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Greek Nurses' Knowledge and Clinical Practice about the Assessment and Management of Dermatotoxicity Caused by Epidermal Growth Factor Receptor Inhibitors (EGFRIs)

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Γνώσεις και Κλινική Πρακτική Ελλήνων Νοσηλευτών στην Εκτίμηση και Διαχείριση της Δερματοτοξικότητας από Αναστολείς του Υποδοχέα του Επιδερμικού Αυξητικού Παράγοντα (EGFRIs)

Περίληψη στο τέλος του άρθρου

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Introduction: The use of monoclonal antibodies that act as inhibitors of epidermal growth factor receptor (EGFRIs) have targeted action, good efficacy and are associated with a number of side effects such as diarrhea, hypomagnesemia and dermatotoxicity. **Aim:** The aim of the present study was to explore Greek nurses' knowledge and clinical practice about the assessment and management of dermatotoxicity caused by EGFR inhibitors (cetuximab and panitumumab). **Method:** A convenience sample of 57 out of 80 nurses (response rate 71.3%) from eight urban hospitals with oncology departments completed a self-administered questionnaire (DKNA), to collect information on the nurses' knowledge about the dermatotoxicity, within a 3-month time period. Descriptive statistics were calculated and both parametric and non-parametric tests were used to analyze the data. **Results:** The majority of nurses were females (93.0%), with average age 39(±5) years and no specialized training in oncology nursing (94.7%). Most of nurses had reported that they knew "well" or "very well" the administration process for both EGFR inhibitors (cetuximab: 89.3%, panitumumab: 85.2%). They also stated that knew "well" (47.4%) or "very well" (24.6%) that EGFR inhibitors were associated with side effects. The average percent of correct answers of nurses to the knowledge questionnaire was 63.2 (±15.8) with a median of 65.2 (range: 26.1–95.7), while the average knowledge level of nurses working at on-

cology wards (57.7±15.5) was lower than those at day clinics (67.4±15.0, p-value=0.021) and related with the age of nurses (p-value=0.043). Regarding the knowledge level on the administration of both EGFRi, it was differed significantly from the knowledge level on the side-effects (items: 1–13) caused by the administration of these EGFRi (p-value≤0.001). The knowledge level about both administration was associated with the number of cases that nurses treated every week (p-value=0.001 and p-value=0.005). In respect to the knowledge level about the side-effects of EGFR inhibitors, nurses working at day clinics had significantly greater levels of side-effect knowledge (t-test's p-value=0.026). Conclusions: Improvements of nurses' knowledge in the assessment and management of dermatotoxicity caused by EGFRIs are necessary. Organized training programs such as oncology nursing specialization and educational material are required in order to improve Greek nurses' knowledge, patients' care and quality of their life.

Key-words: *EGFR inhibitors, chemotherapy, dermatotoxicity, oncology nurse, DKNA questionnaire.*

Introduction

In recent years the use of monoclonal antibodies that act as inhibitors of epidermal growth factor receptor (EGFRs) has given us new impetus to treat patients suffering from various types of cancer.[1] These new regimens have targeted action, good efficacy and do not cause those severe side effects that are often seen with conventional chemotherapy.[2] Most frequently used intravenous EGFRs are cetuximab (Erbitux) and panitumumab (Vectibix), which have a specific way of preparation, administration and common mode of action. Most commonly reported side effects of these agents are diarrhea, hypomagnesemia and dermatotoxicity, while serious, but rare, are allergic reactions and lung toxicity.[3]

Dermatotoxicity, as a major side effect, may appear as papulopustular eruptions, rash, nail changes, xerosis, pruritus, paronychia and alopecia. It is a non-life threatening side effect with a frequency that ranges from 45% to 100%.[4,5] Less than 20% of patients have severe reactions (grade 3 and 4) which will lead to dose reduction or discontinuation of chemotherapy regimen.[6,7] The intensity of dermatotoxicity varies from patient to patient and usually is associated with the type and dose of the agent, as well as, its combination with other chemotherapy regimens.[8,9] It is supported that the intensity of rash indicates the level of effectiveness of treatment.[8] However, the appearance of dermatotocixity has a negative effect on patients' body image which in turn leads to significant discomfort, low self-esteem, social isolation and diminished quality of life.[10,11]

