

Title Page

Healthcare Professionals Knowledge on Cancer-Related Fatigue: A Cross-Sectional Survey in Oman

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Abstract

Cancer-related fatigue is a common and distressing cancer symptom that negatively affects quality of life. The main objective of this study was to determine health professionals' knowledge relating to cancer patients' fatigue in Oman and identify current management practices of cancer-related fatigue. A cross-sectional survey design using Qualtrics® software was performed. The survey had five sections and comprised 32 items. A total of 138 healthcare professionals working in Oman participated in the study (response rate 63.9%). Nearly three quarters of the participants were nurses (74.6%, n=103). The mean level of knowledge of cancer-related fatigue was 16.6/23, with 50% of participants having the expected level of knowledge above 12. The result indicated that professional discipline and work experience each were significantly associated with overall level of knowledge. Participants identified the need for guidelines, assessment tools and training for the oncology staff to help improve the quality of life of patients with cancer related fatigue.

Keywords: Cancer Related Fatigue; Knowledge, Healthcare Professionals, Cross Sectional

Introduction:

Cancer-related fatigue (CRF) is a particularly common and distressing symptom that negatively impacts on quality of life in all phases of treatment or stages for those with cancer. The prevalence of CRF varies, depending on treatment or cancer type and stage, and it is estimated from 25% and 95% (Berger et al., 2019; Qu et al., 2016; Van Lancker et al., 2014). CRF has a negative effect on the physiological and physical state of patients and includes problems such as, anxiety, sleep disturbance, depression and pain (Oh & Seo, 2011; Weber & O'Brien, 2017). CRF interferes with daily life by disrupting social activities and interpersonal relationships, such as spending time with friends (Koornstra, Peters, Donofrio, van den Borne, & de Jong, 2014).

In addition, severe fatigue during cancer treatment may result in delay or discontinuation of treatment because of patients' inability to tolerate fatigue, which negatively affects quality of life (Cheville, 2009; Hofman, Ryan, Figueroa-Moseley, Jean-Pierre, & Morrow, 2007). Fatigue may also have significant impact on financial status, as it can lead to increased sick leave, increased disability and/or a reduction in the number of working hours (Behringer et al., 2016; Sharp, O'Leary, O'Ceilleachair, Skally, & Hanly, 2018).

The National Comprehensive Cancer Network (NCCN) published a clinical guideline which suggested that CRF remained underreported, underdiagnosed, and undertreated (Berger et al., 2019). Several studies have reported barriers to assessment and management of fatigue, including factors related to patients, healthcare professionals and healthcare systems (Bower et al., 2014; Knowles, Borthwick, McNamara, Miller, & Leggot, 2000; Magnusson, Karlsson, Palmblad, Leitner, & Paulson, 1997).

In a study of 100 cancer patients, (Borneman et al., 2007) found that 54% believed that if fatigue was important, physicians would ask them about it. Another survey of 288 cancer patients (Shun, Lai, & Hsiao, 2009) highlighted that the most common barrier to assessment and management of CRF was lack of communication. These researchers concluded that there is a need to improve communication between patients and healthcare professionals relating to CRF.

However, the most frequently identified barrier to fatigue management appears to be healthcare professionals' (HCP) lack of knowledge about CRF and the associated assessment strategies (Abdallah, Herzallah, Zeilani, & Alhalaiqa, 2014). Similar research findings indicated the need for education in the actual management and assessment of CRF (Borneman et al., 2007; Knowles et al., 2000; Magnusson et al., 1997; Miller & Kearney, 2001). In addition, it may not be common practice or a requirement of healthcare organizations to document fatigue in medical records (Borneman, 2013), which is of concern when considering that fatigue is such a common symptom for cancer patients. Understanding the barriers to the assessment and management of CRF should be a fundamental aspect of contemporary cancer care. In Oman, there were approximately 1615 new diagnoses of cancer in 2015 (Al-Bahrani, Al-Lawati, Al-Siyabi, Al-Gharbi, & Al-Wehaibi, 2018), however, to date, there are no published studies that have assessed the level of knowledge of HCPs in Oman and the Gulf Region relating to CRF. The aims of this study were to identify health professionals' knowledge relating to fatigue among cancer patients in Oman and to identify the current strategy for assessment and management of CRF. To our knowledge, this is the first study conducted to assess the level of HCPs knowledge of CRF in Oman.

