Middle East
Journal of Nursing

Editorial

Original Contribution/Clinical Investigation

CME Case

FROM THE EDITOR

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In this issue several themes were touched including knowledge about cancer pain management, effect of body weight on hypertension and cholesterol and burn out of nursing staff in ICU.

Yassin et al did a descriptive, cross-sectional design to explore nurse's knowledge and attitudes about cancer pain. The Nurses Knowledge and Attitude Survey Regarding Pain (NKASRP) survey was used. The NKASRP score differences were examined among nurses with varying demographics, levels of pain education and experience. The study aims to explore pain knowledge and attitudes of oncology nurses working in Qatar. The authors found that the mean NKASRP was 58% significantly below the passing score of 80%. Nurses in palliative care unit scored significantly higher (<0.01) than nurses in other units (Hematology/Oncology). No significant differences between sex, age, and educational level were found.

The authors concluded that the study provides important information about knowledge deficit in pain management among oncology nurses and limited training regarding pain management. Palliative care nurses scores significantly higher than nurses in other (Hematology/Oncology) units and this was as result of specialized palliative care course given to them. Our results support the universal concern of inadequate knowledge and attitudes of nurses regarding cancer pain. There is a need for more effective evidence-based educational programs in cancer pain management. Evaluation of the current educational pain program is also needed.

Helvaci et al looked at the effect of body weight on blood pressure. The study was performed in the Hematology and Internal Medicine Polyclinics on patients with sickle cell diseases (SCD) and routine check up cases. The study included 122 patients with the SCD (58 females) and 176 age and sex-matched control cases. When we compared the patients and control groups, the mean body weight and body mass index were significantly retarded in patients with the SCD (71.6 versus 57.8 kg and 24.9 versus 20.7 kg/m2, respectively, p= 0.000 for both), whereas the mean body heights were similar in both groups (166.1 versus 168.5 cm, p>0.05). Parallel to the retarded mean body weight, mean values of the low density lipoproteins, high density lipoproteins, and alanine aminotransferase were also lower in patients with the SCD (p= 0.000 for all). Parallel to the retarded mean body weight again, mean values of the systolic and diastolic BP were significantly lower in patients with the SCD (113.3 versus 118.8 and 72.3 versus 83.6 mmHg, respectively, p<0.01 for both).

A second paper by Helvaci et al., looked at body weight and plasma lipoproteins. The study included 122 patients with the SCD (58 females) and 176 age and sex-matched control cases, totally. Mean age of patients with the SCD was 28.6 years. The mean body weight and body mass index were significantly retarded in patients with the SCD (71.6 versus 57.8 kg and 24.9 versus 20.7 kg/m2, respectively, p= 0.000 for both), whereas the mean body heights were similar in both groups (166.1 versus 168.5 cm, p>0.05). Parallel to the retarded mean body weight, mean values of the low density lipoproteins (LDL), high density lipoproteins (HDL), and alanine aminotransferase were also lower in patients with the SCD, significantly (p= 0.000 for all). The authors concluded that body weight may be the major determining factor of LDL and HDL values in the plasma.

Almubarak et al., attempt to evaluate the prevalence of burnout among nurses working in the ICU and ED in Saudi Arabia during COVID-19 crisis, and to investigate efforts that can be made to decrease the levels of burnout while the pandemic continues. This work presents an interim analysis of data from one clinical site belonging to a larger study. An online anonymous survey was developed to measure the following domains: personal factors, occupational factors, personal opinions related to COVID-19, and burnout level. A link to this survey was distributed to ICU and ED nurses at four clinical sites by the site principal investigator. Data from one site were obtained and a descriptive interim analysis was conducted using R software. The authors found that a majority (81%) of respondents worked in the pediatric ED, and 40% had worked over 80 hours in the past two weeks. Seventy percent of the subjects expressed they were afraid of infecting people at home with COVID-19, and 68% expressed fear of getting infected themselves. Overall, 30% of respondents were classified as having moderate burnout, while only 11% had high burnout levels. The authors concluded that although burnout was prevalent in many ICUs and EDs before COVID-19, it is now more important than ever to manage and prevent it to maintain a robust healthcare workforce. The numbers from our study indicate a high prevalence of burnout among Saudi Arabian nurses, and are comparable to studies among European HCWs during COVID-19 pandemic. A question is raised as to whether burnout is an inevitable response to working in healthcare and, in that case, what levels of burnout can be considered acceptable. A new approach is needed to monitor burnout among HCWs and implement policy interventions to reduce and prevent it.

THE KNOWLEDGE AND ATTITUDE REGARDING CANCER PAIN MANAGEMENT AMONG NURSES WORKING IN CANCER CENTER; AN EXPERIENCE FROM QATAR

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Abstract

Purpose: The study aims to explore pain knowledge and attitudes of oncology nurses working in Qatar. Methods: A descriptive, cross-sectional design was used to explore nurse's knowledge and attitudes about cancer pain. The Nurses Knowledge and Attitude Survey Regarding Pain (NKASRP) survey was used. The NKASRP score differences were examined among nurses with varying demographics, levels of pain education and experience. Population of 159 oncology nurses working at National Center of Cancer Care and research (NCCCR) Qatar.

Results: The Mean NKASRP was 58%, significantly below the passing score of 80%. Nurses in palliative care unit scored significantly higher (<0.01) than nurses in other units (Hematology/Oncology). No significant differences between sex, age, and educational level were found.

Conclusion: The present study provides important information about knowledge deficit in pain management among oncology nurses and limited training regarding pain management. Palliative care nurses' scores were significantly higher than nurses in other (Hematology/Oncology) units and this was a result of a specialized palliative care course given to them. Our results support the universal concern of inadequate knowledge and attitudes of nurses regarding cancer pain. There is a need for more effective evidence-based educational programs in cancer pain management. Evaluation of the current educational pain program is also needed.

Key words: Middle East, Palliative, Cancer, Health Care Experience, Beliefs

Introduction

Pain is the most common symptom that causes suffering among patients with cancer. According to the National Institutes of Health, higher prevalence rates are reported among patients under active treatments (50–70%) and among patients in an advanced stage of disease (60–90%) [1, 2]. Furthermore, cancer pain has serious negative consequences and great influence on the overall quality of life. As stated by De Laurentis, et al., (2019) patients living with cancer pain are more prone to develop physical, emotional, and psychological distress. Therefore, pain is a significant health issue that needs to be addressed in all health care settings. Cancer pain management and treatment are complicated and require frequent assessment, reassessment, evaluation, and constant observation by health care providers.

Unlike physicians, nurses by virtue of their role within the health care organization are in a vital position to care for patients in pain. Nurses are responsible for assessing pain, identifying the cause of pain, planning the care, administering medication, and evaluating effectiveness of intervention. In addition, physicians rely on nurses' assessment in prescribing pain medication. Inadequate pain relief of cancer related pain can be attributed to nurse's lack of knowledge about pain assessment and management and incidence of narcotic addiction as well as negative attitudes regarding therapeutic level of analgesia [2]. Given the urgency of this issue, nurse's knowledge and attitudes toward pain is an important area that needs to be explored in more detail.

A series of international studies have examined nurse's knowledge and attitude toward cancer pain management including in the USA, Canada, Norway, Italy, Turkey, and China, [4- 8]. These studies concluded that nurses lack adequate knowledge about pain and pain management. Likewise, studies from the Middle East have found that oncology nurses have poor knowledge and attitude toward pain intervention [3, 9-11]. All these studies have used the same questionnaire "knowledge and attitude survey regarding pain" (NKASRP). However, the search didn't reveal any study that has been conducted in Qatar using the same tool.

Underlying factors of suboptimal pain assessment and management will result in continued patient suffering leading to further anxiety and discomfort. Barriers to cancer pain assessment and management has been discussed widely in the literature. These barriers are classified as patients, health care workers and system related barriers [9]. The most prominent factor that affects nurses' knowledge about cancer pain management was the nurses' approach which positively correlates with their previous pain education [6,12]. A qualitative study conducted by Yassin et al., (2015) in order to explore the social organization of nurses' pain management work in Qatar, concluded that there were barriers which resulted in delay of pain management. The study mentioned that nurse's knowledge about pain management was one of the reasons for delay in pain intervention.

Most of the literature search indicated that a lack of preregistration pain education programs and inadequate continuing education for nurses was the reason for poor pain knowledge [3,4,5,6,14]. Studies show that educational intervention improves the nurse's approach toward cancer pain. A study conducted by Al Qadire & Al Khalaileh to evaluate the impact of education on nurses' knowledge and attitude regarding pain management, concluded that attending a short pain course could improve nurses' knowledge and attitudes regarding pain management [12].

Currently in Qatar, there are a few pain education programs designed for oncology nurses. It is likely that nurses working in HMC rely on their basic pain education, particularly university education, to assess and manage patients in pain. Pain management is a dynamic and complex process. Thus, nurses need to be aware of the current evidence-based pain management practice. Given the urgency of this issue, this study is essential to evaluate nurses' knowledge in order to design optimal pain management strategies. Considering the aim of Qatar National Cancer Strategy, and congruent with nurses' essential role in pain management, there is an urgent need to conduct a study that addresses local nurses' knowledge and attitude toward pain intervention. Thus, the purpose of this study is to examine nurse's knowledge and attitudes towards cancer pain management and to identify factors that might affect pain management practice and ultimately, to recommend strategies to improve their knowledge.

