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## ORIGINAL ARTICLE

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# Qualitative Evaluation of the Influence of Acute Oxaliplatin-Induced Peripheral Neuropathy on Quality of Life and Activities of Daily Life

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Frank G.A.M. vanHaren , MD, FIPP; Monique A.H. Steegers , MD, PhD, FIPP; Marloes Thijssen, MD; Selina E.I. van derWal, MD, PhD, FIPP; Kris C.P. Vissers, MD, PhD, FIPP; Yvonne Engels, PhD

*Department of Anesthesiology, Pain- and Palliative Medicine, Radboudumc, Nijmegen, The Netherlands*

### ■ Abstract

**Introduction/Aims:** Oxaliplatin often causes acute or chronic peripheral neuropathy in patients with an intestinal or pancreatic tumor, but in-depth insights in its influence on quality of life (QoL) are lacking. We explored the influence of acute oxaliplatin-induced peripheral neuropathy (OIPN) on daily QoL in these patients.

**Methods:** We performed semistructured interviews with a purposive sample of patients receiving oxaliplatin and possibly experiencing acute OIPN. Interviews were audio-recorded, transcribed verbatim, and coded by two researchers. Data were analyzed by using the constant comparative method for content analysis with ATLAS.ti software.

**Results:** After nine patients, saturation took place. In total, 11 patients were interviewed. Four themes were extracted from the data: (1) adverse effects, (2) physical (un)well-being, (3) emotional aspects, and (4) treatment aspects. All participants were suffering from acute OIPN to a certain extent, leading to restrictions in daily activities such as household chores, but also to a decrease in mobility and independency. Other adverse effects such as general malaise and gastrointestinal side effects also influenced the participants' well-being, as did the diagnosis and prognosis of their disease.

**Conclusion:** Acute OIPN, together with other side effects of chemotherapeutic treatment and the difficulties that come with the diagnosis of cancer and its prognosis, largely influences patients' daily QoL. Managing expectations (by patient education) seems important. ■

Address correspondence and reprint requests to: Frank G.A.M. van Haren, Department of Anesthesiology Pain- and Palliative Medicine, Radboudumc, Huispost 717, PO Box 9101, 6500 HB Nijmegen, The Netherlands. E-mail: frank.vanharen@radboudumc.nl.

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## INTRODUCTION

For an increasing number of patients, cancer becomes a chronic disease.<sup>1,2</sup> While healing or prolonging life is the primary goal for patients with cancer during the curative phase, quality of life (QoL) becomes more important in an advanced or chronic stage.<sup>3</sup> Together with the advances in treatment, the length of survival of many types of cancer increases, and substantially more patients survive or live longer, eventually with long-term side effects of their treatment.<sup>2</sup>

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Colorectal cancer represents the third most common type of cancer among men and women.<sup>2</sup> The type of treatment depends on the stage of the disease at diagnosis. Oxaliplatin, a third-generation organoplatinum compound, is the first-line therapy and adjuvant chemotherapy of choice in this type of cancer.<sup>2,4,5</sup>

The main side effect of oxaliplatin is neurotoxicity, which may even require treatment dose reduction.<sup>5,6</sup> Oxaliplatin neurotoxicity appears to have two distinct manifestations. Acute oxaliplatin-induced peripheral neuropathy (OIPN) occurs in nearly all patients, and symptoms may appear during or shortly after the first infusions. These transient symptoms are paresthesia triggered by cold and dysesthesias in the perioral region, hands, and feet.<sup>7-11</sup> A varied incidence of 4% to 98%, probably due to different starting doses, drug combinations, dosing intervals, and measurements, is reported.<sup>10</sup> Even in low starting doses of 25 mg/m<sup>2</sup>, acute paresthesia of the fingers and toes (grades 1 to 2) is reported by up to 58% of patients, and severe symptoms (grades 3 to 4) are common in higher starting doses of > 85 mg/m<sup>2</sup>, all starting within 24 hours. The chronic manifestations and symptoms consist of a persistent peripheral sensory neuropathy with a stocking-and-glove distribution and affect 13% to 79.2% of patients to a greater or lesser extent after 15 months or longer.<sup>12,13</sup> These symptoms are the main dose-limiting toxicity of oxaliplatin.<sup>6,8,9,14</sup> Addressing acute oxaliplatin-induced neuropathic complaints, given their relationship to chronic neuropathy, is of utmost importance, while OIPN in colorectal cancer survivors is associated with depressive symptoms, reduced sleep quality, and reduced health-related QoL.<sup>15-18</sup>