Increased use of cetuximab and panitumumab at oncology wards and day clinics requires experienced health professionals in the administration of monoclonal antibodies. Furthermore, effective management of their side effects, especially dermatotoxicity, through early recognition and assessment, improve patients' tolerability and adherence to therapy.[12–14] Nurses, as members of the interdisciplinary oncology care team, are amongst the first who are aware of the appearance of dermatotoxicity and receive patients' reflection on their feelings. Furthermore, nurses have an important role in educating patients on topics such as prevention, early recognition and treatment options, which result in improvements of patients' quality of life and satisfaction.[15]

Guidelines for the management of dermatotoxicity have been mainly based on experience, or qualitative rather than quantitative data. Recently, there have been several efforts to develop guidelines, relying on randomized trials, evidence-based practices and new systems of classification and assessment of symptom severity.[7,16–18] Their diffusion to local oncology centers and their use in clinical nursing practice is imperative. In the literature, there are several rating scales that have been developed to assess oncology nurses' knowledge, but there are few references on dermatotoxicity, although it is a frequent problem in specific oncology patients' groups.[19,20] Assessment of nurses' knowledge on dermatotoxicity is required

to recognize their educational needs and implement educational programs that could contribute to the provision of evidence-based nursing care.[21]

Aim

The aim of this study was to explore Greek nurses' knowledge and clinical practice regarding the assessment and management of dermatotoxicity caused by EGFR inhibitors (cetuximab and panitumumab). It was undertaken in response to the growing emphasis on integrating targeted therapies into oncology clinical practice.

Methods

A convenience sample of 80 registered (RN) and assistant (AN) nurses with clinical experience in chemotherapy was recruited from eight urban hospitals in Greece with oncology departments, during a 3-month time period. The study was conducted in compliance with the required ethical standards (Hospitals' Ethics Committee approvals were acquired). A extended version of a self-administered questionnaire (DKNA) with 51 items was used to collect information on nurses' knowledge about management and side effects caused by EGFR inhibitors. More specifically, the first 13 items explore the knowledge of nurses about dermatotoxicity caused by EGFR inhibitors. The questionnaire has very good test-retest reliability.[22]

Data analysis was carried out with IBM SPSS Statistics ver. 20.0. Descriptive statistics were calculated and both parametric and non-parametric tests were used to analyze the data. Differences between groups or conditions on the level of knowledge were analyzed using Mann-Whitney or Kruskal-Wallis tests when the assumptions required by the parametric counterpart tests were not met; otherwise was used t-test or one way ANOVA test. The statistical significance was assumed at $p<0.05$. Of the 80 nurses who met the eligibility criteria, 57 returned completed questionnaires (response rate=71.25%). The mean duration of completing the questionnaire was 10 minutes.

Results

The majority of nurses were females (93.0%), graduates of a Technological Educational Institute (64.9%) and had no specialized training in oncology nursing (94.7%). 56.1% of the respondents was working at day clinics and 43.9% at oncology wards. Their average age was 39 (±5) years with an average of 15.8 (± 6.7) years of professional nursing experience at day clinics and 8.0 (±6.6) years at oncology wards. Regarding administration issues, nurses administered more frequently cetuximab (>10/week) than panitumumab (39.3% vs 18.2%). The majority of nurses stated that they had been informed for EGFR inhibitors mainly from other nurses (39.3% for cetuximab and 36.4% for panitumumab) and from representatives of the drugs' manufacturers, (19.6% for cetuximab and 25.5% for panitumumab). Similarly, most participants were educated on the administration process of EGFR inhibitors by a colleague (cetuximab: 39.3%, panitumumab: 36.4%). Finally, most of nurses had reported that they knew "well" or "very well" the administration process for both EGFR inhibitors (cetuximab: 89.3%, panitumumab: 85.2%) (data not shown in table).

