients' general health, mental health and physical, social and emotional functioning [10], is gaining importance in overall healthcare delivery [11]. Work-focused healthcare provides an important contribution by assessing patients' abilities and limitations related to work participation and by providing advice, support and treatment for functional recovery [12]. Nevertheless, a prominent challenge in delivering patient-centered work-focused healthcare remains the lack of adoption of work-related PROs [13].

The International Consortium for Health Outcomes Measurements (ICHOM) has developed standardised sets of person-centred outcomes, targeting key outcomes for various medical conditions, including coronary artery disease [14]. However, we found that these ICHOM sets predominantly emphasise disease-specific key outcomes, in which work-related aspects either entirely absent or limited to a single domain addressing work functioning. To bridge this gap, a previous study established consensus on the most critical work-related health and functioning outcomes for patients with cardiovascular diseases (CVD), aiming to complement existing disease-specific standard sets that lack work-related measures [15]. Therefore, the Value@WORK-Q23 (V@W-Q23) was developed.

This questionnaire serves as an outcome measure to evaluate these most important work-related health outcomes and experiences [15]. CVD was used as a case in the development of this standard set due to its increasing prevalence among the working-age population [16, 17] and its substantial negative impact on work ability, along with the societal effects of productivity loss and long term work disability [18]. The standardised work-related PRO set, with the V@W-Q23 as an outcome measure, has been developed with the goal of enhancing patient-centeredness in work-focused healthcare settings by assisting both healthcare professionals and patients in addressing individual needs of patients with CVD, this way enhancing the engagement of these patients in their own work-focused care process [15]. The use of PROs across a wide range of healthcare disciplines has demonstrated promising results in enhancing patient-physician communication, addressing health-related challenges, and ultimately improving the patients' quality of life [19, 20]. However, the extent to which PROs fit—or fail to fit—into the routine ways patients and clinicians communicate, how clinicians make decisions, and how healthcare is organized, greatly influences their added value on clinical management and patient outcomes [21]. Therefore, to ensure successful future implementation of the V@W-Q23 that aligns with its context and remains both relevant and feasible for routine use, it is essential to explore whether the questionnaire is practical, understandable, and meaningful in supporting the consultation process.

This study aims to explore the usability of the V@W-Q23 in real-life consultations with working-age patients diagnosed with CVD, investigate the experiences with the use and added value during consultation preparation and interaction, and identify potential barriers and facilitators to its use.

Methods

Study design and setting

This manuscript describes an exploratory mixed-method study in which the V@W-Q23 [15] was user tested at an individual patient level in real-life consultations between patients and healthcare professionals. These real-life consultations were part of the usual care provided within various healthcare settings involved in work-focused healthcare across a wide range of (healthcare) practices in the Netherlands. Quantitative and qualitative observational data was gathered to gain insights into the use, while qualitative interview data provided a deeper understanding of user experiences. The Mixed Methods Article Reporting Standards (MMARS) was used for reporting the results [22].

The Value@WORK-Q23 (V@W-Q23)

The V@W-Q23 is a 23-item patient-reported questionnaire. The V@W-Q23 serves as an outcome measure to evaluate a set of nine work-related health and functioning outcomes and experiences within work-focused healthcare considered most important for patients with CVD in the working age: (1) work participation, (2) suitable work, (3) physical work ability, (4) mental work ability, (5) communication with the patient, (6) person-centeredness, (7) support from the work environment, (8) flexibility in the work environment and (9) interdisciplinary communication. Consensus on the nine work-related health outcomes and the V@W-Q23 was reached in a modified Delphi study with working-age patients with CVD and healthcare professionals involved in work-focused healthcare. The detailed development of the set is described elsewhere [15].

Given the diversity within the target population, the V@W-Q23 is customized to each patient's work situation. Depending on whether patients report having a contract for paid work and/or are currently working, the outcome measures for (2) suitable work, (7) support from -, and (8) flexibility within the working environment are included. In addition, items regarding nine case-mix variables are included in the V@W-Q23. All items can be found in Supplementary material no 1.

Set-up of user testing

User testing in real-life consultations included three steps (see Fig. 1): First, in the days before the consultation, the patient received a digital link to the V@W-Q23 in Microsoft Forms via email. Patients completed the V@W-Q23 independently before the scheduled consultation, and the first author (MEH) facilitated the sharing of the results with both the healthcare professional and the patient. Second, the healthcare professional reviewed the patient's results as part of their preparation for the consultation. The intended objectives of the V@W-Q23 were clearly explained to both patients and professionals prior to these two steps. When requested by the professional or patient, guidance was provided on how to interpret the questions of the V@W-Q23 and its intended objectives. However, regarding its practical use, we simply advised that the professional and patient could incorporate the questionnaire into the consultation whenever they found it useful and valuable. This meant that there was no prescriptive or directive approach. This intentional strategy aimed to capture moments when professionals and patients themselves naturally perceived the questionnaire responses added value during the consultation, allowing to evaluate its usability and perceived added value within regular consultation workflow.

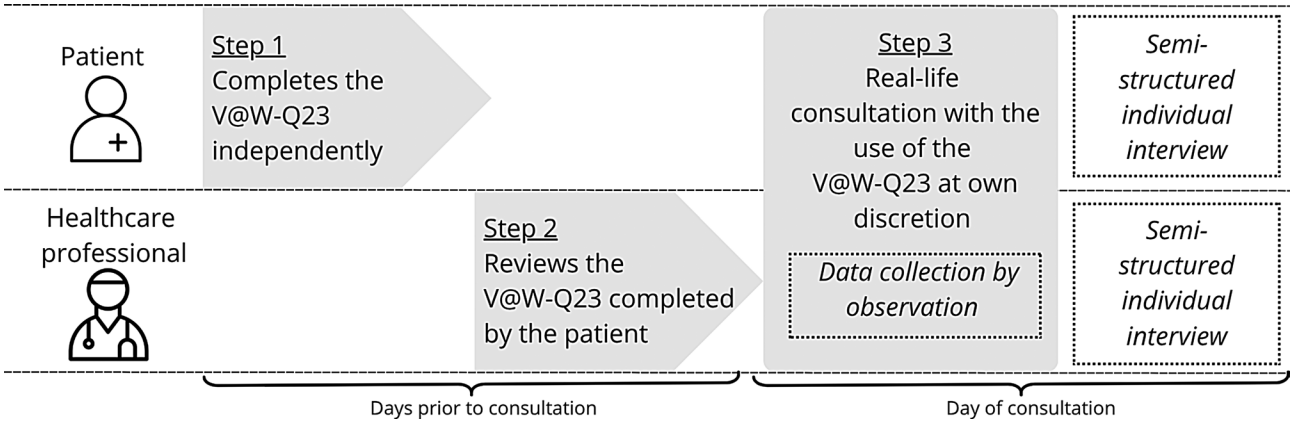

Fig. 1 Set-up of user testing in real-life consultations. The dotted frames indicate the different data collections