Previous studies have shown that chemotherapy-induced peripheral neuropathy (CIPN) results in serious limitations in daily functioning and in reduced QoL.<sup>19</sup> A qualitative study by Bakitas et al.<sup>20</sup> showed that having CIPN causes diverse symptom patterns, emotional distress, alterations in functional ability, and social-role impairment. Growing attention has been paid in research to the role of acute OIPN in QoL. In clinical practice, however, this has not always led to a change in chemotherapeutic regimens. Studies on the effects of CIPN on QoL generally focus on chronic CIPN.<sup>19</sup> Moreover, the few available questionnaires to assess the impact of CIPN on QoL, such as the EORTC QLQ-CIPN20 and the FACT-G,<sup>21,22</sup> do not differentiate between acute and chronic CIPN. Thus, we explored the influence of acute OIPN on daily QoL in patients with intestinal or pancreatic cancer.

## METHODS

An explorative qualitative study with semistructured interviews was performed. The study protocol was approved by the local research ethical committee of the region Arnhem-Nijmegen, The Netherlands (dossier number: 2016-2890).

### Participants

Participants were selected from patients receiving platinum-based antineoplastic agents in a peripheral hospital in the Netherlands, by their treating medical oncologist. Oral and written information was provided (eg, the right not to answer specific questions and withdrawal) to and written informed consent obtained from all participants, but no other exclusion criteria were predefined. A home visit was then arranged to conduct the interview. Participants were considered eligible if they had recently received one or more chemotherapeutic cycles with oxaliplatin, possibly experiencing acute OIPN symptoms. Interviews were ideally planned within the first 48 hours of oxaliplatin treatment. As recruitment of participants continued until thematic saturation was achieved, the total number of participants was not determined beforehand.

### Procedure

Data were collected by semistructured interviews. An interview guide (mainly a topic list) had been developed beforehand consisting of topics found in literature.<sup>15,20,23</sup> These topics, discussed within the research team, were: (1) pain descriptions and experiences (severity of pain, eg, numeric rating scale (NRS), nature of pain, start of pain, alleviating and aggravating factors, secondary symptoms, education on side effects/pain, expectations on side effects/pain), (2) use of medication (pain medication, side effect, earlier experiences with pain and pain medication, future), (3) pain behavior (coping strategies, description of a typical day, specific moments of increased pain, limitation by pain, influence on activities of daily life (ADL)/house chores/perceived QoL/mood/treatment strategy, influence of timing within the treatment regimen), and (4) illness behavior (coping strategies, influence on mood, limitations, influence on ADL/house chores/perceived QoL). Whenever new, relevant topics came up during the interviews, these topics were added to the topic list. Questions were open-ended and broad, allowing the

participants to describe their experiences without being overly structured by the guide. Interviews were conducted from March to June 2017. Each participant was interviewed once, at home. The face-to-face interviews were conducted by one or two researchers using the topic list as a guideline through the interview. The researchers were not involved in the clinical care of the patients. The researchers are both clinicians, receiving additional communication training within their respective education, with an additional introduction to conducting a semistructured interview in this setting.

The interviews began with a general question: “Could you please tell me something about the period from the diagnosis of the disease to where you are now?” As the interview progressed, participants were asked to describe their symptoms and how these symptoms affected their daily lives. The interviews were audio-recorded and lasted 36 to 56 minutes.

After completion of the interview, each participant was asked to fill in a Dutch translation of the Douleur Neuropathique 4 (DN4), a questionnaire developed for diagnosis of neuropathic pain.<sup>24,25</sup> DN4 was used to qualify the specific complaints. Some of those were circumstantial, eg, did not occur spontaneously but only on touching cold objects. DN4 could then score 0, while actual complaints are perceived. Demographics and medical information were obtained from the medical records.