Information regarding nurses' knowledge on side-effects and management of those two EGFR inhibitors were also recorded (table 1). Nurses stated that they knew "well" (47.4 %) or "very well' (24.6%) that EGFR inhibitors were associated with side effects and a nurse (38.6%) or a doctor (19.3%) were providers of such information.

41.1% of nurses encountered >11 cases of dermatotoxicity every month, but only 32.1% used adequate time with the patient discussing the specific side-effect. Doctors (48.2%) or doctors and nurses (42.9%) were responsible for patients' education, but this action was rarely based on written information or other educational material (7.3%). Finally, 45.6% of nurses reported that patients use cosmetics for the management of dermatotoxicity.

The average percent of correct answers of nurses to the knowledge questionnaire was 63.2 (±15.8) with a median of 65.2 (range: 26.1–95.7). They ranged from 22.8% for question 7, to 86.0% for questions 11 and 22 (data not shown in table). The average knowledge level of nurses working at oncology wards (57.7±15.5) was lower than those at day clinics (67.4±15.0, p-value=0.021) and related with the age of nurses (Spearman's rho=0.285, p-value=0.043). The average nurses' knowledge level about the side-effects of EGFR inhibitors was 56.7 (±17.9) with a median 53.8 (range: 15.4–100). The average nurses' knowledge level score about the process of cetuximab administration (items: 14, 16, 17, 19, 20, 21, 22) was 71.3 (±20.0) with a median of 75 (range: 12.5–100), while in case of panitumumab (items: 15, 16, 18, 19, 21, 22) was 70.5 (±26.4) with a median of 83.3 (range: 0–100). These two knowledge level scores about inhibitors were not statistically significant, based on the Wilcoxon Signed Ranks Test's (p-value=0.960). In contrast, the knowledge level on the administration of both EGFR inhibitors differed significantly from the knowledge level on the side-effects (items: 1–13) caused by the administration of these EGFR inhibitors (Wilcoxon Signed Ranks Test's p-value≤0.0001). Furthermore, nurses' level of knowledge on the EGFR

Table 1. *Management of EGFR inhibitors (cetuximab και panitumumab) side effects and dermatotoxicity.*

	n (%)
Do you know (are you aware) that EGFR inhibitors are associated with side effects?	
I do not know	3 (5.3)
I know a little	13 (22.8)
I know well	27 (47.4)
I know very well	14 (24.6)
Who was the first to educate you about the side effects of EGFR inhibitors and their management?	
Doctor	11 (19.3)
Head nurse	4 (7.0)
Nurse	22 (38.6)
Representative from pharmaceutical company	6 (10.5)
No-one	7 (12.3)
Drug flyer (myself)	6 (10.5)
Other	1 (1.8)
How many cases of dermatotoxicity do you treat every month?	
0–5	24 (42.9)
6–10	9 (16.1)
11–15	7 (12.5)
>15	16 (28.6)
How much time you do you spend with a patient discussing dermatotoxicity?	
Not at all	10 (17.9)
Less than 5 min	24 (42.9)
5–15 min	4 (7.1)
As time as it needs	18 (32.1)
Who is responsible at your hospital for patients' education on dermatotoxicity?	
Doctor	27 (48.2)
Nurse	0 (0.0)
Doctor and Nurse	24 (42.9)
No-one	2 (3.6)
Other	3 (5.4)
Do patients at your hospital receive written information for dermatotoxicity?	
No	39 (70.9)
Usually No	12 (21.8)
Usually Yes	4 (7.3)
Yes	0 (0.0)
Is there any educational material for patients regarding side effects of EGFR inhibitors?	
No	54 (94.7)
Yes	3 (5.3)
Has any patient ever mentioned the use of cosmetics in order to deal with dermatotoxicity?	
No	31 (54.4)
Yes	26 (45.6)

inhibitors' side-effects was very low comparing to the knowledge regarding their administration.