Method:**Study Design:**

This was a cross-sectional survey, which used Qualtrics® survey software for electronic distribution and completion of questionnaires. This study adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline for cross-sectional studies (Elm et al., 2007) (Supplementary File 1).

Sample:

To be eligible, participants had to have worked in the National Oncology Centre in Oman in an oncology setting and had healthcare related encounters (within the last 12 months) with patients who had a cancer diagnosis.

There were 218 health professionals employed in National Oncology Centre at the time of this study. The Raosoft software calculator (Raosoft, 2004) was used to estimate the sample size. Based on a confidence level of 95% and margin of error of 5, the calculated sample was 139 participants in order to act as a representative sample. The sample size increased to involve all healthcare professional 218, as there was an expectation of a 40% non-response rate (Livingston and Wislar, 2012).

Data Collection:

An invitational e-mail and link to the survey was sent to all healthcare professionals in the National Oncology Centre. The link included a participant information sheet. Those who agreed to take part provided consent by clicking an 'I consent to participate' box, presented prior to the start of the survey. A reminder message was sent every two weeks, three times to increase the response rate. The study was conducted between April 2018 and July 2018.

Instrument:

The study used previously developed questionnaires to identify the current practice and knowledge of health professionals in Oman. The questionnaire consisted of five sections: The first section collected demographic data with regard to age, gender, professional discipline and years of experience (4 questions). The second section was comprised of questions on knowledge and practice relating to CRF (4 questions). The third (13 True/False questions) and fourth (10 Multiple Choice Questions) sections also gauged participant's knowledge of fatigue. The fifth section asked for suggestions to improve cancer related fatigue.

The study used the Piper Fatigue Integrated Model and City of Hope Quality of Life Model (Piper et al., 1989) as a guide to sections three and four of the survey. In this study, the instrument was used in the oncology centre in an Arabic country. Questions in section two and five were adapted from Pearson *et al.* (2015).

Each of the questions in sections 3 and 4 had only one correct answer, with a value of 1 assigned for a correct response, giving a possible score range from 0 to 23. The knowledge score was divided into three levels; low level of knowledge (below 7), moderate level of knowledge (between 7 and 14), and high level of knowledge (between 15 and 23). The true/false questions and multiple-choice questions measured six domains including: Incidence/prevalence (5 questions), pathophysiology (3 questions), communication (2 questions), assessment (4 questions), management (6 questions) and patients' outcomes (3 questions). The fifth section asked for suggestions to address cancer related fatigue (1 question). The tool had five sections with 32 questions and the survey took between 10 and 15 minutes to complete. Permission had been given by the authors to use the instruments.

The survey was designed to measure the level of knowledge of healthcare professionals, therefore participants who answered, 'I don't know anything about CRF', to question 8 ('Which of the following

best describes your level of knowledge about CRF?') were excluded from answering the next 23 questions and asked to give recommendations about improving knowledge and practice only. All information, participant information sheet, consent and questionnaire were in English because it is the official language used in the Ministry of Health Oman.

Data Analysis:

Data were exported from Qualtrics into the Statistical Package for Social Science (SPSS) version 25. To address the research questions, descriptive statistics were calculated in the form of means, standard deviations, frequency and percentages for all the questions and participant variables. One-way ANOVA was used to test whether levels of knowledge were different in terms of demographic characteristics of the sample. The internal consistency was evaluated by calculating the Kuder Richardson 20 statistic (KR-20), which ranged from 0 to 1.

Ethical Considerations:

Ethical review was initially provided by the Nursing and Health Research Institute Filter Committee at Ulster University. The study was reviewed by the Research and Ethical Review and Approval Committee in the Directorate General of Planning and Studies at the Ministry of Health, Oman (MoH/DGPS/CSP/PROPOSAL_ APPROVED/31/2017). The confidentiality and privacy of the participants was ensured as data was not identifiable.

Results:

Participant Characteristics

Two hundred sixteen surveys were distributed and 203 were returned (response rate = 93.9%). However, of those that were returned, sixty-five were excluded because 36 did not work directly with cancer patients, 26 participants did not complete 90 % of the questions and three participants refused to give

consent, resulting in a total of 138 valid questionnaires being included in the final analysis (63.9% valid response rate). Thirty-one participants indicated that they had no knowledge of fatigue; thus, their responses to sections 3 and 4 (23 questions) were not included in the analysis for these specific sections. Responses from 107 participants were included in the analysis that assessed level of knowledge.