### Data analysis

Qualitative data were analyzed by an inductive process, using the constant comparative method for content analysis.<sup>26</sup> The advantage of this approach is gaining direct information from participants without imposing preconceived categories. Data collection, coding, and analysis started after a specific interview was completed, so these phases occurred simultaneously (on different interviews) as the study progressed. The interviews were audio-recorded, transcribed verbatim, and subsequently entered into Atlas.ti Software v.7 (<http://atlasti.com> ATLAS.ti Scientific Software Development GmbH, Berlin, Germany). Gestures (based on time-coded field notes), as well as pauses, perceived hesitations, and notable changes in tone of voice and emphasis were included as notes in the transcription. Analysis started with open coding of the interviews. Codes derived from previous interviews were used as a starting point for coding the following one. New codes were added when

needed. The interview content was analyzed separately by two researchers. The researchers periodically discussed their findings and discrepancies. In case of discrepancies as to interpretation, both referred back to the data until complete agreement was achieved. Analysis progressed through an iterative process of reducing data into categories and themes.

## RESULTS

### Sample

Thematic saturation occurred after nine interviews, and two additional (thus a total of 11) interviews were performed and analyzed to strengthen this conclusion. No new codes came up in the additional interviews, and enrollment was closed. The participants' demographic and treatment characteristics are presented in Tables 1 and 2. A total of 11 subjects were thus included, six male and five female, mean age 61.9 years (44 to 76, standard deviation [SD] 9.6 years). No previous neuropathic complaints or history of neuropathy, chemotherapeutic treatment, or diabetes came up during the interviews. DN4 was used to qualify the specific complaints. Some of those were circumstantial, eg, did not occur spontaneously but only on touching cold objects. DN4 could then score 0, while actual complaints are perceived. A score of 4 or higher on the DN4 indicates that current neuropathic pain is probable. Seven out of 10 participants had a score of 4 or higher. The lowest score was 0 (one participant) and the highest score was 7 (one participant).

### Themes

In total, 32 descriptive codes were extracted from the data after coding and distracting information from the transcribed text as described in “data analysis” in the methods section. These codes could be placed into the following eight categories: “Side effects—other,” “Side effects—neurotoxic,” “Emotional,” “Social Context,” “Activities,” “Coping,” and “Anamnesis.” Subsequently, five themes were identified out of these categories: adverse effects (neurotoxic and other), coping with the diagnosis of cancer, relationships and dependency, the (in)ability to perform, coping with neuropathy, anamnesis, information. A complete list of all codes, categories, and themes can be found in Table 3.

**Table 1. Sample Description**

Subject number	Sex (m = male, f = female)	Age	Cancer	Regimen	Cycle	Goal	Dose (Current Cycle)	Dose (Cumulative, Total)	Dose (Total, mg/m <sup>2</sup> )	Previous Surgery	Karnofsky (Pre)
1	M	64	Colon	CapOx*	4	Curative	300	1200	520	Yes	90
2	M	64	Rectum	CapOx-b <sup>†</sup>	6	Palliative	250	1500	780	No	90
3	F	44	Sigmoid	CapOx*	1	Palliative	200	200	130	Yes <sup>§</sup>	80
4	M	53	Pancreas	FolfirinOx <sup>‡</sup>	8	Palliative	200	1600	680	No	90
5	M	57	Sigmoid	CapOx*	4	Curative	250	700	364	Yes	90
6	F	56	Coecum	CapOx-b <sup>†</sup>	7	Curative	200	1400	813	No <sup>¶</sup>	70
7	F	73	Pancreas	FolfirinOx <sup>‡</sup>	3	Palliative	150	450	255	No	90
8	F	58	Sigmoid	CapOx*	1	Curative	200	200	130	Yes <sup>§,**</sup>	90
9	M	76	Pancreas	FolfirinOx <sup>‡</sup>	3	Palliative	150	450	255	No	90
10	F	63	Colon	CapOx*	1	Curative	150	150	130	Yes	90
11	M	73	Rectum	CapOx-b <sup>†</sup>	4	Curative	200	800	520	No <sup>¶</sup>	80

For each subject, demographic data (sex, age), disease specifications (location, treatment goal), and treatment regimen are shown (chemotherapeutic regimen, dose of current cycle, cumulative dose total and as mg/m<sup>2</sup>, previous surgery).

\*CapOx: capecitabine + oxaliplatin.

<sup>†</sup>CapOx-b: capecitabine + oxaliplatin + bevacizumab.

<sup>‡</sup>FolfirinOx: leucovorin + fluorouracil + irinotecan + oxaliplatin. <sup>§</sup>Stoma bypass in obstructing ileus without tumor resection. <sup>¶</sup>Planned. <sup>\*\*</sup>Sigmoidal resection and restoring bowel continuity.