The purpose of this study is particularly to investigate the knowledge and attitudes towards pain management among oncology nurses working in NCCCR and to identify factors that influence their knowledge and attitudes regarding pain management, then to recommend strategies to improve nurse's knowledge and attitude.

Method

Study Design, setting, sample

This research study used a descriptive-correlational design to examine demographic variables and their relationship to the knowledge and attitudes of nurses toward cancer pain management. Data were collected from (NCCCR) in Qatar from February 2018 to June 2018. A cross-sectional convenient sample of Oncology registered nurses working in cancer care who had at least 3 year of experience were invited to participate in the study. The target population was 159 nurses working in six oncology units (Hematology/ oncology) inpatient, and ambulatory care units. Nurses with all degrees (diploma, bachelor, Master) were invited to participate in the study.

Instrument

The study instrument included two parts. The first part contained nurses demographic sheet developed by the researchers which had eight items; age, gender, education level, units, years of experience in nursing, and any previous formal/informal education about Cancer Pain

Management. The second part included the Knowledge and Attitudes Survey Regarding Pain (NKASRP) that was originally developed by Ferrell and McCaffery [14]. The survey has been used widely from 1987 till present. It was last revised in 2014 to reflect changes in pain management practice. Permission was granted by the author to use the tool. The survey consists of a total 39 questions which include 22 true/false questions, 13 multiple-choice questions, and 2 case studies. Construct validity was established by comparing survey scores from different levels of expertise [10]. The authors reported the psychometric properties for KAS including test-retest reliability (r > .80) and internal consistency reliability (alpha r > .70). McCaffery and Pasero indicated that a score of 80% is the minimal acceptable score on the NKASRP [14]. The instrument was utilized in the studies conducted in Jordan, UAE, and Iran [15, 10, 16].

Data analysis

Demographic and work-related characteristics of the participants were summarized using frequency distributions. For each of the sections of the knowledge and attitudes survey (T/F section, multiple choice section MCQ, and Case studies section), the percentage of correct answers on each question was obtained. For each participant, a knowledge and attitude score ranging from 0 to 100% was obtained based on that participant's percentage of correct answers among all questions. This score was summarized using the mean, standard deviation, median and range. The associations between this score and participants work-related characteristics were assessed using the independent t-test or one-way ANOVA with multiple comparisons using the Bonferroni's method when needed. A p-value of 0.05 or less was considered statistically significant. All analysis was done using IBM-SPSS (version 25, Armonk, USA)

Results

A total of 126 oncology nurses participated in the study. Most of those nurses were females (82.5%) and of age between 30 and 49 years (91.3%). The majority had a diploma in nursing (55.6%) and worked in the Wards I, II or III (59.1%). Only about 5% had work experience below 5 years and about half received a pain course in University education (46.4%) or during employment (63.2%) with about 39% having both sets of training (See Table 1).

On the True/False Knowledge and attitude questions, the rate of correct response per question ranged between 21.3% and 90.9%. The questions with the lowest number of correct answers were: "Patients may sleep in spite of severe pain", "If the source of the patient's pain is unknown, opioids should not be used during the pain evaluation period, as this could mask the ability to correctly diagnose the cause of pain ", "Aspirin and other nonsteroidal anti-inflammatory agents are NOT effective analgesics for painful bone metastases", "Anticonvulsant drugs such as gabapentin (Neurontin) produce optimal pain relief after a single dose", " Opioids should not be used in patients with a history of substance abuse", and Vital signs are

always reliable indicators of the intensity of a patient's pain". All those questions received less than 50% correct answers. The highest rate of correct answers, with rates above 89%, were for the following 4 questions:" The term 'equianalgesic' means approximately equal analgesia and is used when referring to the doses of various analgesics that provide approximately the same amount of pain relief", "Sedation assessment is recommended during opioid pain management because excessive sedation precedes opioid-induced respiratory depression", "Narcotic/opioid addiction is defined as a chronic neurobiological disease, characterized by behaviors that include one or more of the following: impaired control over drug use, compulsive use, continued use despite harm, and craving", and "Combining analgesics that work by different mechanisms (e.g., combining an NSAID with an opioid) may result in better pain control with fewer side effects than using a single analgesic agent" (Table 2).

On the multiple-choice questions, correct answers ranged between 16.5% to 89.4% (See Table 3). Most of the participants (83.5%) didn't know that oral is the recommended route of administration of opioid analgesics for patients with persistent cancer-related pain. Similarly, 81.8% didn't know that following abrupt discontinuation of an opioid, physical dependence is manifested by sweating, yawning, diarrhea and agitation. On the other hand, the vast majority knew the peak times for morphine whether given orally (89.4%) or intravenously (89.4%). The percentage of correct answers on questions related to the two case studies ranged between 27% and 61.9% (data not shown).

The median knowledge and attitude score were 56.10% and ranged between 36.0% and 100.0% with mean± standard deviation of 58.7%±12.9%. Only 2 (1.6%) of the participants had a score of 100% correct answers, and only 7 (5.6%) had a score above 80%. A quarter (25.4%) of the participants had scores below 50% (see Table 4). There were no significant associations between the knowledge and attitudes scores and any of the demographic and work-related variables except for the Unit where the nurses work. In particular, nurses working in the Palliative Care Unit had significant higher average knowledge and attitudes score than all of the other units (p<0.01, Table 1).

Table 1: Demographic Characteristics of the sample

Variable		N	%	Knowledge and attitudes score		p-value
				Mean	SD	
Age	23-29	8	6.3%	57.0%	9.3%	0.534
	30-49	115	91.3%	59.0%	13.1%	
	50 and above	3	2.4%	51.1%	10.0%	
Gender	Male	22	17.5%	59.5%	12.5%	0.761
	Female	104	82.5%	58.6%	13.0%	
Unit	Day Care	6	4.7%	57.7%	8.3%	<0.01*
	OPD	10	7.9%	51.8%	9.8%	
	Palliative Care	18	14.2%	71.2%	14.8%	
	Urgent Care	18	14.2%	54.8%	8.8%	
	Ward I	35	27.6%	56.4%	9.8%	
	Ward II	35	27.6%	59.9%	14.4%	
	Ward III	5	3.9%	51.2%	7.7%	
Education	Diploma	70	55.6%	59.1%	12.4%	0.444
	Bachelor	51	40.5%	57.6%	13.4%	
	Masters	5	4.0%	64.9%	14.4%	
Experience	3-5 years	6	4.8%	60.6%	7.7%	0.793
	5-10 years	40	31.7%	57.5%	13.1%	
	10-15 years	45	35.7%	58.3%	12.1%	
	>15 years	35	27.8%	60.3%	14.4%	
Pain course	None	37	29.6%	0.5737	0.1306	0.728
	Only during education	9	7.2%	0.5526	0.1304	
	Only during employment	30	24.0%	0.5987	0.1117	
	Both during education and employment	49	39.2%	0.5892	0.1291	

*significant difference between units with Palliative Care significantly higher than all the other Units

Table 2: Rate of Correct answer on the T/F knowledge questions

Question	Correct/total	% correct
Patients may sleep in spite of severe pain.	26/122	21.3
If the source of the patient's pain is unknown, opioids should not be used during the pain evaluation period, as this could mask the ability to correctly diagnose the cause of pain.	41/122	33.6
Aspirin and other nonsteroidal anti-inflammatory agents are NOT effective analgesics for painful bone metastases.	49/123	39.8
Anticonvulsant drugs such as gabapentin (Neurontin) produce optimal pain relief after a single dose.	51/122	41.8
Opioid should not be used in patients with a history of substance abuse.	52/122	42.6
Vital signs are always reliable indicators of the intensity of a patient's pain.	53/124	42.7
Patients who can be distracted from pain usually do not have severe pain.	62/123	50.4
Giving patients sterile water by injection (placebo) is a useful test to determine if the pain is real.	62/122	50.8
Vicodin (hydrocodone 5 mg + acetaminophen 300 mg) PO is approximately equal to 5-10 mg of morphine PO.	67/121	55.4
Because their nervous system is underdeveloped, children under two years of age have decreased pain sensitivity and limited memory of painful experiences.	70/124	56.5
Benzodiazepines are not effective pain relievers and are rarely recommended as part of an analgesic regimen.	69/121	57.0
Respiratory depression rarely occurs in patients who have been receiving stable doses of opioids over a period of months.	73/122	59.8
The usual duration of analgesia of 1-2 mg morphine IV is 4-5 hours.	73/122	59.8
Patients' spiritual beliefs may lead them to think pain and suffering are necessary.	74/122	60.7
Children less than 11 years old cannot reliably report pain so clinicians should rely solely on the parent's assessment of the child's pain intensity.	77/121	63.6
Patients should be encouraged to endure as much pain as possible before using an opioid.	80/122	65.6
Elderly patients cannot tolerate opioids for pain relief.	100/122	82.0
After an initial dose of opioid analgesic is given, subsequent doses should be adjusted in accordance with the individual patient's response.	105/121	86.8
The term 'equianalgesic' means approximately equal analgesia and is used when referring to the doses of various analgesics that provide approximately the same amount of pain relief.	109/122	89.3
Sedation assessment is recommended during opioid pain management because excessive sedation precedes opioid-induced respiratory depression.	109/122	89.3
Narcotic/opioid addiction is defined as a chronic neurobiological disease, characterized by behaviors that include one or more of the following: impaired control over drug use, compulsive use, continued use despite harm, and craving.	108/120	90.0
Combining analgesics that work by different mechanisms (e.g., combining an NSAID with an opioid) may result in better pain control with fewer side effects than using a single analgesic agent.	110/121	90.9