Participants and recruitment

User testing was performed across four professions involved in work-focused healthcare: occupational medicine, social insurance medicine, general practice and cardiology. Therefore, both the healthcare professional and the patient of a pre-scheduled consultation had to be eligible and willing to participate. Eligible healthcare professionals included those employed in any of the medical fields mentioned above. Patients were eligible if they had a CVD diagnosis and were of working age (18–67 years). All participants needed to understand and speak Dutch.

The recruitment was conducted through two distinct pathways. First, healthcare professionals were selected nationwide using purposive sampling. Recruitment of these healthcare professionals occurred through social media platforms and the researchers' professional networks. Interested and eligible healthcare professionals were tasked with recruiting eligible patients who were scheduled for an upcoming consultation. After a patient gave verbal consent to the healthcare professional to share their contact details with the researchers, the first author (MEH) contacted the patient by phone to provide further information. Second, patients of working-age who were diagnosed with CVD and an upcoming appointment with an occupational physician, social insurance physician, general practitioner (or practice assistant), or cardiologist were invited to participate through an open call on social media. The first author (MEH) approached the healthcare professionals of interested patients to confirm their willingness to participate. The user test was conducted after both the patient and the healthcare professional expressed their willingness, confirmed their eligibility, and signed informed consent. Both healthcare professionals and patients could participate in two user testing settings, but not as part of the same pair.

Primarily, we aimed to involve at least three healthcare professionals per healthcare setting, each conducting two user tests, resulting in a total of six user tests per context. The primary aim was not to achieve data saturation, but rather to obtain a diverse and exploratory understanding of practical experiences with the use.

Data collection

Observations

The first author (MEH) observed all real-life consultations to assess how the set was utilized during each consultation (see Fig. 1, step 3). She observed either in person or virtually via video connection, depending on how the consultation was carried out and the researcher's ability to attend in person. A structured observation data collection was employed, using an observation checklist (see Supplementary material no. 2) to systematically capture the use of the V@W-Q23, including: consultation duration, whether the patient and/or healthcare professional kept the set at hand, points in time when the content of the set was discussed, duration of discussions related to the set, who initiated the discussion related to the set, and frequency of outcome measures discussed. Additionally, field notes were taken to capture the essence of discussions related to the outcome measures, as well as any contextual or behavioural nuances that could not be captured in a structured way. The observer was non-participatory.

Semi-structured interviews

Semi-structured interviews were conducted by the first author (MEH) with the patient and healthcare professional individually. To ensure the data collection was momentary, all interviews were conducted directly after the real-life consultations (see Fig. 1). Patients were asked how they experienced completing the set. Professionals were asked how they integrated the completed set in their preparation for the consultation. Both patients and professionals were asked about the usability of the set during the consultation, about the experienced added value on their (preparation for the) consultation and the potential barriers and facilitators to its use. In addition, all participants were asked to rate their experienced usability and added value of the V@W-Q23 in their real-life consultation with a grade from 0 (worst) to 10 (best). Interview guides listing topics and open-ended questions were developed for the patients and healthcare professionals separately (see Supplementary material no. 3). These interview guides were used as a memory aid for the interviewer. All interviews were performed in Dutch and were voice recorded with the permission of the participants. The voice recordings of the interviews were transcribed verbatim and de-identified for data analysis.

Data analysis

Analysis of the quantitative data

The quantitative data gathered from the observation checklists and usability and added value scores were processed by means of frequency counts, converting real time to minutes, and calculating percentages using SPSS version 28 [23]. Descriptive statistics were used to summarize the characteristics of the patients. Characteristics of the patients were extracted from the V@W-Q23.

Analysis of the qualitative data

All transcripts of the semi-structured interviews were analysed using qualitative content analysis [24]. For each transcript, open codes were assigned to all relevant text fragments and deductively subdivided into three subthemes concerning the (1) usability, (2) added value and (3) barriers & facilitators for the use of the V@W-23Q during real-life consultations, independently by two researchers (MEH, LPJ) using MAXQDA 2020 [25].

Disagreements were resolved by discussion. Finally, emerged themes were reorganised and reformulated in discussion with the research team (MEH, NZ, MM, JLH, PJvdW & SJvdB-V) with the aim of reaching agreement on the final coding. The findings were not checked by the participants. The field notes from the observations were reviewed by the first author (MEH) to provide an overview of the context of the discussions related to the outcome measures.

Results

Participant recruitment and characteristics

Following the outreach through social media and direct invitations via the researchers' professional networks, 19 healthcare professionals expressed interest in participating. Two additional healthcare professionals expressed interest following a referral via already participating healthcare professionals. However, not all healthcare professionals were successful in recruiting eligible patients during the study period, resulting in user testing in 14 real-life consultations. On the patient side, five individuals responded to the social media call, all of whom had an upcoming appointment with a cardiologist. Ultimately, only one of these patients participated, resulting in user testing during two real-life consultations. In total, user testing was performed during 16 real-life consultations, carried out by 12 different healthcare professionals and 15 patients. Resulting in 32 semi-structured interviews, each lasting 10 to 45 min. See Fig. 2 for more details on the recruitment process.