**Neurotoxic Adverse Effects.** All participants, to some extent, experienced neurotoxic adverse effects. These mainly consisted of a tingling sensation and pain when touching anything cold. The symptoms started immediately after the infusion was started and lasted for 1 to 2

When I walked barefoot to the bathroom in the morning, it was just like walking on hot coals, but then because of the cold. [participant no. 10] weeks. Hands were mostly more affected than feet; only one participant reported more problems in the feet. Participants' complaints were less severe with higher temperatures:

Besides the complaints about hand and feet, participants also experienced dysesthesias of the throat:

I cannot consume drinks straight from the refrigerator. . . . My throat, everything collapses. [participant no. 11]

**Other Adverse Effects.** Four patients reported to experience a painful, tingling feeling in their arm during the infusion with oxaliplatin, or stiffness of the arm the day after:

. . . it felt like there was bruising all over my arm. There is nothing to see, that's the annoying part. But now, after a week, I still feel something is not completely right. [participant no. 8]

All patients reported symptoms of malaise as a result of the chemotherapy. These symptoms were discomforting and limiting participants' coming and going:

The fatigue, that is a problem. I was not used to that. I was always moving forward. Right now, now I am sitting here

that is okay. But when I walk a small round outside, I am running out of breath. [participant no. 9]

Besides the malaise, participants suffered from gastrointestinal side effects. Nausea, vomiting, and diarrhea were often recurring symptoms:

Starting from Wednesday (the day after the chemotherapy) I had tremendous diarrhea. (. . .) Now it is somewhat okay, but in the beginning, . . . That is extremely uncomfortable. [participant no. 8]

**The Inability to Perform.** Participants were impeded in their activities of daily living, including household chores, exercise, and hobbies. Most participants were not able to do any household chores:

Vacuum cleaning, I try it, but it is very tiresome, so my husband takes over. [participant no. 3]

. . . now I can dress myself. In the beginning, I could not get dressed or undressed, because of the pain in my fingers. [participant no. 8]

Participants were also affected in their mobility. Being mobile was important for patients to feel independent of their partners and relatives:

When walking up the stairs, my husband had to walk behind me, because I could lose all my power and fall all the way down. [participant no. 6]

Furthermore, exercising became difficult, as participants experienced weakness and fatigue resulting from the chemotherapy. Some patients were not able to perform their hobbies the way they were used to before

**Table 2. Description of Interview Timing, Perceived Symptoms/Complaints, Related Dose- and Behavioral Adaptations, and Functional Status (Karnofsky Score) for each Subject**