In terms of gender, 73.2% were female, and 26.8% were male. The largest age group was 25-34 years (49.3%). Approximately 75% were nurses, 14% were doctors and 11.5% were allied or other health professionals. Almost half of the 138 participants had worked in oncology for more than 10 years. Participants' demographic data and characteristics are shown in Table 1.

Health Professionals' Knowledge on CRF:

Thirty-one (22.5%) acknowledged that they did not know anything about CRF in question 8. These participants were not required to answer the next 23 questions. Hence the mean level of knowledge reported here is for 107 participants only. Out of 107 participants, the mean score for level of knowledge was 16.6 (SD=3.5). Overall, 51 of the participants had excellent level of knowledge (37% of the 138 participants), 47 had good level of knowledge (34% of the 138 participants), and only 9 (6.5% of the 138 participants) had poor level of knowledge (table 3). The proportion of correct answers for the six domains of knowledge were: incidence/prevalence (76.6%), pathophysiology (71.3%), communication (38.3%), assessment (72.2%), management (72.7%) and patients' outcome (87.5%) are shown in Table 4.

Table 2 provides results on the responses to the 23 questions which assessed knowledge of CRF. Approximately 96% of participants agreed to questions 9 and 14, which identified knowledge that fatigue exists as a symptom for cancer patients and that this has a detrimental impact on quality of life. However, only 35.5% of HCPs endorsed the questions 15 and 30 as being true, which relates to knowledge of family, friends and healthcare professionals with regard to the impact of fatigue. Many participants

wrongly answered the two questions relating communication between HCPs and patients, question 15 (64.5%) and 22 (58.9%); which indicates poor knowledge of communication.

As shown in Table 1, there were statistical group differences in total knowledge among professional discipline ($F(6,100) = 3.81, p = 0.00$) and the duration of work experience ($F(4,102) = 3.03, p = 0.02$). The post-hoc result revealed that those with less than 1 years work experience had less knowledge about CRF than the more experienced practitioners. Oncologists, radiotherapist, physiotherapists, dietitians and other medical groups had greater knowledge than both nurses and other professional groups. Participants who disclosed to having no knowledge about fatigue were mainly nursing staff. Gender and age did not result in any statistical significant differences in mean level of knowledge.

Current Assessment and Management Practice:

The results indicate that the majority of the participants 65.2% (n=90), did not routinely ask patients about CRF. In terms of assessing and managing CRF, only 23.9% (n=33) of participants had used guidelines and 29% (n=40) were unaware of the existence of any guidelines. Almost 45% of participants reported that CRF was routinely screened for or assessed by themselves or others in the workplace, with informal interview being the most common method of assessment (91.1%), and validated CRF instruments were only used by 9% of participants.

Suggestions for Improving CRF Management:

Participants were asked if they had any suggestions to improve the assessment and management of cancer related fatigue in Oman (See Table 5). The majority of participants proposed that improvements were required in guidelines for CRF (89.1%); there was an identified need for valid assessment tools (78.3%), routine screening for fatigue (82.6%) and improved patient access to the services in the oncology centre (5.4%). Enhancement of staff expertise in CRF assessment and management was proposed by 113 participants and staff education was strongly supported by the participants (81.9%).

Four participants gave further suggestions with two favouring improvements in education for both nursing staff and patients, and two others suggested improving patient access to services in the Oncology Centre. One participant proposed a follow-up system, such as phone consultations, with daily assessments of CRF.

Discussion:

The study assessed the level of HCPs knowledge of CRF in the Cancer Centre in Oman. The response rate was 63.9%, which is considered acceptable, especially as Livingston and Wislar (2012) suggested that 60% was an acceptable level for a response rate. A high response rate can help reduce the risks of bias (Groves & Peytcheva, 2008; Sedgwick, 2014). The internal consistency of the 23 items was acceptable as KR-20 was above 0.70. However, some researchers suggest that 0.80 is the minimal acceptable level for an educational instrument that measures knowledge (El-Uri & Malas, 2013).