Table 3: Rate of Correct answer on the MCQ knowledge questions

Question	N correct/total answers	% correct answers
The recommended route of administration of opioid analgesics for patients with persistent cancer-related pain is oral	20/121	16.5
Following abrupt discontinuation of an opioid, physical dependence is manifested by sweating, yawning, diarrhea and agitation	22/121	18.2
A patient with persistent cancer pain has been receiving daily opioid analgesics for 2 months. Yesterday the patient was receiving morphine 200 mg/hour intravenously. Today he has been receiving 250 mg/hour intravenously. The likelihood of the patient developing clinically significant respiratory depression in the absence of new comorbidity is less than 1%	30/123	24.4
5-15% of patients who develop pain are likely to have an alcohol and/or drug abuse problem	48/120	40.0
Obstructive sleep apnea is an important risk factor for opioid induced respiratory depression	61/123	49.6
A 30 mg dose of oral morphine is approximately equivalent to Morphine 10 mg IV	65/123	52.8
Individually assessing patients to determine cultural influences is the best approach for cultural considerations in caring for patients in pain	68/118	57.6
All the following: Ibuprofen, hydromorphone and Gabapentin are useful for treatment of cancer pain?	78/123	63.4
The most likely reason a patient with pain would request increased doses of pain medication is that the patient is experiencing increased pain	86/121	71.1
The recommended route of administration of opioid analgesics for patients with brief, severe pain of sudden onset, such as trauma or postoperative pain is intravenous	88/123	71.5
The most accurate judge of the intensity of the patient's pain is the patient	104/118	88.1
Analgesics for post-operative pain should initially be given around the clock on a fixed schedule	109/123	88.6
Morphine is considered the drug of choice for the treatment of prolonged moderate to severe pain for cancer patients.	109/122	89.3
The time to peak effect for morphine given IV is 15 min	110/123	89.4
The time to peak effect for morphine given orally is 1-2 hours	110/123	89.4

Table 4: Knowledge and Attitudes Score

Knowledge and attitudes Score	Summary statistic
Mean±SD	58.7±12.9
Median (Range)	56.1 (35.7, 100.0)
Score Rage	N (%)
0-49	32 (25.4%)
50-59	45 (35.7%)
60-69	26 (20.6%)
70-79	16 (12.7%)
80-89	1 (0.8%)

Discussion

This study is the first of its kind to survey knowledge and attitudes to pain and pain management among nurses working in an Oncology setting in Qatar. The purpose of this study was to explore the knowledge and attitude of nurses working in the Cancer Center regarding pain management and to find out what might be considered as barriers to provide optimal Cancer pain management.

Multiple studies have been published worldwide regarding pain and pain management practice [6-8, 17,18]. One of the largest studies is the one conduced in Norway by Utne, et al., (2019). The authors concluded that oncology nurses received pain education scores higher in NKASRP than nurses who didn't receive any prior pain education course. This reflects better knowledge in the first group. The advantage of this study is that the oncology nurses scored significantly higher and had a mean score in NKAS of 75% which indicated higher level of knowledge and good attitude toward pain. Despite the sample in the study representing all countries, in Norway most of the respondents were oncology nurses and thus there were no representatives from nurses who work in other cancer care such as hematology and palliative care.

Similar, to other areas around the world, there were studies in the Middle East that addressed the oncology nurse's knowledge and attitude toward pain management using NKASRP [3, 9, 10, 11, 13, 15]. Most of those studies concluded that level of awareness regarding cancer pain management is weak in most Arab countries regardless of the country in which the study has been performed. For instance; a study conducted in UAE found suboptimal pain knowledge and beliefs among UAE oncology nurses. The study was conducted in two large hospitals in UAE with population of 115 nurses, which significantly limits the generalizability to other populations in the UAE and the Middle East. Another limitation is that the study sample included nurses working in general oncology/Hematology units.

In contrast to the previous studies, the findings of the current study are unique. The study was conducted in a comprehensive Center (NCCCR) which consists of oncology, hematology, and palliative care units. Most of the earlier studies were conducted either in oncology or oncology and hematology settings; none of the earlier studies explored the knowledge of palliative care nurses. And the reason behind that might be that palliative care in some Western countries is delivered either through home based palliative care or through hospices care [20, 21]. Hospice care is a form of community-based palliative care predominantly serving patients and their loved-ones at the end of life. Both hospice care and palliative care is considered as supportive care for patients with advanced-stage disease [20, 21]. The current study exclusively includes nurses from three sectors of cancer care (oncology/hematology/palliative care).

One of the important findings of current study revealed that nurses working in palliative care unit had a mean NKASRP total score of 71.2% indicating a relatively high level of knowledge and good attitudes toward pain and pain management comparing to nurses in Hematology / Oncology units. The first reason for the high score is that palliative care nurses in our center have a background of hematology and oncology which can positively affect their decision about pain management. Also, palliative care nurses are dealing with highly symptomatic patients where pain is more prevalent, and they are more exposed to opioid and analgesia than nurses in hematology and oncology wards.

Another reason for high scores among palliative care nurses is prior pain education. The nurses in palliative care unit attended a palliative passport program which was designed and reviewed by the education department of NCCCR and Palliative Clinical Nurse Specialists. Palliative Care Passport is designed to improve the knowledge, skills and attitudes of nurses directly working with patients and their families who have palliative care needs, It is comprised of three days classroom contact with clinical-based activities to be undertaken once a week for a total of three weeks.

The three mainstream courses include: symptoms management, pain management and end of life care. Subsequently, Palliative care nurses' scores were significantly higher than their counterparts with no pain management education. This course was developed as a response to the recommendation of an earlier study conducted by Al-kindi et al., (2014) to assess the need for palliative education among oncology nurses in Qatar. The study concluded that there is lack of formal palliative care education including pain and pain management among palliative care nurses in Qatar.

Overall, the current study results showed that oncology nurses' knowledge and attitude toward pain and pain management was not optimal. The average NKASRP score of participants was 56.10%, lower than the passing score of 80%. This corresponds with the result of an earlier qualitative study conducted by Yassin et al., (2016) in order to explore the social organization of nurse's pain management work in Qatar. The study concluded that nurse's poor knowledge about pain management was one of the reasons for delay in pain intervention. However, comparing the result of the current study with other studies conducted in the Middle East region using the same tool indicates that the score of oncology nurses in Qatar were slightly higher than what was reported in UAE, Saudi Arabia, Jordan and Iran [10,11, 16, 17].

Surprisingly, there was no correlation between (NKASRP) scores and demographic variables (age, gender, level education, work experience and prior general pain course). 39% of the participants have attended a pain course during their education and employment, however this didn't make any difference to knowledge and attitudes of those nurses. This might be due to inadequate preparation in the nursing curriculum and in continued professional education. It has been well documented in the literature that educational programs improve nurses' knowledge and skills for pain management [13].

In the current study, there was a gap in the knowledge of pharmacology related to pain management as well as a deficit in the knowledge related to addiction and substance abuse. Specific areas of deficiency were in opioid dosing, use of opioids in patients with history of substance abuse, combination of opioid with other medications, best routes to administer analgesia, and pain assessment. Most nurses scored less than 50% in these questions which suggests that nurses have myths and misconceptions about opioid use. Similarly, prior research has found that insufficient knowledge about the physiology of pain and misconceptions about opioids side effects were the most perceived barriers that hinder Cancer Pain Management [18]. Thus, greater knowledge about pain and reinforcement of positive attitudes toward opioid use are necessary.

The participants in the survey were highly diverse in terms of culture, region and nationality. Such diversity is common in other gulf region (Saudi Arabia, UAE, and Oman) where most of the nurses working were expatriates. Although in the current study the impact of culture on oncology nurse's knowledge was not measured, Darawad, et al., found a variation of nurses' scores in NKASRP was due to cultural factors about pain assessment and management [17]. Likewise, Alqahtani and Jone reported significant differences in (NKASRP) scores among culturally heterogeneous nurse populations [8]. Therefore, there is a need for an educational program that unifies and overcomes the diversity among oncology nurses in Qatar.