Three occupational physicians conducted a total of five user tests; three insurance physicians conducted a total of three user tests; two practice assistant general practitioners conducted a total of two user tests, and; four cardiologists conducted a total of six user tests. For an overview of the demographic characteristics of the participants, see Table 1.

The use of the V@W-Q23 in real-life consultations

The V@W-Q23 was discussed in 14 of the 16 consultations. It was observed that the primary strategy for utilizing the V@W-Q23 was to discuss only a few items during the consultations. Two professionals, an occupational physician and a cardiologist, reviewed all items with the patient and addressed any issues encountered. On average, the discussion regarding the V@W-Q23 was introduced at the ninth minute and lasted about 5 min on average, accounting for 20% of the total consultation time. Discussions dominantly involved work participation ($n = 7$), work ability ($n = 8$), work environment ($n = 6$), and interdisciplinary communication ($n = 6$), while the outcomes on suitable work ($n = 4$) and person-centeredness ($n = 3$) were least addressed. It was observed that there were occasional instances in which a patient interpreted an item differently than intended. In all cases this was clarified by discussion with the professional during consultation. Patients gave an average score of 8.3 (SD 0.6) for the usability of the V@W-Q23, and a 7.3 (SD 2.1) for its added value. Professionals rated the usability at 7.9 (SD 0.7) and the added value at 7.2 (SD 1.5). For an overview of the quantitative data, see Table 2.

Below are the qualitative themes related to the experiences with the usability of the V@W-Q23, the perceived added value of the V@W-Q23, and the barriers and facilitators to its use, along with several illustrative quotes. Additionally, representative quotes for each theme can be found in Table 3.

Experiences with the usability of the V@W-Q23

Discussing only a few items is enough - Patients indicated that it was of utmost importance to them to discuss the items relevant to their work-related problems with all involved professionals. Professionals especially prioritized discussing the items where patients' responses deviated from their prior expectations, whether positively or negatively. As highlighted in the field notes, one professional remarked *"I saw a number of things in the questionnaire that I would like to discuss with you"*. Healthcare professionals found this strategy of focusing solely on items important to either the patient or the professional to be time-efficient and effective. This approach also seemed to meet patients' needs, as they reported high levels of satisfaction.

> *So I think it's good the way it went. You fill in [the V@W-Q23] at home, and if something unusual comes up, [the cardiologist] quickly reviews it and can then discuss this item with you. – Patient 5 at the cardiologist*

Easy to understand - From both the perspective of the patients and healthcare professionals, the majority mentioned that the items of the V@W-Q23 were easy to understand. Only one patient reported to find the questions challenging to comprehend. While the majority of patients expressed being satisfied with receiving the V@W-Q23 digitally, the same patient expressed the preference for completing the questionnaire through verbal communication.

Relevance of the content - All participants confirmed that the V@W-Q23 did not contain irrelevant items nor omitted any relevant ones. However, one insurance physician noted that patient-reported information on the patient's work participation is less relevant, because this information from the patient is already registered in their system.

Appropriateness of time investment prior to consultation – All patients expressed satisfaction with the time

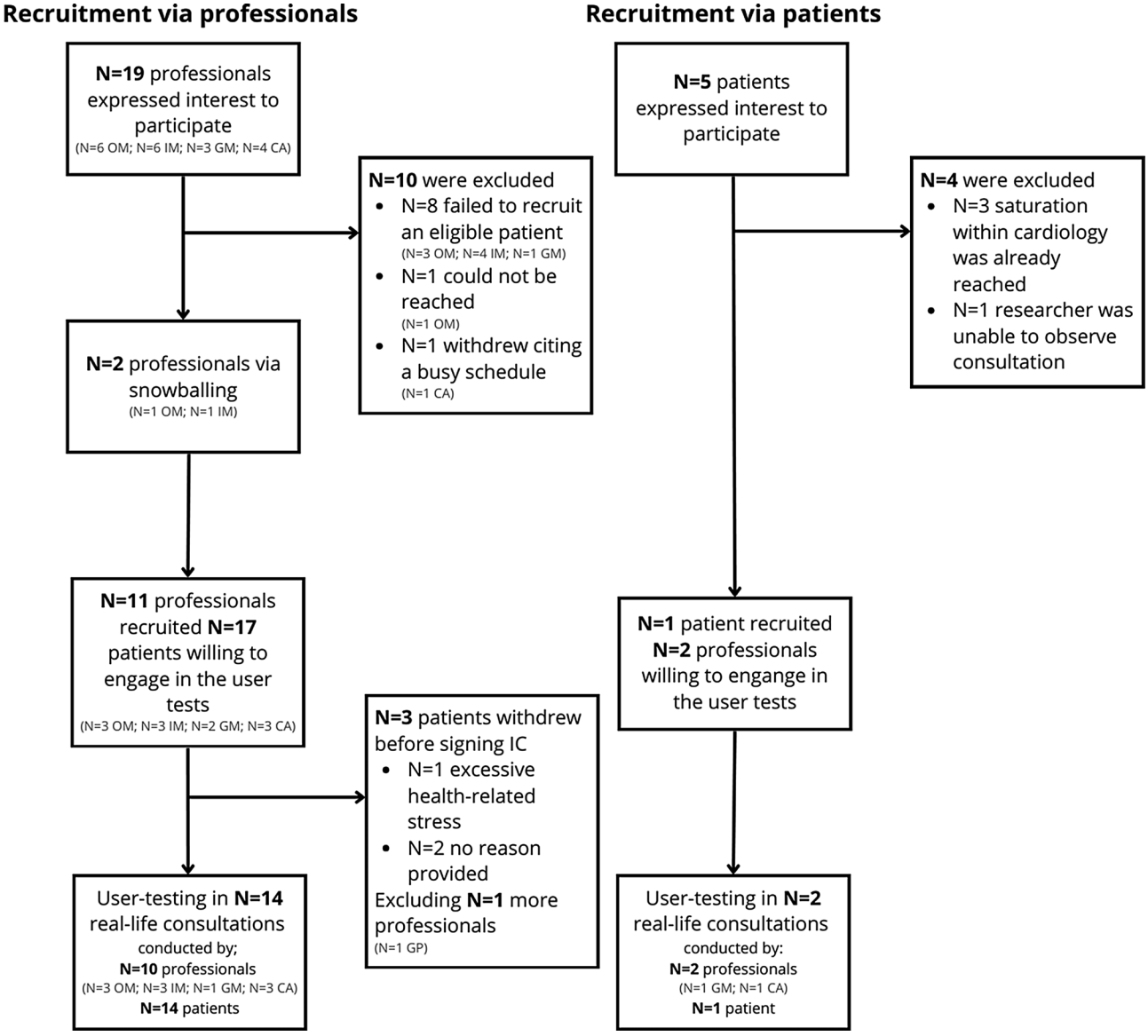

Fig. 2 Flowchart of recruitment. Professionals from: OM = occupational medicine, IM = social insurance medicine, GM = general practice, and CA = cardiology