The mean level of knowledge score was 16.6 (SD=3.5) out of a possible score of 0-23, which indicated a good level of knowledge among those who were aware of CRF. Participants obtained a 72.28% correct score to 23 questions. However, 31 (22.5%) participants had no knowledge of fatigue. These findings are similar to other studies conducted with healthcare professionals. Pearson *et al.* (2015) conducted cross-sectional research that included 129 healthcare professionals and found that more than half of the participants had some knowledge about CRF management. Likewise, Abdalrahim *et al.* (2014) found Jordanian nurses had a reasonable knowledge in incidence, pathophysiology, management and patients outcome, but held negative attitudes and lack of knowledge in assessment of CRF. Two other studies investigated the level of knowledge of CRF among nurses (Knowles *et al.*, 2000; Miller & Kearney, 2001). These studies reported underestimation of CRF, and poor knowledge and practice in terms of communication, assessment and management among participants. Overall, the findings of the current study are consistent with other research that indicates a gap in knowledge of CRF among HCPs.

In this study, the rate of correct responses for the questions relating to communication were less than 50%, indicating poor understanding of the importance of communication. The findings of past research indicated that communication is one of most common barriers between patient with cancer and HCPs and recommended support for patients to ensure effective (Noordman et al., 2017; van Bruinessen et al., 2013).

The experience level of the health care practitioners was shown to influence HCPs knowledge of CRF. Participants who had less than one-years' experience demonstrated less accurate knowledge of CRF than that of more experienced groups. In addition, the medical oncologist, radiation oncologist, radiotherapist, physiotherapist, dietitian and other doctor groups had greater knowledge than other healthcare professionals about CRF. It is noted that the sample size for these groups was small however, there is similar studies which have compared differences between demographic data and the total level of knowledge.

Alternative management strategies were suggested by the participants to improve the assessment and management of CRF. The majority of participants suggested developing guidelines which would provide a structured approach to assessment and management of CRF. Several organization have published clinical guidelines that can assist in the management of fatigue and improve the quality of life of patients diagnosed with cancer; (NCCN) (Berger et al., 2019); American Society of Clinical Oncology (ASCO) (Bower et al., 2014); Canadian Association of Psychosocial Oncology (CAPO) (Howell et al., 2015); European Association for Palliative Care (EAPC) (Radbruch et al., 2008). The guidelines provide strategies for managing CRF for clinical practice, such as screening, assessment and management of CRF for healthcare professionals. Indeed, de Raaf *et al.* (2013) found improvements in fatigue intensity and interference with daily life for patients who were treated by staff who had received training in CRF NCCN guidelines.

In Oman there are no official guidelines issued by the Ministry of Health. In this study 23.9% of HCPs stated that they used a guideline, but it is not clear what tool was being referred to in this situation. It is suggested that the Ministry of Health need to provide formal guidelines for assessment and management of CRF. Adapting existing guidelines is a systematic approach to implementing a guideline in another setting with different cultural and organisational contexts (Pearson, Morris, & McKinstry, 2016; Wang, Norris, & Bero, 2018). Several organisations have proposed guidelines for adaptation processes, such as the World Health Organization (World Health Organization, 2014); the Institute of Medicine (Steinberg, Greenfield, Wolman, Mancher, & Graham, 2011) and the National Institute for Health and Clinical Excellence (National Institute for Health and Clinical Excellence, 2018). The objective of existing guidelines is to use evidence-based practice to ensure quality and validity of adapted guidelines.

The current study identified the need for a valid assessment tool to measure fatigue. To date, there has been no published data to help validate CRF assessment in Arabic. Lack of appropriate scales to measure CRF is one of the major challenges to identifying fatigue symptom disorders among patients with cancer in the Arabic population. Therefore, it is necessary to adopt and translate appropriate CRF scales into the Arabic language and subsequently investigate the psychometric properties to validate them in Arabic, thereby ensuring the generation of scientifically valid knowledge, and proven applicability in the context concerned (Prinsen et al., 2018).

Another suggestion by participants was to improve staff education about CRF. Several studies suggested that training, workshops and coaching can directly improve patients' satisfaction of care (Delvaux et al., 2004; Dilworth, Higgins, Parker, Kelly, & Turner, 2014).