In regards to associations with demographic characteristics, the average knowledge level of nurses about the process of administration of cetuximab related significantly with the age of nurses (Spearman's rho=0.341, p-value=0.014) and years of their working experience (Spearman's rho=0.313, p-value=0.018). More specifically, nurses with greater working experience demonstrated a higher knowledge level about the process of cetuximab administration. Similarly, the average nurses' knowledge level of panitumumab administration related significantly with the age (Spearman's rho=0.341, p-value=0.014), the years of working experience (Spearman's rho=0.313, p-value=0.018) and the working department (Mann-Whitney test's, p-value=0.042). Nurses working at a day clinic had a greater knowledge level (median: 83.3, range: 0-100) about panitumumab administration compared to those working at oncology ward (median: 50, range: 16.7-100).

In table 2, are shown data concerning the relation of EGFR inhibitors' knowledge level (0–100) and EGFR inhibitors' administration. The knowledge level about cetuximab administration was associated with the number of cases that nurses treated every week (p-value=0.001). Nurses who treated zero to five patients with cetuximab

Table 2. *Relation of EGFR inhibitors' knowledge level (0 - 100) and EGFR inhibitors' administration.*

	Cetuximab (Erbitux) Median (Range)	**p-value**	**Panitumumab (Vectibix) Median (Range)**	**p-value**
How many cases of EGFR inhibitor do you treat every week?				
0-5	62.5 (25–87.5)		50 (16.7–100)	
6–10	87.5 (50–87.5)	0.001[a]	100 (66.7–100)	0.005[a]
11–15	87.5 (75–100)		100 (83.3–100)	
>15	87.5 (37.5–100)		83.3 (33.3–83.3)	
Who informed (or educated) you first for EGFR inhibitors?				
Doctor	62.5 (50–100)		66.7 (16.7–100)	
Head nurse	56.3 (37.5–75)		75 (33.3–100)	
Nurse	75 (37.5–87.5)		75 (16.7–100)	
Pharmaceutical company	87.5 (75–100)	0.007[a]	100 (33.3–100)	0.299[a]
No-one	62.5 (50–75)		83.3 (50–83.3)	
Drug flyer (myself)	75 (25–87.5)		58.3 (50–100)	
Other	0 (0–0)		50 (50–50)	
Who presented to you the administration process for EGFR inhibitors first?				
Doctor	68.8 (50–87.5)		66.7 (16.7–66.7)	
Head nurse	75 (37.5–87.5)		83.3 (33.3–100)	
Nurse	75 (37.5–100)	0.012[a]	66.7 (33.3–100)	0.027[a]
Pharmaceutical company	87.5 (75–100)		100 (33.3–100)	
No-one	62.5 (25–75)		75 (50–83.3)	
From the drug leaflet (by myself)	68.8 (62.5–75)		58.3 (33.3–100)	
Do you believe you know the administration process for EGFR inhibitor?				
I do not know	75 (75–75)		41.7 (33.3–50)	
I know a little	50 (50–75)	0.087[a]	50 (33.3–83.3)	0.045[a]
I know well	75 (25–100)		83.3 (16.7–100)	
I know very well	87.5 (37.5–100)		83.3 (33.3–100)	

a: Kruskal-Wallis Test

per week demonstrated a lower knowledge level (median: 62.5) about the process of cetuximab administration compared to those who met more patients (median: 87.5). Also, nurses' knowledge level about cetuximab administration was associated with the person who initially informed them (p-value=0.007) and presented its administration (p-value=0.012).

As regards to the knowledge level about panitumumab administration, it was also associated with the number of patients that nurses treated every week (p-value=0.005). Nurses who administered panitumumab zero to five patients per week had a lower knowledge level (median: 50.0). In contrast to nurses' knowledge level about cetuximab, nurses' knowledge level about panitumumab administration was not related to the person initially informed them (p-value=0.299), but only to the person who presented the administration process (p-value=0.027). Finally, nurses who believed that they knew "well" or "very well" the panitumumab administration presented greater knowledge level about its administration (p-value=0.045).