required to complete the questionnaire. Also the occupational and insurance physicians expressed that the time needed to review the completed V@W-Q23 prior to the consultation fits within their available time. In contrast, some of the cardiologists and practice assistant general practitioners reported that the time required to review the questionnaire prior to the consultation did not align with their time constraints.

Perceived added value of the V@W-Q23

Better understanding of personal circumstances - Patients reported that completing the V@W-Q23 encouraged them to reflect on their work situation, particularly helping them better prepare for consultations in occupational medicine, general practice, and insurance medicine. Some patients indicated that this moment of reflection was an emotional process as they were still coming to terms with their circumstances. Healthcare professionals from all professions reported that reviewing the patient's results prior to the consultation provided them with new insights regarding the context of the patients work-situation, as signalling uncertainty about returning to work, poor support from the employer, and reporting poor interdisciplinary communication. This better understanding among the professionals was also highlighted by the patients, conveying a sense of being valued.

More focus and awareness to the topic work – Patients and professionals noted an increased focus and

Table 1 Participants characteristics

	Mean, SD, min-max	*N*	%
Amount of user tests		16	
Occupational medicine		5	31.2
Social insurance medicine		3	18.8
General practice		2	12.5
Cardiology		6	37.5
Healthcare professionals		12	
Occupational physicians		3	25
Insurance physicians		3	25
Practice assistant general practitioners		2	16.7
Cardiologists		4	33.3
Patients		15	
Age	53, 6.2, 45-64		
Gender *(male)*		10	66.7
Highest education			
Higher professional education		4	26.7
Secondary school		3	20
Secondary vocational education		6	40
University education		2	13.3
Current employment status			
Full sick leave		7	46.7
Partly working		3	20
Working as usual		5	33.3
Type of work agreement			
Contracted employee		7	46.7
Self-employed		4	26.7
Unemployed		4	26.7
Type of CVD			
Cardiomyopathy		2	13.3
Coronary Vascular Dysfunction		2	13.3
Coronary artery aneurysm		1	6.7
Heart failure		3	20
Heart rhythm disorder		2	13.3
Stroke		3	20
Valve insufficiency		2	13.3
Time since diagnosis (years)	4.5, 8.2, 0.1-29		
< 1 year		7	46.7
1-3 years		4	26.7
3-10 years		2	13.3
>10 years		2	13.3
Present comorbidities (Yes)		8	53.3
Arthrosis		2	25
Asthma		1	12.5
Hypertension		1	12.5
(Pre)diabetes		2	25
Sleep apnea		1	12.5
Varicose veins		1	12.5
Previous long-term sick-leave (Yes)		5	33.3

awareness on work-related issues during consultations in both cardiology and general practice compared to usual practice.

> *I am more aware [of the topic work] now. Now I think: oh yes, how do they deal with it at work? Before using the [V@W-Q23] I didn't really think about asking those questions. - Practice assistant general practitioners*

Better structure and more interaction during consultation – Patients across all medical settings and professionals reported an improved structure and engagement during consultation when discussing work-related issues using the V@W-Q23. The occupational physician and cardiologist who reviewed all items with the patient and discussed any issues encountered, found it valuable to use the V@W-Q23 items as a new framework for work-related conversations. This strategy of using the V@W-Q23 as new structure in consultations also led to more interaction, as reported by the patients who visited these professionals.

Conversation starter for overlooked work-related topics - Professionals from all medical settings reported that the insight from the V@W-Q23 helped them to already determine what and how to discuss work-related topics, in which patients' answers to the items served as a starting point to ask further questions and delve deeper into these topics. Patients acknowledged that this strategy of their professionals using the results as a starting point in conversation, resulted in discussions of work-related topics that were typically not addressed, enhancing the quality of the consultation. Patients, especially those visiting the cardiologist or practice assistant general practitioners, reported that submitting the V@W-Q23 beforehand made it easier for them to initiate a conversation about their work-related challenges. As one patient noted during the consultation, *"As I had also indicated in the questionnaire, I experience a lot of fatigue, which also limits me in my work".*

> *Filling out the V@W-Q23 has made a difference, because it provides an easier way to address work-related issues. It has given me some support to bring up an important point. – Patient 11 at the cardiologist*

Greater added value for patients on temporary sick leave or experience problems while working - Patients who are currently on (partial) sick leave or experience problems while working reported that the use of the V@W-Q23 had highly impacted their (preparation for) consultation. Patients in stable work conditions experiencing no work-related problems, as well as those not employed