The result of this study provides an overview of the knowledge and attitude of oncology nurses working in Cancer Center in Qatar. According to the World Health Organization (WHO) pain management should be achievable in up to 90% of all cancer patients and suboptimal cancer pain management will result in patient suffering [19]. Nurses play a crucial role in the treatment of patients with cancer pain. Therefore, a nurse's ability to effectively assess pain is vital to ensure that sufficient pain management is provided. The result of this study is an indication that the current pain educational program needs to be revisited. Thus, there is an urgent need to develop a specialized educational program for cancer pain management. In addition, nursing universities can benefit from this research by developing curricula that incorporates pain assessment and management.

Conclusion

The present study explored the knowledge and attitudes of nurses working in a Cancer center in Qatar. The overall results show that nurses have suboptimal knowledge about cancer pain assessment and management. Palliative care nurses scored higher than nurses in oncology and hematology units due to several reasons, one of which is their involvement in a prior specialized course. Therefore, pain management education needs to go beyond traditional training. Specialized courses for pain management are required to improve nurse knowledge and skills regarding cancer pain assessment and management. The organization and quality development should encourage continued professional development activities and encourage upgrading the level of pain management courses.

Data availability

The datasets generated and/or analyzed in the current study are not available publicly as eligible patients were informed at the time of the survey that their data would be stored securely and confidentially.

Code availability: not available

Compliance with Ethical Standards

Funding: not applicable

Ethics approval:

The study was approved by the Medical Research Center (MRC) as well as the research committee at NCCCR. Participants who met the inclusion criteria were provided with explanations regarding the purpose, study nature, the benefits and risks and measured to protect confidentiality and privacy of the participants. The surveys did not include identification that would tie the individual nurse to the survey. Furthermore, participants were informed that their participation is voluntary, and they need to complete the questionnaire in the hospital, in private room

Consent to participate:

Verbal consent was obtained from all participants prior to participate in the study (as per the requirements for the Hamad Medical Corporation, Medical Research Center).

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MONITORING BURNOUT IN THE INTENSIVE CARE UNIT AND EMERGENCY DEPARTMENT DURING THE COVID-19 PANDEMIC: THE SAUDI ARABIAN EXPERIENCE

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Abstract

Background: Burnout among healthcare workers (HCWs) is a prolonged unhealthy response to chronic interpersonal and emotional stress originating in the workplace. Prior to the coronavirus disease 2019 (COVID-19) pandemic, burnout was prevalent among HCWs in many intensive care units (ICUs) and emergency departments (EDs) around the world. In the present study, we aimed to evaluate the prevalence of burnout among nurses working in the ICU and ED in Saudi Arabia during the COVID-19 crisis, and to investigate efforts that can be made to decrease the levels of burnout while the pandemic continues.

Methods: This work presents an interim analysis of data from one clinical site belonging to a larger study. An online anonymous survey was developed to measure the following domains: personal factors, occupational factors, personal opinions related to COVID-19, and burnout level. A link to this survey was distributed to ICU and ED nurses at four clinical sites by the site principal investigator. Data from one site were obtained and a descriptive interim analysis was conducted using R software.

Results: Forty-seven surveys were available for analysis. A majority (81%) of respondents worked in the pediatric ED, and 40% had worked over 80 hours in the past two weeks. Seventy percent of the subjects expressed they were afraid of infecting people at home with COVID-19, and 68% expressed fear of becoming infected themselves. Overall, 30% of respondents were classified as having moderate burnout, while only 11% had high burnout levels.

Discussion: Although burnout was prevalent in many ICUs and EDs before COVID-19, it is now more important than ever to manage and prevent it to maintain a robust healthcare workforce. The numbers from our study indicate a high prevalence of burnout among Saudi Arabian nurses, and are comparable to studies among European HCWs during the COVID-19 pandemic. A question is raised as to whether burnout is an inevitable response to working in healthcare and, in that case, what levels of burnout can be considered acceptable. A new approach is needed to monitor burnout among HCWs and implement policy interventions to reduce and prevent it.

Key words: Occupational health, burnout, nurse, intensive care unit, COVID-19, disease outbreak, Saudi Arabia.

Introduction

Burnout among healthcare workers (HCWs) has been defined as a prolonged deleterious response to chronic interpersonal and emotional stress arising from attending to patients as part of their work (1). Workplace circumstances that increase the risk of burnout include expending excessive effort and time at work without having enough subsequent recovery time to stabilize to normal (1).

A formalized measurement for burnout was established with the Maslach Burnout Inventory (MBI), which allowed measurement and study of burnout (1,2). Burnout is now recognized as an occupational hazard in healthcare, and is linked to many negative outcomes, including decreased HCW wellbeing, quality of care provided, and patient safety, among others (1). Most importantly, burnout in HCWs leads to the depletion of the workforce. Studies reveal a pattern where burned out HCWs have a high rate of job turnover and low job satisfaction (3,4). Burnout among HCWs also leads to absenteeism, since the worker develops symptoms that lead them to stay home from work (5,6). Burnout is also a factor influencing intention of early retirement in HCWs (7).

Prior to the global coronavirus disease 2019 (COVID-19) pandemic, there were already issues with high rates of burnout in healthcare workforces in different countries, especially among critical care nurses and HCWs in intensive care units (ICUs) and emergency departments (EDs) (8,9). These issues were exacerbated at the beginning of the COVID-19 epidemic, especially in areas that were hit hard, such as China (10). Since Wuhan, China, was the initial epicenter of the epidemic, the Chinese government dispatched over 40,000 HCWs to work in field hospitals in Wuhan and Hubei province (10). Since many field hospitals were deployed early in the outbreak in China, there was little knowledge of infection control around COVID-19 (10,11). Although personal protective equipment (PPE), isolation, disinfection of surfaces, and other measures were recommended, it was not clear that there was sufficient PPE for the workers early in the outbreak, and that there was sufficient knowledge of infection control measures (10,11). Sadly, over 3,000 Chinese HCWs became infected with COVID-19 and there were 22 deaths (10). Reviewing this situation, researchers found that not only were there issues with PPEs and infection control knowledge among HCWs, there was also mounting pressure on them due to work intensity and lack of rest, and this could have contributed negatively to their outcomes (10). This issue highlights the challenges of managing an ongoing pandemic such as COVID-19, where HCWs need to work long hours and learn a new protocol, are exposed to potential infection, and may not have all the supplies necessary throughout the crisis.

Researchers have studied the impact of COVID-19-related stay-at-home and other policies on the general public, and have found serious mental health consequences (12). Alkhamees and colleagues conducted an anonymous survey of the general public in Saudi Arabia using an online social media administration approach, and found that HCWs, women, students, and those with poor self-reported health scores were more likely to experience higher levels of stress, anxiety, and depression (13). This highlights the humanity of HCWs and the fact that, similarly to everyone else, they are also suffering because of the disruptions in their families and lifestyle due to COVID-19.

Saudi Arabia may have been better positioned than other countries to respond to COVID-19 (14). Saudi Arabia has experience with implementing changes to the healthcare system to respond to viral outbreaks during the Middle East Respiratory Syndrome (MERS)-related public health emergency, and has studied the impact on its health professionals (15,16). However, even though this experience has led to an extensive well-managed public health infrastructure, there are still lingering issues. Alsahafi and Cheng surveyed HCWs in Saudi Arabia in 2015 after what had been a prolonged MERS outbreak that started in 2012 (15). Their sample was comprised of approximately 57% nurses, and the rest were physicians and other HCWs (15). In this survey, researchers found that 61% of HCWs reported anxiety about contracting MERS, and among those who had been investigated for suspected MERS, half of them reported decreases in performance after the investigation (15). In the study, HCWs also seemed not to be well-informed about MERS: less than half of the physicians and only about 30% of the nurses and other HCWs were aware that MERS could be asymptomatic (15). The authors concluded that the knowledge about MERS in this occupational cohort was poor, and that better training to use PPEs and other infection control methods was needed (15). Another study of MERS knowledge in HCWs in the Najran region of Saudi Arabia was conducted more recently, and showed a similar result, with only 51% of participants having sufficient knowledge of MERS (16).

In Saudi Arabia, the healthcare workforce is comprised of both Saudis, and ex-patriate "non-Saudis" who are employed as guest workers. The greater proportion of the ICU and ED nurses in Saudi Arabia is made up of non-Saudis, although Saudis are welcome to work in these roles (17). Saudi Arabia's healthcare system consists of a large, well-networked public system with medical cities centered in urban areas, with more distant regions served by primary healthcare centers (18). All healthcare services are offered to citizens by the government and to non-citizens through their employers. Starting on March 2, 2020, when Saudi Arabia saw its first case of COVID-19, Saudi's health authority began implementing containment policies, and ordered that all individuals in Saudi Arabia would receive COVID-19 treatment free of charge. (19). However, cases climbed from 1,563 on April 1 to over 20,000 on April 29 (19). By summer, community transmission was brought under control and stabilized, and containment policies continued (19). Although the initial outbreak was under control, there was still risk of viral transmission through the population, and the disease continued to be deadly for some (19).