In respect to the knowledge level about the side-effects of EGFR inhibitors, nurses working at day clinics had significantly greater levels of side-effect knowledge (p-value=0.026). Their average side-effect knowledge was 61.3 (±17.0), while in nurses working at oncology wards was 50.8 (±17.6).

Finally, were explored factors influencing nurses' knowledge level about side-effects of EGFR inhibitors, the relationship of nurses' side-effects knowledge level and the level of information about EGFR inhibitors' side effects (table 3). Nurses who stated that they knew "well" or "very well" that EGFR inhibitors were associated with side effects reported a higher level of side-effects knowledge (p-value=0.003). Furthermore, nurses who stated that the doctor or the pharmaceutical company initially informed them about the side effects of EGFR inhibitors, presented higher level of side-effects knowledge (p-value=0.002). Additionally, in hospitals where doctors and nurses were responsible for patient's education about specific side-effects, nurses had higher level of side-effects knowledge (p-value=0.040).

Discussion

This study is the first that investigates Greek nurses' knowledge and clinical practice about the assessment and management of dermatotoxicity caused by EGFR inhibitors. It was reported an adequate nurses' knowledge level about the process of their administration, using DKNA questionnaire.[22] It was also noted low level of knowledge regarding their side effects, especially for dermatotoxicity, despite their views for effective management. Assessing administration and side effects knowledge concerning specific drugs in health personnel, working at oncology wards and day clinics, help finding possible gaps of information regarding their better management and consequently help focus on implementation of appropriate training programs.[23]

In the present study, nurses knew much better the administration of EGFR inhibitors than handling their side-effects. Other studies have shown that nurses may administer drugs to patients without knowing the possible contraindications and side effects.[24] Previous studies have also shown that early recognition of side effects can decrease the treatment-related toxicity, the need for dose reduction or therapy interruption, limited hospital admissions, enabling patients to achieve a better clinical outcome, satisfaction and improved quality of life.[25–27]

It was remarkable that more than half of nurses reported less than five minutes discussing with patients about dermatotoxicity, without giving any written information or educational material. Additionally, they didn't know to classify its severity, as shown with the lowest percentages of correct answers given in the question about the rash grading scale. Dermatotoxicity is a serious problem in many patients receiving EGFR inhibitors, affecting body image and arising questions for effective management.[21,28] Changes in body image increase cancer patients' suffering, distress and depression. Barriers in information and communication issues in oncology patients have been also reported by others.[29] They usually occur due to time restrictions working in a busy oncology environment, ineffective training, difficulties in communication between patients and health professionals and underestimation of patients' informational needs. For example, most of nurses at the current study reported no specialized training in oncology nursing. Additionally, as the patient's care in Greece is mainly medical centered, the nurses' participation in treatment of side effects remains limited.

The current study results have also shown that a variety of different people, such as doctors, experienced nurses and representatives of drugs' pharmaceutical companies are involving in nurses' education concerning the administration process and the managing of side effects. These dubious and sporadic methods of receiving information may cause confusion, when they are not a part of a well-organized and specialized training program. It is imperative that introducing a new drug or treatment in every day clinical practice must be followed by clinical practice guidelines and specific protocols, that include training of the health personnel about its