Whilst the current study did not capture patient needs, healthcare professionals perceived a need for patient education on CRF within Oman. A Cochrane Systematic Review of fourteen randomised controlled trials investigating educational interventions to manage fatigue in patients diagnosed with

cancer, found this had a small effect on reducing CRF intensity and the interference with daily life by fatigue, but patient education provided a moderate effect on reducing fatigue distress (Bennett et al., 2016).

One healthcare professional suggested that it might be helpful to create a smartphone application that involved assessment and recommendations for management of CRF in Arabic language. This would permit remote monitoring of patients with fatigue through an on-line system, which could incorporate evidence-based practice and guidelines to monitor and improve fatigue throughout the treatment of cancer. Related research using mobile apps has found positive experiences for patients with cancer and healthcare professionals (Egbring et al., 2016; Rincon et al., 2017; Young-Afat et al., 2016). In Oman, smartphone use has increased by 154% in the last three years (Ministry of Transport and Communications, 2017), with most of the population having a smartphone. Future studies should investigate the usefulness of smartphone application use by patients and healthcare professionals to assess and manage CRF.

Despite being the first study to investigate the level of knowledge of CRF among healthcare professionals in Oman, this study has some limitations. The study design used self-reporting questionnaires; this may not represent the actual level of knowledge. The sample involved multiple healthcare professionals working with cancer patients. The majority of respondents were nurses (75%); thus, the study findings more heavily reflect nurses' knowledge. The participants were recruited via email invitation, this can limit the response rate of some health professional groups because they may not answer the emails routinely.

Implication for practice:

The knowledge of HCPs are very important as they are in direct contact with patients and this can potentially have an impact on the delivery of care. It is suggested that the Ministry of Health need to provide formal guidelines for assessment and management of CRF.

However, currently, in Oman, most healthcare professionals do not measure fatigue regularly. Similarly, several studies found that CRF assessment and management are not routinely performed in different countries (Sikorskii et al, 2012; Blaney et al, 2013; Pertl et al, 2014; Williams et al, 2016). Therefore, it would be advisable for healthcare professionals to conduct regular assessment of fatigue for cancer patients and provide appropriate management.

The findings of this study indicated that communication is one of most common barriers between patient with CRF and HCPs and it is recommended to improve the communication relating to fatigue between patients and healthcare providers was paramount. The current study identified the need for a valid assessment tool to measure fatigue, therefore, it is necessary to adopt and translate appropriate CRF scales into the Arabic language.

The data help to determine and develop targeted education for HCPs, as well as improving guidelines for the assessment and management of CRF. Furthermore, planning educational programmes to improve CRF is essential if the quality of care for patients with cancer is to be improved.

Conclusion:

This is the first known study to investigate HCP's knowledge relating to CRF and the current management. The study found that the level of knowledge in management and assessment of cancer related fatigue among healthcare professionals was acceptable, but despite this, 23% of participants admitted that they had no knowledge of CRF. This raises concerns about the assessment and management of CRF and the quality of care provided to patients. The result highlights the need for guidelines,

assessment tools and training for the oncology staff to improve quality of life for patients diagnosed with cancer and to improve knowledge about cancer related fatigue.

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Table 1: Summary of Demographic Data for the Participants:

Variable	Overall (N=138)		Total knowledge score with (N=107)					
	N	%	N	%	Mean	SD	F	P
Gender							1.39	0.17 ^a
• Male	37	26.8	30	28	17.4	3.7		
• Female	101	73.2	77	72	16.3	3.3		
Age							1.36	0.25
• Below 24 years	13	9.4	7	6.5	15.4	3.1		
• Between 25 and 34 years	68	49.3	54	50.5	16.1	3.5		
• Between 35 and 45 years	46	33.3	35	32.7	17.3	3.5		
• More than 45 years	11	8.0	11	10.3	17.6	3.4		
Professional Discipline							3.81	0.00
• Nurse	103	74.6	75	70.1	16.1	3.1		
• Other doctors ^c	11	8.0	10	9.3	16.9	5.2		
• Oncologists	8	5.8	8	7.5	19.5	1.5		
• Others, Professional Groups ^b	5	3.6	4	3.7	12.7	3.8		
• Dietitian	4	2.9	4	3.7	19.5	1.0		
• Physiotherapist	4	2.9	3	2.8	20.0	1.0		
• Radiotherapist	3	2.2	3	2.8	19.3	2.1		
Work Experience							3.03	0.02