Management of COVID-19 patients in the ICU and the ED puts a high demand on HCWs because of the severe complications (20). Pre-COVID-19, Alharbi and colleagues surveyed 150 critical care nurses in Saudi Arabia and reported that they had moderate to high levels of burnout, and experienced low job satisfaction (21). A more recent study of anxiety in HCW in Saudi Arabia of those working during COVID-19 found that nurses were experiencing higher anxiety than other professions (22). It anticipated that, like with China, Saudi Arabia will need to plan for the situation of burnout becoming chronic in this workforce, which will be needed into the future. Now is the time to make efforts to prevent the progression of burnout in these HCWs to avoid as this could lead to a shortage of workers. Therefore, we conducted a study to evaluate the prevalence of burnout among nurses working in a public hospital in Saudi Arabia during COVID-19, and discussed the efforts that could be made to reduce the likelihood of continued burnout.

Methods

This study represents an interim analysis of data being collected as part of a larger study involving four medical centers in Saudi Arabia. The larger study is a cross-sectional survey of HCWs in ICUs and EDs in Saudi Arabia who are working during COVID-19 pandemic.

Participants and study setting

This study is being conducted at four public medical centers in Saudi Arabia. To be eligible to participate in the survey, respondents must be licensed nurses who are HCWs in an ICU or ED in one of these four public medical centers. Also, they need to have worked in the past two weeks in their position at the public medical center.

Questionnaire

The survey contained the following domains: personal factors, occupational factors, personal opinions related to COVID-19, and a measurement for burnout.

Personal and occupational factors

The survey asked about personal and occupational factors that constitute risk factors for burnout: age in years, sex (male or female), citizenship (Saudi or non-Saudi), number of adults and children in the household, primary practice location, number of clinical hours worked in the past two weeks, frequency of night shift work, length of shifts, treating or not treating COVID-19 patients at work, dealing or not dealing with end-of-life issues at work, and years of experience working in ICU or ED (1,10).

Personal opinions related to COVID-19

Respondents were asked to rate their agreement with eight statements on a scale of 1 to 5, with 1 meaning Strongly Disagree and 5 meaning Strongly Agree. No other anchoring labels were given to the levels of 2, 3, and 4, so these were added: 2 = Somewhat Disagree, 3 = Neither Agree nor Disagree, and 4 = Somewhat Agree). The statements were derived from fears reported by HCWs in China during the COVID-19 epidemic and from the burnout literature, and included not being able to control work schedules, shifts being too long, being afraid

of getting COVID-19 due to lack of PPE, being afraid of not having access to a COVID-19 test, being afraid of getting sick and not being able to work, being afraid of getting sick and even dying which would cause a problem for the family, and bringing home COVID-19 infection to housemates (1,10).

Respondents were also asked what strategies they use to de-stress from work, since those can impact on burnout, and were given a checklist (23–26). The strategies "Exercise", "Meditation", "Engage in sports", "Prayer", and "Taking courses/education" were chosen for analysis because we considered that these could be promoted by workplace policies.

Burnout measurement

To measure burnout, the emotional exhaustion (EE) subscale of the Maslach Burnout Inventory-Human Services Survey (MBI-HSS) was used (2,27). This includes seven statements about how the HCW feels at work, which are rated with the following scale: 0 = Never, 1 = A few times per year, 2 = Once a month, 3 = A few times per month, 4 = Once a week, 5 = A few times per week, and 6 = Every day. An example statement is: "I feel emotionally drained by my work". The EE subscale is scored by adding together the points associated with the ratings for each statement. Scores of 17 or less are considered low burnout, scores of 18 through to 29 are considered moderate burnout, and scores of 30 and greater are considered high burnout.

Survey administration

The data of the larger study are still being collected anonymously through the online survey software, QPlatform (28). Data collection is currently taking place at four clinical sites which are public medical centers with multiple ICUs and EDs. For each site, the site principal investigator receives a unique link for the survey for respondents at that site. This site principal investigator e-mails this link to HCWs in the ICU and EDs at the site and encourages them to complete it. The study is anticipated to be completed in early 2021. The data analyzed here were collected from one of these four sites, a large hospital with over 1,000 beds, between August 22 and September 7, 2020, and included 50 respondents.

Data analysis

Data analysis was performed with R (29). ggplot2, Likert and upsetR packages were used for data visualization.

Results

At the time of the interim analysis, 50 records were available from one study site. Three records were missing data and were removed, leaving 47 complete records for further analysis. The distribution of number of hours worked in the past two weeks among those who responded was skewed left (see Figure 1).

As shown in Figure 1, most of the nurses completing the survey were from the ED setting, not the ICU. Table 1 (page 32) provides a descriptive analysis of the participants in the survey.

Figure 1: Figure 1. Distribution of hours worked in the past two weeks. Adult ED = adult emergency department, Ped ED = pediatric emergency department.
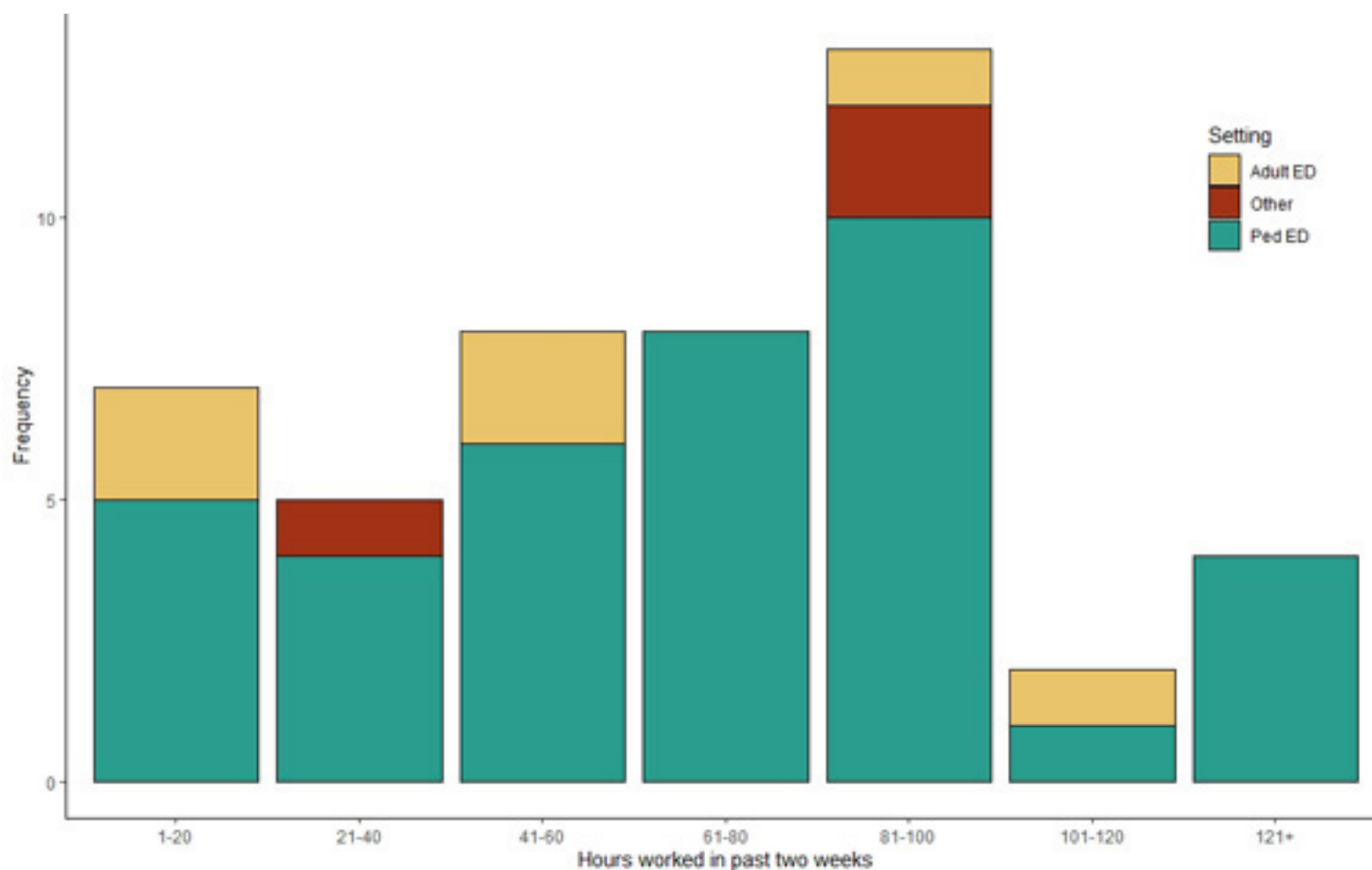
As shown in Table 1, most of the respondents worked in the pediatric ED (n = 38, 81%), were less than 35 years of age (n = 26, 55%), were female (n = 41, 87%), and were non-Saudi (n = 44, 94%). Very few lived alone (n = 4, 9%), and most lived in households without children (n = 39, 83%). Over two thirds had more than five years of experience working in the ED (n = 32, 68%). In the two weeks before they completed the survey, over half of the respondents reported treating COVID-19 patients (n = 29, 62%), and another fifth said they treated patients without knowing their COVID-19 status (n = 10, 21%). Over three quarters had worked more than twice on the night shift in the past two weeks (n = 37, 79%). Overall, a majority of the survey participants were in the low burnout category, but 14 (30%) had moderate burnout, and 5 (11%) were experiencing high burnout.