Table 2 Overview of the quantitative data

Characteristics of discussing the V@W-Q23 during the real-life consultations[a]	mean, SD, min-max	
Length of the real-life consultation *(minutes)*	30, 15.3, 13–60	
Moment of first introduction of the V@W-Q23 as a topic *(minutes)*	8.7, 9.5, 1–30	
Length of discussing items from the V@W-Q23 *(minutes)*	5.4, 5.3, 0–18	
Share of discussing the V@W-Q23 in consultation *(%)*	19.8, 18.6, 0–59	
Amount of professionals keeping the V@W-Q23 at hand *(N)*	9	
Amount of patients keeping the V@W-Q23 at hand *(N)*	2	
Given grades (0 [worst] -10 [best])[b]	**mean**, **SD**, **min-max**	
Grade for usability given by patients	8.3, 0.6, 7–9	
Grade for added value given by patients	7.3, 2.1, 2.5–10	
Grade for usability given by professionals	7.9, 0.7, 7–10	
Grade for added value given by professionals	7.2, 1.5, 3–9	
Amount of real-life consultations in which the item was discussed[a]	**N**	**N at professionals' initiative**
Part 1: Work participation*	7	5
Item 1: Do you currently have a contract for paid work?	1	0
Item 2: For how many hours per week do you currently have a contract?	0	.
Item 3: Are you currently performing the job?	2	2
Item 4: How many hours per week do you currently work?	2	1
Item 5: Can you perform all tasks you were used to?	0	.
Item 6: How confident are you that you can return to or remain at work?	2	2
Part 2: Work ability*	8	5
Item 7: Do you feel that you are able to perform work?	2	2
Item 8: Do you feel that you are physically able to perform work?	2	2
Item 9: Do you feel that you are mentally able to perform work?	1	1
Item 10: Do you feel you have enough energy to perform work?	4	2
Part 3: Suitable work*	4	3
Item 11: Does your cardiovascular disease make it difficult to perform your job?	2	2
Item 12: Work fast enough	1	1
Item 13: Finish work on time	1	1
Item 14: Work without mistakes	1	1
Item 15: Done what you are capable of	1	1
Item 16: Handle workload	1	1
Part 4: Work environment*	6	4
Item 17: How much support do you need from the people at your work?	4	4
Item 18: How much support you get from the people at your work?	6	5
Item 19: How well do the people at your work help you adjust your work?	3	2
Part 5: Person centeredness*	3	1
Item 20: How much effort is made to help you understand how your health affects your work situation?	2	2
Item 21: How much effort is made to listen to the things that matter most to you about your health and work situation?	2	2
Item 22: How much effort is made to include what matters most to you in choosing what to do next regarding your health and work situation?	2	2
Part 6: Interdisciplinary communication*	6	5
Item 23: Do you think that your healthcare providers cooperate well when it comes to your work situation?	5	5

[a]Data from the observations, [b] Data from the interviews. *Please note: In some cases parts were also discussed more generic during the real-life consultations, without a direct link to a specific item. Find the information per healthcare context in Supplementary material no 4

and without prospects of employment, reported that the use of the V@W-Q23 had less impacted their (preparation for) consultation. In cases where patients were in stable work conditions, field notes showed that the questionnaire was briefly mentioned by the professionals, mainly to confirm that everything was going well. Conversely, in cases where patients had no employment prospects, it was noted that professionals in general practice and cardiology generally tended to avoid discussing work. In addition, patients who met with professionals within cardiology and general practice who usually involve work-related topics in their consultation, or those whose V@W-Q23 was overlooked during consultation, did report they did not perceive any added value of

Table 3 Representative quotes of the qualitative data

Theme	Representative quote
Experiences with the usability of the V@W-Q23	
Discussing only a few items is enough	"So I think it's good the way it went. [As the patient] you fill in [the V@W-Q23] at home, and if something unusual comes up, [the cardiologist] quickly reviews it and can then discuss this item with you." – Patient, consultation with the cardiologist
Easy to understand	"The [items] were clearly stated, so it wasn't that I had to read a question twice or that I didn't understand it." – Patient, consultation with the occupational physician "[The V@W-Q23] was very clear, and I actually have no points for improvement." – Insurance physician
Relevance of the content	"So I did not see any redundant questions in [the V@W-Q23]." – Patient, consultation with the occupational physician "I think [the V@W-Q23] provides useful information. Above all, I found it insightful." – Cardiologist "I don't think that the data on [current work participation] needs to be included, because [the Dutch Social Security Institute: the Institute for Employee Benefits Schemes (UWV)] already has that information. We don't need to ask it the patient." – Insurance physician
Appropriateness of time investment prior to consultation	"No, [filling out the V@W-Q23] takes only about fifteen or 25 minutes. For me, it's not burdensome at all. I wouldn't mind filling it out again for every consultation." – Patient, consultation with the occupational physician "Because [the V@W-Q23] takes very little time and we have plenty of time to prepare… [Studying files] is a big part of our job. More than in a general practice, (…) they have one minute to prepare. [In social insurance medicine] we can really go through the files. So no, it really… takes little time and it fits perfectly." – Insurance physician
Perceived added value of the V@W-Q23	
Better understanding of personal circumstances	"First of all, [the V@W-Q23] makes you more aware and helps you reflect on your personal circumstances. (.) It gives you some insight into your personal circumstances. (.) So that you are better prepared for consultation. Because by filling out the [V@W-Q23], you have already thought about these things. And you have thought about what needs to be discussed." – Patient, consultation with the occupational physician "[The V@W-Q23] also gives you a bit of an idea of how [the patient] is positioned in the situation. That provided me with some more information. (.) [The patient] hadn't expressed that so explicitly to me in an earlier consultation, and the [V@W-Q23] brought that out." – Occupational physician
More focus and awareness to the topic work	"There was clearly more interest [in the topic of work] today." – Patient, consultation with the cardiologist "I am more aware [of the topic work] now. Now I think: oh yes, how does [the patient] deal with [his medical condition] at work? Before using the [V@W-Q23] I didn't really think about asking those questions." – Practice assistant general practitioners
Better structure and more interaction during consultation	"In fact, the questions the occupational physician asks [during consultation] should already provide enough information to conclude something [about work capacity], but of course - such a [the V@W-Q23] makes it much more structured." – Patient, consultation with the occupational physician "[During consultation] there was more interaction between [the occupational physician and me because of the V@W-Q23]. Otherwise, [the occupational physician] has to search for things to know, and now that is somewhat predetermined. (.) By filling out the [V@W-Q23], the conversation is better than the other times. Then it was often more one-sided, more from [the OCs] side." – Patient, consultation with the occupational physician
Conversation starter for overlooked work-related topics	"I always discuss the patients vision [on their own (future) work capacity]. And [the V@W-Q23] fits very well within [this part of the consultation], because then [insurance physicians] discuss: if the patient thinks he/she can stay at their own work? How it should be adjusted, or if lighter work is possible? So this really aligns very well with [the V@W-Q23]. (.) I can also ask: why is [the answer on the V@W-Q23] a two? Why not a three or what? What [other work] could you do? What do you need? So you could actually… It could really be a good starting point for this discussion." – Insurance physician "Filling out the V@W-Q23 has made a difference, because it provides an easier way to address work-related issues. It has given me some support to bring up an important point." – Patient, consultation with the cardiologist
Greater added value for patients on temporary sick leave or experience problems while working	"I think [the added value of the V@W-Q23] depends on the answers you give, and if your answers are very consistently on one side - especially on the high side, that it's going well - then [the V@W-Q23] doesn't add much value. Whereas, I think, if it's on the other side, then [the V@W-Q23] can add a lot of value." – Patient, consultation with the occupational physician "I am interested in the outliers. (.) I examine [the V@W-Q23] for outliers, more than the results that fall within my expectations, and then I think: why does someone choose, for example, [to answer] 'not at all' or 'fully supported' [at the work environment question of the V@W-Q23]? And if [the results] are more neutral then I find them less interesting." – Cardiologist
Barriers to the use of the V@W-Q23	
Low health literacy of patients	"The only thing is that [patients with a low health literacy] really need some further explanation on the items. That might be a point of… I don't really know what to do with that further. (.) So this is the written questionnaire, but maybe [the items can be explained more] through an additional video" – Insurance physician
Lack of knowledge on the added value	"Well, in my patient population, I think there will be a large percentage that won't fill in [the V@W-Q23]. So I think the main barrier will be that patients don't fill it out since they do not see the added value or they think (.) I don't feel like it." – Insurance physician "No, I still don't quite see my role [in work-focused healthcare]. – Practice assistant general practitioner
Limited time during consultation	"[The V@W-Q23] also takes a lot of time to discuss" – Patient, consultation with the cardiologist
Prioritizing the medical aspects	"For [the cardiologists] [the topic work] not very important or something. (.) They are still too medically focused." – Patient, consultation with the cardiologist