• Less than 1 Year	21	15.2	16	15.	14.2	3.6
• 1-5	18	13.0	12	11.2	16.3	3.4
• 6-10	33	23.9	28	26.2	16.5	3.1
• 11-15	34	24.6	24	22.4	17.1	3.4
• More than 15	32	23.2	27	25.2	17.8	3.4

^a t-test, other were One-way ANOVA

^b (Pharmacist =1, Discharge planner= 1, Neuroscientist= 1, Paramedic= 2)

^c General Practitioner

Table 2: Distribution of Correct Answers to 23 Questions Among 107 Healthcare Professionals:

Questions	Correct Answer	
	n	%
True/False Questions		
9 Fatigue is the most common symptom associated with cancer and cancer treatments	102	95.3
10 An abnormally low haemoglobin always accompanies a patient's complaint of fatigue	76	71
11 Simply getting a good night's sleep will often resolve a cancer patient's level of fatigue	73	68.2
12 The fatigue associated with radiation therapy resolves as soon as treatment ends	75	70.1
13 Patients with cancer who complain of fatigue one year after completion of cancer treatments must be depressed	63	58.9
14 The symptom of fatigue may impact patients mentally, physically, emotionally and/or financially	103	96.3
15 Patients' complaints of fatigue are often not believed or understood by family members and/or healthcare providers	38	35.5
16 Patients with cancer have the same type of fatigue found in everyday life	78	72.9
17 After successfully treating a patient's pain, nausea, vomiting or diarrhoea the patient should be grateful that he/she only has fatigue	75	70.1
18 Fatigue should not be assessed unless the patient mentions it	90	84.1
19 Although fatigue, like pain, is a multi-causal, multidimensional symptom, fatigue cannot be measured	67	62.6
20 Fatigue or unusual tiredness may be the first sign of the presence of malignancy	63	58.9
21 Because there are no elective treatments for fatigue in patients with cancer, it is better not to treat it	99	92.5
Multiple-Choice Questions		
22 Communication about fatigue between the health care provider and patient with cancer is generally....	44	41.1
23 Cancer-related fatigue may impact on which of the following?	91	85
24 Which of the following interventions have been tested and shown to be elective in reducing cancer-related fatigue?	86	80.4

25	The most accurate judge of the severity of a patient's fatigue is	74	69.2
26	Which of the following can be initiated to prevent or alleviate cancer-related fatigue?	96	89.7
27	Which of the following are potentially correctable causes of fatigue?	90	84.1
28	When discussing cancer treatment-related fatigue, we should view it as	78	72.8
29	Uncontrolled cancer-related fatigue may lead to which of the following	88	82.2
30	Healthcare providers place as much emphasis on the treatment of fatigue as they do on other symptoms such as pain or nausea vomiting	38	35.5
31	Research suggests that fatigue occurs in what percent of patients undergoing chemotherapy	92	86
Mean of Overall 23 Questions:		77.3	72.3%

Table 3: Level of Knowledge of CRF (N=138):

	N	%
No level of knowledge (from Q8)	31	22.5
Remaining (n=107)		
Poor level (< 12)	9	6.5
Good level (12-17)	47	34
Excellent level (18-23)	51	37

Correct answer below or equal to 52% = Poor level; Correct answer between 52%-75% = Good level; Correct answer above 75% = Excellent level

Table 4: Level of Knowledge According to Domains (N=107):

Domains	No of Question	Mean number of participants giving correct Answer	% participants giving correct answer
Incidence & Prevalence	5	82	76.6
Pathophysiology	3	76.3	71.3
Communication	2	41	38.3
Assessment	4	77.3	72.2
Management	6	77.8	72.7
Patient's Outcome	3	94	87.5

Mean of Overall Level of Knowledge	23	77.3	72.3%
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Table 5: Suggestions to Improve CRF:

Suggestions	N	%
Improved Guidelines for CRF	123	89.1
Routine Screening for fatigue	114	82.6
Need for valid assessment or screening tools	108	78.3
Enhanced Expertise	103	74.6
Better staff education about CRF	113	81.9
Better access to services	104	75.4