Because the questions were about work over the last two weeks, and considering a full-time work week at 40 hours, we classified the sample as to those working 80 hours or more in the past two weeks, and compared them to those who worked less than 80 hours in the past two weeks. A total of 19 (40%) respondents worked 80 or more hours in the past two weeks and, among those, five (26%) were experiencing moderate burnout, and 2 (11%) were experiencing high burnout. However, the sample was too small for bivariate testing, and no discernable patterns emerged.

Figure 2 shows the distribution of responses to Likert-scale questions about COVID-19, providing a visual depiction of the responses to the eight statements on opinions about COVID-19.

The statements that were rated are listed along the y-axis of the figure, and each bar corresponds to the distribution of ratings. The center vertical line marks the neutral choice, "Neither Agree nor Disagree". The grey field represents the percentage of respondents who chose this neutral choice (which was 3 on the survey) as their response to the statement, and this percentage is listed on the grey field. To the right, the light and dark green fields indicate the percentage of sample choosing either 4 or 5 (labeled "Somewhat Agree" or "Strongly Agree") as their statement rating (see legend), and this percentage is printed on the right side. On the left side, the light and dark gold fields indicate the percentage of sample choosing either 1 or 2 (labeled "Somewhat Disagree" or "Strongly Disagree") as their rating (as shown in the legend), with the percentage listed on the left side. The statements are arranged in order of the largest percentage of the ratings of 4 and 5 together downward.

As shown in Figure 2, four of the eight statements had over 50% agreement as seen on the right side of the figure. The largest was 70% agreement with the statement, "I am afraid of getting COVID-19 at work and bringing it home to my household and infecting people there." The people in the household were more

Table 1. Descriptive analysis of the sample

| Category	Level	Total n, %	Worked up to 80 hours in previous two weeks n, %	Worked 80 + hours in the previous two weeks n, %
All	All	47, 100%	28, 60%	19, 40%
Primary practice setting	Pediatric emergency department	38, 81%	23, 82%	15, 79%
	Adult emergency department	6, 13%	4, 14%	2, 11%
	All others*	3, 6%	1, 4%	2, 11%
Age group	< 35 years	26, 55%	18, 64%	8, 42%
	35 to 44 years	11, 23%	6, 21%	5, 26%
	45 years and older	10, 21%	4, 14%	6, 32%
Gender	Female	41, 87%	25, 89%	16, 84%
	Male	6, 13%	3, 11%	3, 16%
Citizenship	Saudi	3, 6%	25, 89%	16, 84%
	Non-Saudi	44, 94%	3, 11%	3, 16%
Adults in household	Lives alone	4, 9%	3, 11%	1, 5%
	Lives with one to three other adults	30, 64%	18, 64%	12, 63%
	Lives with more than three other adults	13, 28%	7, 25%	6, 32%
Children in household	No children in household	39, 83%	24, 86%	15, 79%
	One to two children in household	6, 13%	3, 11%	3, 16%
	More than two children in household	2, 4%	1, 4%	1, 5%
Emergency department experience	Less than one year	1, 2%	1, 4%	0, 0%
	One to five years	13, 28%	6, 21%	7, 37%
	More than five years	32, 68%	20, 71%	12, 63%
	Never worked in emergency department setting	1, 2%	1, 4%	0, 0%
Treating COVID-19 patients at work in past two weeks	Yes	29, 62%	17, 61%	12, 63%
	No	7, 15%	5, 18%	2, 11%
	I treated patients, but I did not know the COVID-19 status of the patients I treated	10, 21%	5, 18%	5, 26%
	I did not treat any patients at work in the last two weeks	1, 2%	1, 4%	0, 0%
How often worked on night shift in past two weeks	Not at all	8, 17%	4, 14%	4, 21%
	Once or twice	2, 4%	2, 7%	0, 0%
	More than two times	37, 79%	22, 79%	15, 79%
Burnout levels	Low	28, 60%	16, 57%	12, 63%
	Moderate	14, 30%	9, 32%	5, 26%
	High	5, 11%	3, 11%	2, 11%

* In a pool of nurses working among different emergency departments (1), In a pool of nurses working among intensive care units and emergency departments (1), and pediatric intensive care unit (1).