Table 3 (continued)

Theme	Representative quote
Fear that discussing work-related issues will stir up emotions	"I think [work] is be a sensitive topic. I think that for people who are sick and would rather work (.) but cannot, (.) if you bring up this emotional topic [the topic work], it can take quite a lot of time." – Cardiologist
Fixed rules and regulations	"While I do find it important to discuss the patient's perspective and offer appropriate participation advice, during a claim assessment I have to assess the medical status of the patient following some strict rules, in which discussing the V@W-Q23 does not fit. (.) I believe there is more room to discuss the patient's perspective and offer appropriate participation advice in the Sickness Benefits Act." – Insurance physician
Too burdensome to complete for every healthcare professional	"And in my case, you have so many healthcare providers, you have the cardiologist, physiotherapy, internist. If you have to fill out a questionnaire for all of them, it becomes too much. I can imagine that if you are with one doctor, it is manageable. But I see so many healthcare professionals, that for each time [to fill out] the V@W-Q23, it may not be burdensome but it becomes annoying." – Patient, consultation with the occupational physician
Facilitators to the use of the V@W-Q23	
Broader applicability	"The [V@W-Q23] question: do you think you still have the energy to work? (.) Then you don't think: [The fact] that I have less energy, could that also be from that viral infection? Or could it be from those my heart problem? Should I answer that question so that it points to [my heart problems]? That becomes very complicated, I think." – Patient, consultation with the cardiologist "Yes, I think you could also use [the V@W-Q23], for example, within other patients [populations]." – Practice assistant general practitioner
Repeated assessments for monitoring progress	"With [repeated assessments] you can see if there is any improvement. If I score a 5 now and it becomes a 7 [next time], that would mean I feel more supported [in the work environment]. The occupational physicians can then say, yes, that is an improvement, and if there is a deterioration, you can discuss it with human resource." – Patient, consultation with the occupational physician
Clearly establish responsibilities	"That questionnaire also has to be sent [to the patient], when returned it automatically has to end up with the secretary. And they need to schedule 10 minutes before the consultation for [the physician] to review the completed [V@W-Q23] list. That requires some coordination." – Insurance physician
Optimize design	"You can show [the results] with colors and bars. I think that would be very useful to do. (.) So [the professional] can quickly see how to interpret [the results]." – Cardiologist
Integrate into electronic health record	"I already find [the V@W-Q23] easy, but you could ensure that it gets [integrated] into the medical file, (.) that it becomes part of the medical record, so [the professional] can click on it in the file. That's an added convenience." – Occupational physician

the V@W-Q23 during their consultation. Moreover, the professionals noted that the use of the V@W-Q23 had a greater added value on their consultation when the results of the patient showed any deviation from their expectations, merely than only confirming their expectations.

Barriers to the use of the V@W-Q23

Low health literacy of patients - Professionals highlighted that proper completion of the V@W-Q23 may be hindered by low health literacy. Therefore, the professionals highlighted the importance of making the questions as simple as possible and suggested to explain the content of the V@W-Q23 to patient, for example by adding a video explaining the individual items.

Lack of knowledge on the added value – In addition, professionals highlighted that proper completion may be hindered by a lack of knowledge of patients on the added value of completing the V@W-Q23. Therefore, professionals highlighted the importance of explaining the purpose of the V@W-Q23 to patients, for example in the cover letter. Additionally, a practice assistant general practitioner expressed a lack of knowledge and understanding regarding her own role and patients' expectations in work-focused healthcare, being a barrier to its use.

Limited time - Both professionals and patients emphasized the importance of thorough review of the completed V@W-Q23 by the professional. However, they acknowledged that professionals may not always meet these preparatory demands because of limited time. In addition, limited time was also mentioned as a barrier for the use of the V@W-Q23 during consultation in the practices of cardiology and general practice.

Prioritizing the medical aspects over work-related issues - Both patients and professionals reported a barrier for the use of the V@W-Q23 within cardiology and general practice practices, since these practices still prioritize the medical aspects over work-related issues.