Table 3. *Relation of knowledge level (0–100) of EGFR inhibitors' side-effects.*

	Mean±SD	Median (Range)	p-value
Do you know that EGFR inhibitors are associated with side effects?			
I do not know	46.2±7.7	46.2 (38.5–53.9)	0.003[d]
I know a little	40.8±17.9	46.2 (15.4–61.5)	
I know well	62.1±12.1	61.5 (38.5–92.3)	
I know very well	63.2±20.1	53.9 (38.5–100)	
Who was firstly present to you about the side effects and the way of handling them?			
Doctor	69.9±15.6	69.2 (53.9–100)	0.002[b]
Head nurse	50±18.3	57.7 (23.1–61.5)	
Nurse	54.9±15.6	53.9 (23.1–84.6)	
Pharmaceutical company	69.2±15.4	61.5 (53.9–92.3)	
No-one	49.5±15.3	53.9 (23.1–69.2)	
From the drug leaflet (by myself)	37.2±13.3	38.5 (15.4–53.9)	
Other	0±0	69.2 (69.2–69.2)	
How many cases of dermatotoxicity you meet every week?			
0–5	52.9±18.1	53.9 (15.4–84.6)	0.350[d]
6–10	58.1±20	61.5 (23.1–92.3)	
11–15	64.8±8.7	61.5 (53.9–76.9)	
>15	58.2±19.9	53.9 (23.1–100)	
How much time do you spend with a patient discussing the specific side effect?			
Not at all	58±19	53.9 (15.4–84.6)	0.499[b]
Less than 5 min	65.4±18.3	61.5 (23.1–100)	
5–15 min	56.8±14.2	73.1 (38.5–76.9)	
As time as it needs	58±19	53.9 (23.1–84.6)	
Who is responsible at your hospital for the patient's education due to the specific side effect?			
Doctor	60.1±15.2	61.5 (23.1–92.3)	0.040[b]
Nurse	0±0	0 (0–0)	
Doctor and Nurse	57.4±18.7	53.9 (23.1–100)	
No-one	38.5±21.8	38.5 (23.1–53.9)	
other	33.3±19.4	30.8 (15.4–53.9)	
Do the patients at your hospital receive any written information for the specific side effect?			
No	56.8±15.8	61.5 (15.4–92.3)	0.645[b]
Usually No	60.9±19.8	57.7 (23.1–100)	
Usually Yes	51.9±29.7	46.2 (23.1–92.3)	
Yes	0±0	0 (0–0)	
Is there any educational material for the patients?			
No	56.6±18.4	53.9 (15.4–100)	0.775[c]
Yes	59±4.4	61.5 (53.9–61.5)	
Has any patient mentioned to you the use of cosmetics in order to deal the specific side effect?			
No	52.9±19.5	53.9 (15.4–100)	0.078[a]
Yes	61.2±14.8	61.5 (38.5–92.3)	

a: t-test, b: one-way ANOVA test, c: Mann-Whitney Test, d: Kruskal-Wallis Test

way of action, preparation, administration, prevention, early recognition and management of possible side effects.[30,31] Unfortunately, the limited existing continuing training programs about drugs administration and side effects' management along with few specialized oncology nurses in Greece lead to knowledge deficits that affect optimal care.

Another important finding was that the average level of knowledge of nurses regarding the administration of EGFR inhibitors was directly related to the workplace and the working years. Day clinic nurses knew more about handling EGFR inhibitors and had significantly greater levels of side-effect knowledge. This is probably due to the increased number of cases used at day clinics, since their administration don't usually require hospitalization, unless there is a complication or a specific chemotherapy protocol. Additionally, older nurses with greater working experience presented higher knowledge level about the process of administration and management of cetuximab and panitumumab. Inadequate formal training programs about EGFR inhibitors probably initiate informal networks of education where older nurses have more experience and skills. It is of most importance that nursing care to cancer patients must be offered by registered specialized oncology nurses with clinical experience.[32,33]

Limitations

The main limitation of this study stem from the convenience small sample. Additionally, internal consistency reliability, test-retest reliability and validity of the questionnaire, were not evaluated in the context of the current study. However, the tool has been tested by the researchers in a pilot study, with good psychometric properties.

Conclusions

In every day practice, it is important to investigate the knowledge of clinical nurses, in administration and possible side effects, especially for new-entry and many times "unknown" drugs. Systematic education is needed through implementation training programs (workshops, conferences) and evaluation of health professionals' knowledge. Better clinical environment is also needed, giving the opportunity for patients to ask about their treatment and have appropriate answers in a timely manner. Over the last years, the necessity of such programs led to better collaboration between clinical experts, pharmaceutical companies and oncology nursing associations to improve their knowledge and skills in drugs management and offer high quality nursing care.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

ΠΕΡΙΛΗΨΗ

Γνώσεις και Κλινική Πρακτική Ελλήνων Νοσηλευτών στην Εκτίμηση και Διαχείριση της Δερματοτοξικότητας από Αναστολείς του Υποδοχέα του Επιδερμικού Αυξητικού Παράγοντα (EGFR)