Figure 2. Distribution of opinion on Likert-scale statements. This provides a visualization of the responses to the eight statements about COVID-19 that respondents rated. The statements are listed along the y-axis, and each bar corresponds to the distribution of answers. The center vertical line indicates the neutral choice, "Neither Agree nor Disagree". The grey area represents the percentage of respondents who chose this level as their response to the statement, and this percentage is listed on the grey area. To the right, the light and dark green indicate the percentage of sample choosing "Somewhat Agree" or "Strongly Agree" as their response to the statement (as shown on the legend), and this percentage is listed on the right side. On the left, the light and dark gold indicate the percentage of sample choosing "Somewhat Disagree" or "Strongly Disagree" as their response (per the key on the figure), with the percentage listed on the left.
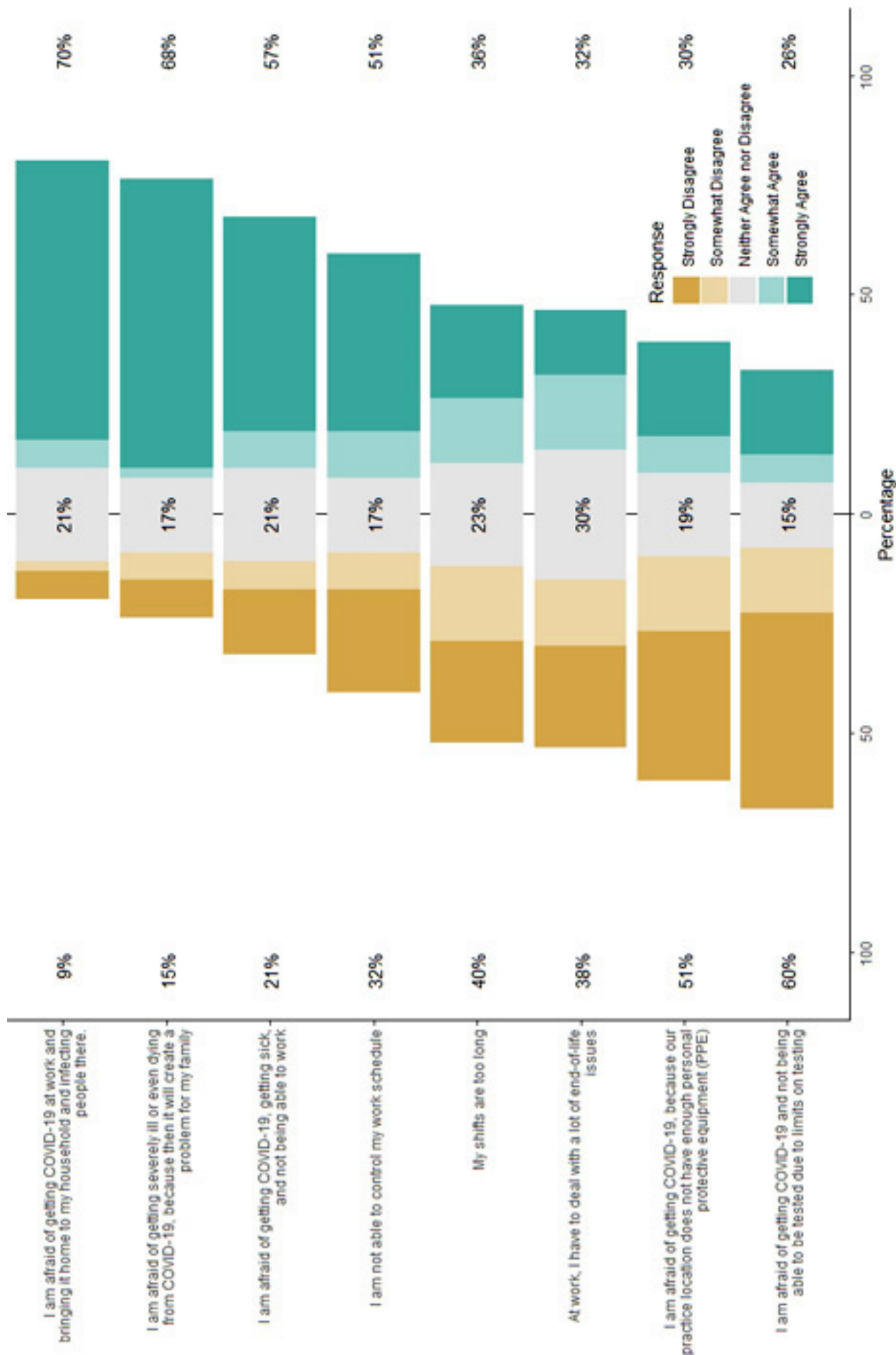
Figure 3. Pattern of preferred activities to destress from work. This provides an upset plot showing the patterns preferred activities for destressing from work.
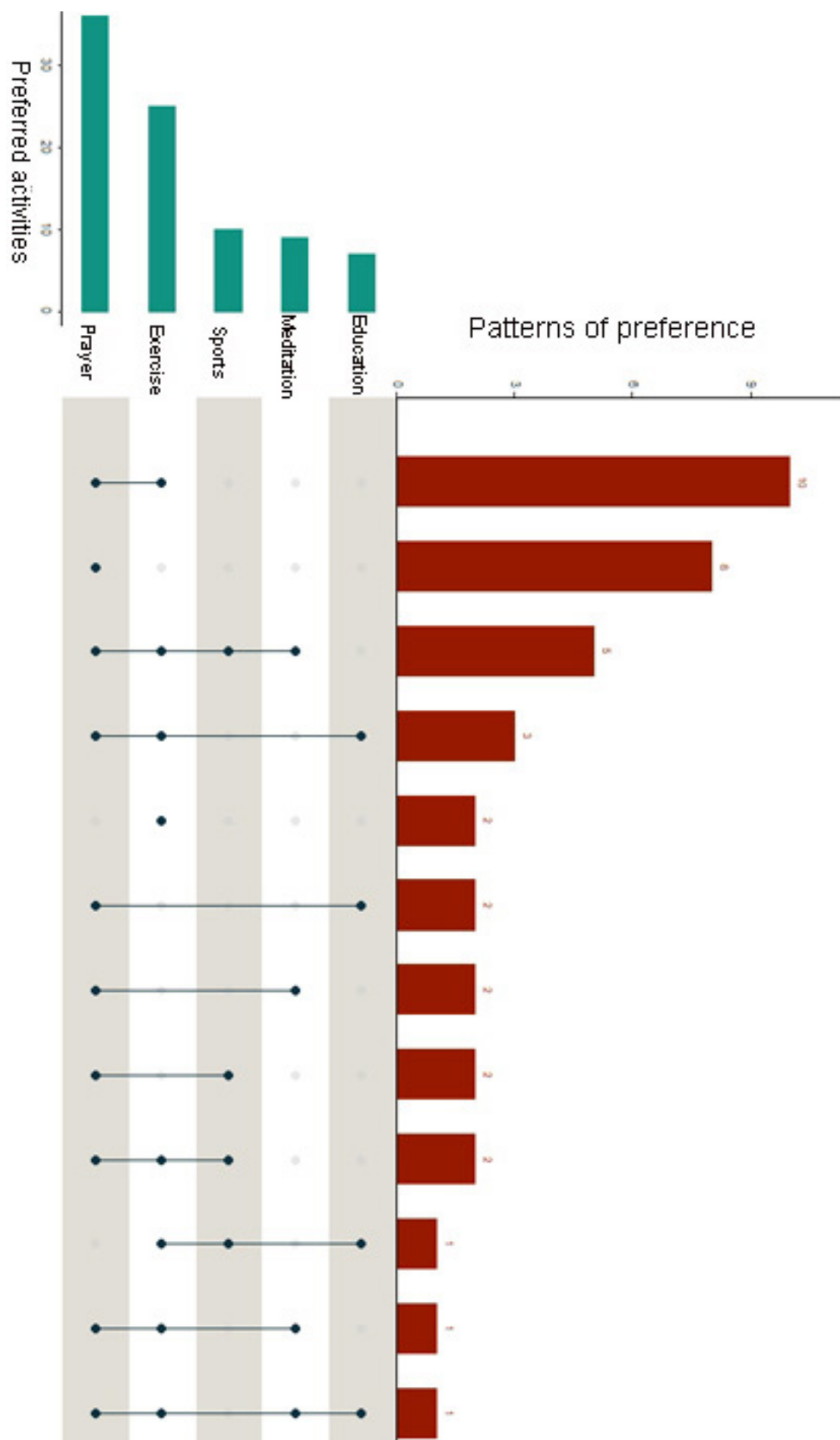
likely to be other adult non-Saudis who are in Saudi Arabia for work purposes (Table 1). The second largest agreement (68%) was with the statement, "I am afraid of getting severely ill or even dying from COVID-19, because then it will create a problem for my family." The third statement "I am afraid of getting COVID-19, getting sick, and not being able to work" had a 57% agreement, and the fourth statement "I am not able to control my work schedule" presented a 51% agreement. The statements with the lowest levels of agreement were: "My shifts are too long" (36%), "At work, I have to deal with a lot of end-of-life issues" (32%), "I am afraid of getting COVID-19 because our practice location does not have enough PPE" (30%), and "I am afraid of getting COVID-19 and not being able to be tested due to limits on testing" (26%).

Responses to the question "What strategies do you use to destress from work?" are visualized in Figure 3. By far, prayer and exercise are the most popular ways to destress from work, much more popular than education, meditation, and sports. In fact, the pattern of preferring both exercise and prayer was the most prevalent pattern.

Discussion

In our interim analysis including 47 ICU and ED nurses from a public hospital in Saudi Arabia working during COVID-19, the combined prevalence of moderate or high burnout was 41%, with 11% for high burnout alone. These numbers are difficult to benchmark and interpret, because burnout has been endemic in healthcare globally for decades (30,31). It is not clear whether this numerical rate is materially different from what was found in the survey of 150 critical care nurses in Saudi Arabia before the outbreak, which showed high rates of moderate and high burnout, and low job satisfaction (21). But because the respondents also reported working frequent, long shifts, including night shifts, and because COVID-19 is not abating soon, these burnout rates are expected to rise. This could mean that Saudi Arabia, similar to other nations, might see the burnout of their healthcare workforce during a global pandemic if interventions are not implemented immediately.

This leads to the question: Is there an acceptable level of burnout? And if we are lowering it, what should be our target? A survey of intensivists in Europe working during COVID-19 used the MBI-HSS and found that 51.8% had an overall score indicating high level burnout, with an additional 23% having moderate burnout (30). Spanish researchers used the MBI-HSS to measure burnout in 1,422 HCWs in Madrid who were working during COVID-19 and for EE, they found a rate of 41% in the high burnout category, and 23.1% in the moderate burnout category (32). These findings are consistent with the study mentioned earlier, where among HCWs in Saudi Arabia working during COVID-19, nurses had a comparatively higher anxiety level (22). These numbers look both unacceptable and unsustainable, and make the numbers that come from this smaller sample in Saudi Arabia look better. But this does not answer the question of what the right numbers should be.

Contracting COVID-19 on the job and bringing it home to infect others, as well as workers getting sick themselves, are realistic fears for these individuals. While it is encouraging that only about a quarter of respondents said they feared they could not get tested if needed, these areas still provide an opportunity to improve and reduce the reasons for their fears. Focusing on these areas can also improve control of the spread of COVID-19 in general, is it is often transmitted through the HCW population. Even well-intended hospital management in Saudi Arabian may not realize that their staff is lacking knowledge, as was observed by the studies on the MERS outbreaks (15,16). There may be testing or PPE available, but the HCWs may not know the policies well, or understand the reasons for them. Simply ensuring that HCWs are well-educated on the policies and protocols would help them adjust their risk assessments and hopefully give them a better sense of control over their environment.

Policy interventions could help with this issue in ways other than simply ensuring that protocols and policies are known and followed. COVID-19 fears in HCWs could be mitigated by ensuring the highest level of safety and protection from infection in their occupational environment. Additional monetary and practical support for workers who contract COVID-19 at work could reduce the fear of getting sick and not being able to perform their job. Supplying adequate PPE and removing all barriers to HCWs being tested would help reduce these realistic fears. Also, giving workers more control over their schedule would not only reduce the situation with having too many shifts, too many night shifts, and too long shifts, but would also provide the worker some locus of control.

Even with these policy interventions to reduce potential risk factors, since HCW COVID-19 fears are realistic, HCWs in this situation will likely be anxious regardless of what is done in the environment. This means that it is important to make the environment less stressful. The most popular pattern of destressing activities reported in the activities we analyzed was "prayer" and "exercise". Setting aside private, dedicated spaces in the workplace for prayer, stretching and using exercise equipment could help this group, as long as they are provided time and ability to access it.

This discussion, however, skirts a larger issue, which is what the actual number should be when we are measuring burnout rates in HCWs. Even if we create an ideal workplace, it might not be reasonable to bring this rate to zero because burnout is a personal reaction. It has been suggested that HCW burnout in the ICU and ED should be seen in the way that errors rates are seen in a laboratory: as an inevitable outcome of the system, meaning that it is our responsibility to manage them, and make them as low as possible (33). This suggests that there is no official target number for rate of burnout, but that benchmarking should be done, as we have to try to troubleshoot ways to lower it. Especially during COVID-19, burnout should be seen as a chronic workforce problem that needs to be continually managed and kept within control limits.