UE	LE	Facial	GI	Other	Chronic	Δ dose	Time	Behavioral
1	Tingling (all, τ 4 to 5 days, only cold)	None	Throat on cold drinks	i.v. (all, τ), tired (cont), hiccup (cont), hiccup i.v. (all, τ), tired (cont), conditional loss (cont)	No	None	+1 day	Warming drinks (τ)
2	Tingling pain (all, τ 5 to 6 days, mainly cold)	None	None	Perceived weakness and extreme tiredness	UE, since cycle 4	None	+1 day	Gloves, some avoidance (τ)
3	Tingling pain, (this = all, τ, only cold)	Tingling (this = all, τ, only cold)	D, N, V, cramps (this = all, slowly τ)	Profound conditional loss	Not applicable	Oxaliplatin cessation after 1st cycle	+1 day	Practical (cold touch, τ)
4	Tingling, mildly painful (all, τ 2 to 5 days, mainly cold)	Tingling (all, τ)	Some N and V (all, τ), flatulence (cont)	Profound conditional loss	Hands feel cold (since cycle 4), numbness feet	None	+2 days	Practical (cold touch, τ), no fridge drinks, hat (τ)
5	Tingling pain (all, τ 3 to 6 days, only cold, less after 2nd + cycles)	Tingling (nose and cheeks, all, τ less after 2nd + cycles)	Throat "collapses" (all, τ, cold), mild belching (some, τ)	Some conditional loss, muscle pain (mainly low back)	Cold hands on touch (no pain) + tingling throat and feet (all only cold)	After 1st cycle due to neuropathic symptoms	+1 day	Gloves, warm clothing (τ), interruptions in activities (cont)
6	Tingling pain (all, τ 5 days, mainly cold)	Tingling nose and cheeks (all, τ)	Throat collapses (all, τ, cold), loss of appetite, N after 3rd cycle	Profound tiredness and perceived weakness (improving)	Unpainful tingling of fingers and toes (mainly cold)	None	+2 days	Gloves, practical (cold touch), no fridge drinks, warm clothing, avoidance and assistance
7	Tingling and burning pain (all, τ 7 days, only cold)	None	Loss of appetite without N	Tiredness, dizziness (mainly 3rd, τ), profound conditional loss	Mild tingling on touching cold, dizziness	None	+1 day	Handkerchief or cloth (cold touch), socks, domestic help; walking stick (dizziness)
8	Tingling pain and numb hands (mostly τ partial 6 days, on touch)	Nausea (variable), vomiting (τ)	Painful throat on drinking (τ)	i.v. arm (τ), lack of energy and tiredness	Some not painful tingling persists	Patient plans to discuss dose adjustment	+7 days	Gloves, difficulty performing ADL; hardly any outside activities
9	Tingling on longer touch (τ, 3 to 5 days)	None	N (3 days)	Tiredness	None	None	+1 day	Practical (cold touch, τ)
10	Tingling fingers (mainly cold, τ 2 days)	None	N + V (τ), collapsing throat on cold (τ)	Some tiredness and lack of energy	N/A	None	+2 days	Gloves, warm clothing
11	Tingling fingers and hands (τ, 3 to 4 days, mainly cold)	Painful jaw, tingling eyes (τ, 3 to 4 days), facial skin (tingling on wind)	Collapsing throat	Profound tiredness and conditional loss	Progressive tingling in the feet (not disappearing in between cycles)	None	+1 day	Practical (cold touch, cold drinks)

Δ dose, dose adaptations; ADL, activities of daily life; all/this/some, present in or after all/only the latest/some of the cycle(s); cold touch, in relation to touching cold or metal object or drinks; cont, continued or continuous, currently present; GI, semistructured(Q = diarrhea, N = nausea, V = vomiting); i.v., symptoms related to the intravenous line and limited to the one arm in which it was placed; LE, lower extremity; mainly/only cold, mainly/only present on touching cold surfaces or in cold surroundings; UE, upper extremity; time, interview timing (days after chemotherapy infusion); τ, transient or temporary, not currently present.

treatment. Activities such as gardening or playing musical instruments proved to be more difficult than before:

I play the guitar, and after the first infusion my fingertips started to hurt when I had been playing for a while. [participant no. 5]

Six participants were employed at the time of diagnosis. Most participants were not able to work during the chemotherapeutic treatment. One participant was doing some work from home. Two participants were considering going back to work soon:

... I was experiencing some concentration loss. (...) Now I notice, when I am doing some stuff on the couch, I make little mistakes, also financially. [participant no. 1]

**Dealing with Neuropathy.** After a while, all participants reported to have developed habits to deal with the neurotoxicity. Many participants used gloves for touching anything cold (eg, door handles):

In the beginning I had gloves everywhere, they had to be everywhere, because I forgot. So, I had thin gloves, household gloves. My regular gloves were always around. [participant no. 6]

When peeling the potatoes, I put on fabric gloves first and rubber gloves on top. [patient no. 5]

Some found other ways to prevent them from feeling neuropathic pain:

... I put a can of water on the heating. ..., so it gets lukewarm and it is more drinkable. [participant no. 1]

I have my husband open the fridge and get everything out. [participant no. 7]

Participants received several treatments against side effects they were suffering from. Most got medication for the gastrointestinal symptoms. Four participants reported that their abdomen was being taped by a physiotherapist to treat the nausea and vomiting:

They tape my abdomen. Mainly the last four times I benefitted from it, from my point of view. So, I don't suffer a lot from nausea. [participant no. 4]

One participant was taking pain medication for back pain which developed after starting chemotherapy.

Sometimes, therapy adjustment was needed. Four participants had been admitted to the hospital. Two of them received intravenous fluids. Two were admitted for severe constipation and nausea. Three participants had had a dose reduction or cessation of oxaliplatin at the time of the interview.