Fear that discussing work-related issues will stir up emotions - A cardiologist who did not address the V@W-Q23 during consultation explained that she refrained from doing so because the patient was not employed and had no prospects of employment and, therefore, considered it a too sensitive topic evoking emotions taking too much time.

Fixed rules and regulations – During one real-life consultation in social insurance medicine, the V@W-Q23 was not addressed at all. During this consultation an assessment of the patient's work capacity was performed. This professional explained that, due to strict guidelines for this specific disability benefit assessment, there was

no room to discuss the results or provide relevant reintegration advice during the assessment.

> *While I do find it important to discuss the patient's perspective and offer appropriate work functioning and participation advice, during a claim assessment [as part of the Work and Income according to Labour Capacity Act] I have to assess the medical status of the patient following strict guidelines, in which discussing the V@W-Q23 does not fit. (.) I believe there is more room to discuss the patient's perspective and offer appropriate participation advice in the Sickness Benefits Act. – Insurance physician*

Too burdensome to complete for every healthcare professional - Patients indicated that completing the V@W-Q23 for each professional individually would be too burdensome.

Facilitators to the use of the V@W-Q23

Broader applicability - Patients with comorbidities reported to struggle answering the items focusing solely on their CVD. As a facilitator for its use, both the patients and professionals suggested that the V@W-Q23 should be made broader applicable to all chronic conditions, so it can add value more generically.

Repeated assessments for monitoring progress - Professionals acknowledged that the V@W-Q23 enables the standardization of measuring patients' views on their own work-related situation, providing valuable insights into changes over time allowing for better alignment of reintegration strategies. Therefore, repeated measurements for monitoring progress were reported as a facilitator for the added value of the V@W-Q23.

Clearly establish responsibilities - To facilitate a more sustainable use, professionals recommend to clearly establish who is responsible for sending, receiving and processing the V@W-Q23.

> *That questionnaire also has to be sent [to the patient], when returned it automatically has to end up with the secretary. And they need to schedule 10 minutes before the consultation for [the physician] to review the completed [V@W-Q23] list. That requires some coordination. – Insurance physician*

Optimize design - Professionals proposed a graphical redesign in which all answers are displayed on a single page, visually depicting changes after each completion of the questionnaire, to serve as a visual facilitator. Additionally, a patient suggested that a way to mitigate the time investment required for the questionnaire would be to allow patients to highlight the items they consider most crucial.

Integrate into electronic health records - To facilitate easy access, professionals from the various professions mentioned the need to integrate the results of the V@W-Q23 into electronic health records.

Discussion

The V@W-Q23, designed to measure work-related outcomes in patients with CVD, was evaluated through user testing in 16 real-life consultations across practices in occupational medicine, social insurance medicine, general practice, and cardiology. The V@W-Q23 was primarily utilized for discussing items of interest to the patient or those that deviated from the professional's expectations. Interviews indicated that both patients and professionals found the items in the V@W-Q23 to be relevant, easy to understand, and manageable within acceptable time constraints. Patients and professionals reported the added value was beneficial, resulting in better understanding of personal circumstances, increased attention to work-related topics, improved structure of the consultation, enhanced interaction between patient and professional, and an effective conversation starter to discuss work. However, the use and reception of the V@W-Q23 tool depended on contextual differences across healthcare settings. For example, occupational physicians primarily used the tool to improve the structure of the conversation, which can be explained by the fact that their consultations are typically already focused on work-related topics. Insurance physicians mainly used the tool to open the discussion about the patient's perspective, which is a standard part of their assessment process. Cardiologists and practice assistant general practitioners, on the other hand, saw the tool as an accessible way to introduce the topic of work into the conversation, as they often encounter challenges in finding the right approach to bring up this subject. Additionally, the tool was especially valued by patients on temporary sick leave or those facing work-related issues, reflecting their greater need for support. In contrast, patients in stable work situations without work-related problems, as well as those not employed and without employment prospects, found the tool less relevant. Several barriers were identified to the use of the V@W-Q23, including low health literacy, a lack of knowledge about one's role in work-focused healthcare, time constraints and the prioritization of medical aspects. To enhance the usability and added value of the V@W-Q23, both patients and professionals emphasized the importance of repeating measurements over time, presenting results in a more appealing layout, clearly establish who is responsible for sending, receiving and processing the V@W-Q23, and integrating it into electronic health records. It was also suggested that the V@W-Q23 could be used for other chronic health conditions.

In line with previous research, our findings also underscore the broader challenge of engaging healthcare professionals in the implementation of PROs [26]. Time constraints, competing priorities, and limited opportunities to integrate PROs into existing workflows emerged as key barriers in our study. This has great influence on PROs added value, since the use is inextricably linked to their potential added value [27]. Encouragingly, most patients and professionals in our study found the V@W-Q23 easy to understand, were satisfied with the time required to complete and review it, and reported a positive influence on consultations. This suggests promising potential for future implementation at the level of professional integration. In a recent Dutch-language whitepaper, preconditions for cross-domain use of patient-reported outcomes in work-focused care was explored - some of which were also identified in this manuscript [28]. These include embedding PROs in current workflows, developing supportive technical infrastructure, securing financial resources for implementation, and ensuring compliance with legal frameworks. Achieving this will require coordinated efforts from government, practice, and research [28]. Additionally, allowing patients and professionals to complete and review PROs at their own pace may further support successful engagement and adoption [29].

In concordance with other studies we found that the V@W-Q23 seems to align with previously reported effects of disease-specific standard sets, as encourage patients to reflect on their own circumstances, helping them to feel better prepared for consultations, and encouraging them to raise their issues [30]. Furthermore, our study revealed that the V@W-Q23 helped facilitate conversations between patients and professionals on work-related topics which are often lacking in the curative sector, despite patients' desire [31]. A key finding in our study was that the added value of using the V@W-Q23 seemed to be higher for those on temporary sick leave or those experiencing problems while working. Patients in stable work conditions and those not employed without employment prospects reported lower added value, which aligns with literature suggesting that the perceived value of standard sets is lower when the patient's health status is either too low or too high [26].