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Εισαγωγή: Η χρήση μονοκλωνικών αντισωμάτων που δρουν ως αναστολείς του υποδοχέα του επιδερμικού αυξητικού παράγοντα (EGFRIs) έχει στοχευμένη δράση, καλή αποτελεσματικότητα και συνδέεται με έναν αριθμό παρενεργειών όπως διάρροια, υπομαγνησιαιμία και δερματοτοξικότητα. **Σκοπός:** Σκοπός της παρούσας μελέτης ήταν η διερεύνηση των γνώσεων και της κλινικής πρακτικής Ελλήνων νοσηλευτών στην εκτίμηση και στη διαχείριση της δερματοτοξικότητας από τους αναστολείς του EGFR (cetuximab and panitumumab). **Υλικό και Μέθοδος:** Το τελικό δείγμα περιελάμβανε 57 άτομα νοσηλευτικού προσωπικού (ποσοστό συμμετοχής 71,3%) από ογκολογικά τμήματα 8 νοσοκομείων, κατά το χρονικό διάστημα Οκτώβριος 2015–Ιανουάριος 2016. Η συλλογή των δεδομένων έγινε με τη χρήση του αυτοσυμπληρούμενου ερωτηματολογίου DNKA. Η ανάλυση των δεδομένων έγινε με παραμετρικές και μη παραμετρικές δοκιμασίες. **Αποτελέσματα:** Η πλειοψηφία του δείγματος ήταν γυναίκες (93,0%), με μέσο όρο ηλικίας τα 39 (±5) έτη, χωρίς καμία εξειδίκευση στη νοσηλευτική ογκολογία σε ποσοστό 94,7%. Οι περισσότεροι συμμετέχοντες ανέφεραν ότι

γνώριζαν «καλά» ή «πολύ καλά» τη διαδικασία χορήγησης και για τους δύο αναστολείς του EGFR (cetuximab: 89,3%, panitumumab: 85,2%). Επίσης, δήλωσαν ότι γνώριζαν «καλά» (47,4%) ή «πολύ καλά» (24,6%) ότι οι αναστολείς σχετίζονταν με παρενέργειες. Η μέση βαθμολογία των σωστών απαντήσεων στις ερωτήσεις εκτίμησης γνώσεων ήταν 63,2 (±15,8) και το μέσο επίπεδο των γνώσεων των νοσηλευτών που εργάζονταν σε ογκολογικές κλινικές ήταν χαμηλότερο σε σχέση με τους εργαζόμενους σε τμήματα ημερήσιας νοσηλείας (THN) (57,7±15,5 έναντι 67,4±15.0, p-value=0,021), ενώ σχετιζόταν με την ηλικία τους (p-value=0,043). Επίσης υπήρχε στατιστικά σημαντική διαφορά στο επίπεδο των γνώσεων σχετικά με τις παρενέργειες των δύο αναστολέων (p-value≤0,001), ενώ οι γνώσεις αυτές σχετίζονταν με τον αριθμό των περιστατικών που διαχειρίζονταν σε εβδομαδιαία βάση (p-value=0,001 και p-value=0,005) και την εργασία τους σε THN (p-value=0,026). **Συμπεράσματα:** Το σχετικά περιορισμένο επίπεδο νοσηλευτικών γνώσεων στην εκτίμηση και τη διαχείριση της δερματοτοξικότητας που προκαλείται από τους EGFRIs αναδεικνύει την ανάγκη για περισσότερη σχετική εξειδίκευση. Απαιτούνται οργανωμένα εκπαιδευτικά προγράμματα και εκπαιδευτικό υλικό για τη βελτίωση της γνώσης που θα συμβάλλει στη καλύτερη φροντίδα και ποιότητα ζωής των ασθενών με καρκίνο.

Λέξεις-ευρετηρίου: *EGFR αναστολείς, δερματοτοξικότητα, ογκολογικός νοσηλευτής, DKNA ερωτηματολόγιο.*
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