Participants had their own way of dealing with the diagnosis and developed different coping strategies. One participant was trying to find a way to get cured of an incurable disease. Most patients resigned themselves to the diagnosis and developed ways to self-manage the symptoms as much as possible:

During three chemotherapy infusions I wrote down exactly what I was eating, how much weight I gained (...). I just wrote down everything I had, so on a certain point I knew exactly what to do to feel most comfortable. [participant no. 4]

**Coping with the Diagnosis of Cancer.** Both patients with a curative intent and patients in palliative care were interviewed. Emotions that were involved with the diagnosis were different in the two groups of participants:

The surgery went well, everything is gone. There were no metastases on the CT scan. That was a very weird moment (...) In the end you realize, you know, "yes" is okay, but if "no," your whole world collapses. [participant no. 1]

I was shocked it hit me, a disease like this. And mainly the word "incurable." So, it is incurable, no happy end. They will never say: "you are cured." That hurts me most. [participant no. 2]

Participants had mixed feelings about the treatment they were enduring. The treatment was a cure or a medicine for a longer life, but at the same time it made them feel miserable. Participants were having a hard time dealing with these mixed feelings:

I got the chemotherapy only once and I got very sick of it. (...) I thought this is not what I want, I just want to live, and I don't want to be sick on the couch every time again. So, I flatly refuse to continue... [participant no. 3]

... I want to do it for them (family), for myself as well, ..., that I can look everybody straight in the eyes and tell them I did everything. [participant no. 8]

**Table 3. Codes Extracted from the Interviews (First Column), Categorized in Their Respective Categories (Second Column) and Themes (Third Column)**

Codes	Categories	Themes
Adverse effect malaise	Other adverse effects	Adverse effects
Adverse effect gastrointestinal		
Adverse effect psyche		
Adverse effect intravenous line		
Adverse effect other		
Adverse effect extremities	Neurotoxic adverse effects	
Adverse effect throat		
Adverse effect perioral		
Attitude towards treatment	Coping with the diagnosis of cancer	Emotional aspects
Emotions diagnosis		
Future		
Coping emotional	Interpersonal relationships and dependency	
Dependency		
Emotions diagnosis		
Future image		
Coping emotional		
ADL	The inability to perform	Physical (un)well-being
Hobbies		
Restrictions		
Sports		
Work		
Mobility	Dealing with neuropathy	
Coping behavior		
Measures due to neurotoxicity		
Treatment of side effects		
Change of treatment		
Side problems	Anamnesis	Treatment aspects
Disease history		
Education	The lack and necessity of information	The lack and necessity of information
Negative		
treatment aspects		
Positive treatment aspects		
Logistics hospital		

ADL, activities of daily life.

Emotionally, participants developed different coping mechanisms. Overall, the tendency was that people were staying positive and eager to fight against the disease, no matter if they were in a curable or palliative treatment regimen:

The one thing I told my oncologist is that I am going to beat all the statistics. If everybody tells me I only have one year to live, I am sure I will live longer than one year. [participant no. 4]

In response to: what would be a reason for you to stop treatment?—"Well... I will never stop! Absolutely not!" [participant no. 11]

Participants' ideas of the future were mostly dependent of the prognosis of the disease:

How do I see the future? Cured. [participant no. 5]

Future, I don't have a lot of future left. I just try to postpone my departure..., with quality of life. [participant no. 9]

**Interpersonal Aspects and Dependency.** The social context was a regularly recurring subject during the interviews. Three participants had difficulties facing the fact that they were becoming dependent on their partners and family:

It is just annoying, being dependent of everybody, while three months ago I did everything myself. [participant no. 7]

Relationships and support were reoccurring subjects as well. All participants reported they were receiving a lot of support from their environment. Relationships became even closer after going through these difficult times together:

Our relationship was not bad at all. But if you go through this, you really need each other and if you are truly there for each other, the relationship becomes more intense. [participant no. 9]

Another subject during the interviews was "contact with fellow sufferers." While receiving the chemotherapy, participants had the option to be in a single room, or in a room with other patients. Some participants appreciated the opportunity to share some thoughts, others did not feel like any kind of contact:

I have been to a place where cancer patients come together. (...) To talk to each other, how do others experience this and that. It is not going to cure you, but you can get things of your chest. [participant no. 2]

Once I was in a room with four other men, and they were complaining so much. I cannot relate to that. [participant no. 4]