Our study suggested that low health literacy might be a barrier to complete the V@W-Q23, a finding supported by earlier experiences indicating that print literacy and technology literacy can also serve as additional barriers to completion [29]. In our study cardiologists particularly preferred a graphical redesign to make reviewing the V@W-Q23 results more easy. For this, inspiration can be drawn from existing standard sets that use colors and images to present results in a visually appealing way [32, 33]. Professionals may perceive PROs as intrusive to their clinical practice and critically question how to integrate them effectively [34]. However, we believe that the current shift in healthcare towards a more holistic focus on functioning, along with increased patient involvement, will help change this perception [35].

Although developed for CVD, both professionals and patients recognize significant opportunities in applying the V@W-Q23 more broadly for other health conditions. The decision to generalize the use of the V@W-Q23 for other conditions must be carefully considered and should be further explored. While generic PROMs may lack sensitivity to condition-specific outcomes, limiting their implementation at the individual level, they may offer greater applicability at a systems level, aligning with the great diversity of practices involved in work-focused healthcare [36].

Methodological considerations

A strength of this study is that the V@W-Q23 was used during usual care consultations in various healthcare settings, including four professions, providing real-life insight into its usability and added value and ensuring diversity in practices and population. Furthermore, choosing a mixed-methods approach, capturing both the perspectives of healthcare professionals and patients, allowed us to gain insight into the V@W-Q23's usability and added value during consultations. A limitation of this study was the lower-than-intended number of user tests conducted within general practice and social insurance medicine potentially impacting the generalizability of the findings for these settings. However, since the primary aim was not to achieve data saturation, and usability literature indicates that a sample size of around 16 participants is sufficient to identify over 90% of usability problems in tested interfaces [37], we believe this study nonetheless provides meaningful and valuable insights that support the iterative process of usability testing. We observed no inconsistencies between questionnaire completion times, observed behaviours, and participants' reported experiences during the interviews.

The presence of an observer during consultations may have encouraged the influence of social desirability bias. However, we believe this stimulated professionals and patients to use the V@W-Q23 optimally, giving us the optimal conditions to evaluate both usability and its added value. On the other hand, social desirability bias which may affect the reliability of the findings may have occurred during the interviews, the interviewer being the same as initiating the test in practice. However, the observer and interviewer (MH) did not identify discrepancies between questionnaire completion times, observed behaviours, and participants' reported experiences during the interviews.

Implications for practice

We consider using the V@W-Q23 as a screening tool or as a method of promoting patient-centred care and decision aid in practice, as a method to improve the patient-centeredness of work-focused healthcare. However, integrating the V@W-Q23 into practice on a large scale is considered challenging [38], as it requires seamless incorporation into existing workflows, needing developing supportive technical infrastructure, securing financial resources for implementation, and ensuring compliance with legal frameworks [28]. Achieving this requires coordinated efforts from government, practice, and research [28]. Therefore, as a first step, we recommend that healthcare professionals explore the use and potential benefits of the V@W-Q23 in their individual practice. An initial step could involve utilizing the V@W-Q23 as a screening tool, providing professionals with valuable information about their patients. A subsequent step would be to use the tool as a method of promoting patient-centered care by actively discussing the gathered information during consultations [19]. The V@W-Q23, which includes measuring health outcomes using PROMs and experience with healthcare using PREMs, offers a comprehensive view of patients' perceptions on outcomes and processes of care by capturing both subjective and experiential information. This integrated approach enables a richer assessment of quality of care, and hence for quality improvement [39, 40]. However, professionals should be aware that interpreting the results can be more complex, as each type of measure reflects a different perspective. For example, a patient may report improvement in their health status, while their experience with care may not align. This discrepancy requires careful consideration and nuanced interpretation during consultations to ensure that both aspects are addressed effectively. Therefore, also following the experiences of earlier PROM implementation, training and ongoing support for healthcare professionals may be crucial for effective and consistent use of the V@W-Q23 [38].

Implications for future research

While in the current study the V@W-Q23 was user tested in four professions, many more are involved in work-focused healthcare [41]. Future research should explore its use throughout all practices, to understand its applicability and effectiveness during the full healthcare trajectory. It would also be valuable to study if the use of the V@W-Q23 may contribute to better collaboration and coordination between different professionals. Furthermore, future research should focus on the V@W-Q23's implementation and technical integration into everyday practices. Practical guidelines for PROM implementation can guide this process [38]. Additionally, exploring the V@W-Q23's generalizability beyond cardiovascular issues could broaden its added value [42]. Given the differences in consultation goals, duration, and workflow between healthcare setting (e.g. general practice vs. insurance medicine), future studies should also systematically compare how these contextual factors influence the perceived usability and added value of the V@W-Q23. Stratifying findings by professional setting may offer deeper insight into its contextual fit and guide more tailored implementation strategies.

Conclusion

The current study indicates that the usability of the V@W-Q23 are experienced mainly positive by both the patients and healthcare professionals. It demonstrates some positive added value during (preparation of) consultation, resulting in a better conversation about work-related challenges. Managing the barriers and facilitators during further implementation, may improve the V@W-Q23 usability and added value.

Abbreviations

CVD	Cardiovascular diseases
MMARS	Mixed Methods Article Reporting Standards
PREMs	Patient-reported experience measures
PROs	Patient-reported outcomes
PROMs	Patient-reported outcome measures
V@W-Q23	Value@WORK-Q23

Supplementary Information

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Supplementary Material 1

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Author contributions

MEH, NZ, JLH, MM, PJvdW and SJvdB-V were involved in conceptualizing the study. MEH was involved in the data collection. MEH and LPJ were involved in the data analysis. All authors have read and approved the final manuscript and agreed to be accountable for all aspects of the work.

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Data availability

The raw datasets used in the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

Written informed consent was obtained from all participating individuals. The Medical Ethics Committee of the Amsterdam University Medical Center granted ethical approval for the study. The committee declared that the study design did not require comprehensive ethical review, as the Medical Research Involving Human Subjects Act did not apply to this study (Reference number: 2023.0863). The study was conducted in accordance with the relevant guidelines for medical and health research, including the Declaration of Helsinki.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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