**Treatment Aspects.** Participants reported that they received sufficient information about the neurotoxic

side effects. However, they did not realize what the side effects truly entailed until they experienced the symptoms themselves:

One learns really fast. They do prepare you, but you have to experience it yourself first to know what is going on. [participant no. 6]

... the first infusion begins, but everything is new (...) I get home, wash my hands, open the tap: cold water. For half an hour, almost 45 minutes, my fingers were tingling and irritated. [participant no. 5]

Most participants were very positive about the fact that there was a case manager, who arranged all meetings and other organizational aspects. This case manager seems to have more time to speak to patients after they had spoken to the medical oncologist and was able to discuss the things going on in their lives that were not directly related to the treatment.

All participants were content about the way they were treated in this particular hospital. They felt looked after and taken care of in a pleasant way:

The ambiance I feel in the hospital is friendly and concerned. They look at the patient, not only at the procedures they have to finish. [participant no. 5]

## DISCUSSION

We explored patients' perceptions on the influence of acute OIPN on daily QoL. A qualitative, semistructured evaluation used to inventory as many factors as possible for the further use in quantitative research and clinical practice. Patients reported to be limited in day-to-day activities due to acute neurotoxicity as well as other side effects such as malaise and gastrointestinal complaints, with a major impact on patients' general well-being. Acute OIPN resulted in decreased mobility and more dependency of their relatives, possibly resulting in a decrease in physical, emotional, and social well-being. Emotional well-being was also strongly affected by the patients' diagnosis and prognosis, seemingly not primarily related to OIPN or the type of chemotherapy. This study confirms acute OIPN has an evident influence on daily QoL, together with other side effects and difficulties involved with the diagnosis and prognosis of cancer.

Previous studies show that chronic CIPN does also affect QoL.<sup>15,16,19,20</sup> However, results of these studies cannot be translated to the influence of acute CIPN on

daily QoL. The impact of acute OIPN alone on daily life has been studied less. Some statements by the participants led to the conclusion that even transient symptoms alone were not acceptable, even in relation to (worse) outcome. Symptoms and duration of acute OIPN participants in the current study mentioned were in line with previous studies.<sup>6,27</sup> Acute neurotoxicity may require dose modification or cessation of the chemotherapy.<sup>14</sup> In our study, oxaliplatin dose was reduced in four participants, due to severe acute neuropathic complaints, expressing its importance.

This is the first qualitative study giving insights in the consequences of acute OIPN on the quality of daily life, adding to the description of acute side effects by previous studies. Both participants in palliative and curative treatments and participants in different stages of the treatment were interviewed, providing cues on differences in acute side effects accepted.

A limiting factor to the generalizability is that minority populations were not represented within the study population, as previous research indicates that there is a difference in beliefs and preferences regarding end-of-life care between ethnic groups.<sup>28</sup> Furthermore, symptoms of the disease itself, side effects of the chemotherapy treatment, as well as the fact that one has an incurable disease may all have a respective impact on the experienced QoL. As mentioned, definite statements on the exact influence of acute OIPN alone are to be made with caution. Thereby, the chemotherapy regimens of our participants often included capecitabine. One of the side effects of capecitabine is the hand foot syndrome. Symptoms of this syndrome are erythema and desquamation, but also dysesthesia and pain, involving a tingling sensation in hands and feet.<sup>29</sup> These additional features were not reported by the participants, but the diagnosis cannot entirely be ruled out.

This study provides a qualitative insight in the effects of acute OIPN on daily activities and experienced QoL. The symptoms of acute OIPN were often severe and a reason for dose reduction or even cessation of oxaliplatin. Based on this research, patient education can be improved and specific examples of changes in daily activities can be provided. Thereby, this research could be used as the basis for quantitative research, to assess which symptoms of acute OIPN are most limiting and have the largest influence on QoL. Further research on the prevention of acute and chronic OIPN could provide a means for avoiding dose reduction of chemotherapy, as well as the symptoms and/or consequences



themselves, with an even further improvement of overall survival without the detrimental effect on QoL.

In conclusion, the present study indicates that acute OIPN, together with other side effects of chemotherapeutic treatment and the difficulties that come with the diagnosis of cancer and its prognosis, largely influences patients' daily QoL. Managing expectations (by patient education) seems important.

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### CONFLICT OF INTEREST

The authors state that they do not have any conflict of interest.

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