In conclusion, our interim analysis of survey data from ICU and ED nurses working in a public hospital in Saudi Arabia during the COVID-19 pandemic showed that 41% were experiencing either moderate or high burnout, and that they feared getting the disease, and bringing it home and infecting their household. Health care authority needs to put every possible effort into supporting our healthcare workforces during the COVID-19 crisis, so that there is no shortage of workers before the pandemic resolves.

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BODY WEIGHT AND BLOOD PRESSURE

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Abstract

Background: Body weight may have some effects on systolic and diastolic blood pressure (BP) in the body.

Methods: The study was performed in the Hematology and Internal Medicine Polyclinics on patients with sickle cell diseases (SCD) and routine check up cases.

Results: The study included 122 patients with the SCD (58 females) and 176 age and sex-matched control cases, totally. Mean age of patients with the SCD was 28.6 years. When we compared the patients and control groups, the mean body weight and body mass index were significantly retarded in patients with the SCD (71.6 versus 57.8 kg and 24.9 versus 20.7 kg/m2, respectively, p= 0.000 for both), whereas the mean body height was similar in both groups (166.1 versus 168.5 cm, p>0.05). Parallel to the retarded mean body weight, mean values of the low density lipoproteins, high density lipoproteins, and alanine aminotransferase were also lower in patients with the SCD (p= 0.000 for all). Parallel to the retarded mean body weight again, mean values of the systolic and diastolic BP were significantly lower in patients with the SCD (113.3 versus 118.8 and 72.3 versus 83.6 mmHg, respectively, p<0.01 for both).

Conclusion: Body weight may be the major determining factor of systolic and diastolic BP in the body.

Key words: Body weight, body mass index, blood pressure, metabolic syndrome

Introduction

Chronic endothelial damage may be the most common type of vasculitis, and the leading cause of end-organ insufficiency, early aging, and premature death in human beings (1-4). Much higher blood pressure (BP) of the afferent vasculature may be the major underlying mechanism by inducing recurrent injuries on vascular endothelium. Probably, whole afferent vasculature including capillaries are mainly involved in the process. Therefore the term of venosclerosis is not as famous as atherosclerosis in the literature. Due to the chronic endothelial damage, inflammation, edema, and fibrosis, vascular walls thicken, their lumens narrow, and they lose their elastic nature, which eventually reduces blood flow to the terminal organs and increases systolic BP further. Some of the well-known underlying causes or indicators of the inflammatory process are physical inactivity, sedentary lifestyle, animal-rich diet, smoking, alcohol, overweight, hypertriglyceridemia, dyslipidemia, impaired fasting glucose, impaired glucose tolerance, white coat hypertension, chronic inflammation, prolonged infections, and cancers for the development of terminal consequences including obesity, hypertension (HT), diabetes mellitus (DM), cirrhosis, peripheric artery disease (PAD), chronic obstructive pulmonary disease (COPD), coronary heart disease (CHD), chronic renal disease (CRD), mesenteric ischemia, osteoporosis, stroke, dementia, other end-organ insufficiencies, early aging, and premature death (5-7). Although early withdrawal of the underlying causes can delay terminal consequences, after development of HT, DM, cirrhosis, COPD, CRD, CHD, PAD, mesenteric ischemia, osteoporosis, stroke, dementia, other end-organ insufficiencies, and early aging, endothelial changes cannot be reversed completely due to their fibrotic natures The underlying causes and terminal consequences are researched under the titles of metabolic syndrome, aging syndrome, or accelerated endothelial damage syndrome in the literature, extensively (8-10). On the other hand, sickle cell diseases (SCD) are chronic inflammatory processes on vascular endothelium terminating with accelerated atherosclerosis induced end-organ failure and a shortened survival in both genders (11, 12). Hemoglobin S (Hb S) causes loss of elastic and biconcave disc shaped structures of red blood cells (RBC). Probably loss of elasticity instead of shape is the main pathology since sickling is rare in peripheric blood samples of the patients with associated thalassemia minor, and human survival is not affected in hereditary spherocytosis or elliptocytosis. Loss of elasticity is present during the whole lifespan, but exaggerated with inflammations, infections, and various stresses of the body. The hard RBC induced chronic endothelial damage, inflammation, and fibrosis terminate with disseminated tissue hypoxia all over the body (13, 14). As a difference from other causes of chronic endothelial damage, the SCD may keep vascular endothelium particularly at the capillary level (15), since the capillary system is the main distributor of the hard RBC into the tissues. The hard cells induced chronic endothelial damage builds up an advanced atherosclerosis in younger ages of the patients. Vascular occlusions induced ischemia and infactions are the final consequences of the SCD, so the mean life expectancy is decreased by 25 to 30 years in the SCD (16).

Material and Methods

The study was performed in the Hematology and Internal Medicine Polyclinics of the Mustafa Kemal University on patients with the SCD and routine check up cases between March 2007 and April 2010. Only patients with the SCD on silent phase instead of the patients with painful crises were included into the study. SCD were diagnosed by the hemoglobin electrophoresis performed via high performance liquid chromatography. The control cases were age and sex-matched cases with the SCD. The medical history of all cases including already used medications was learnt, and a routine check up procedure including fasting plasma glucose (FPG), low density lipoproteins (LDL), high density lipoproteins (HDL), triglycerides (TG), and alanine aminotransferase (ALT) values were performed. Body weight and height were measured, and body mass index (BMI) of each case was calculated by the same physician instead of verbal expressions. Weight in kilograms is divided by height in meters squared (17). Systolic and diastolic BP were checked after a 5 minute rest in seated position by using the mercury sphygmomanometer (ERKA, Germany) with the same physician again, and no smoking was permitted during the previous 2 hours. Eventually, the mean body weight, height, BMI, FPG, LDL, HDL, TG, ALT, and systolic and diastolic BP were detected in each group, and compared in between. Mann-Whitney U Test, Independent-Samples t Test, and comparison of proportions were used as the methods of statistical analyses.

Results

The study included 122 patients with the SCD (58 females) and 176 age and sex-matched control cases (84 females), totally. The mean age of patients with the SCD was 28.6 years. When we compared the patients and control groups, the mean body weight and BMI were significantly retarded in patients with the SCD (71.6 versus 57.8 kg and 24.9 versus 20.7 kg/m2, respectively, p= 0.000 for both), whereas the mean body heights were similar in both groups (166.1 versus 168.5 cm, p>0.05). The mean values of the FPG were unchanged between the patients and control groups (93.9 versus 94.7 mg/dL, respectively, p>0.05), and the mean value of TG was higher in patients with the SCD, but the difference was non-significant (120.1 versus 112.1 mg/dL, p>0.05). Parallel to the retarded mean body weight and BMI, the mean values of LDL (74.0 versus 109.6 mg/dL), HDL (24.4 versus 42.6 mg/dL), and ALT (34.9 versus 56.7 U/L) were also lower in patients with the SCD, significantly (p= 0.000 for all). Parallel to the retarded mean body weight again, mean values of the systolic and diastolic BP were significantly lower in patients with the SCD (113.3 versus 118.8 and 72.3 versus 83.6 mmHg, respectively, p<0.01 for both) (Table 1). On the other hand, six patients with the SCD (three females and three males with mean ages of 32.3 and 29.3 years, respectively) were lost due to intercurrent infections induced sepsis, and there were pulmonary HT

Table 1: Characteristic features of the study cases

Variables	Sickle cell cases	Control cases	p-value
Number	122	176	
Female ratio	47.5% (58)	47.7% (84)	Ns*
Mean age (years)	28.6 ±10.2 (14-59)	28.6 ±8.2 (15-58)	Ns
Mean weight (kg)	57.8 ± 11.0 (31-83)	71.6 ± 14.4 (43-111)	0.000
Mean height (cm)	166.1 ±9.1 (145-188)	168.5 ±10.0 (137-195)	Ns
Mean BMI‡ (kg/m²)	20.7 ± 2.9 (14.7-29.9)	24.9 ± 4.3 (17.3-41.2)	0.000
Mean FPG‡ (mg/dL)	93.9 ±13.8 (56-119)	94.7 ±12.0 (63-160)	Ns
Mean LDL§ (mg/dL)	74.0 ± 29.8 (24-164)	109.6 ± 29.6 (43-231)	0.000
Mean HDL‖ (mg/dL)	24.4 ± 7.8 (9-45)	42.6 ± 11.0 (24-91)	0.000
Mean triglycerides (mg/dL)	120.1 ±63.9 (31-348)	112.1 ±65.0 (27-388)	Ns
Mean ALT¶ (U/L)	34.9 ± 20.5 (11-125)	56.7 ± 26.6 (20-168)	0.000
Mean systolic BP** (mmHg)	113.3 ± 14.9 (80-150)	118.8 ± 16.6 (80-170)	0.008
Mean diastolic BP (mmHg)	72.3 ± 9.9 (60-100)	83.6 ± 10.7 (60-110)	0.000

*Nonsignificant (p>0.05) †Body mass index ‡Fasting plasma glucose §Low density lipoproteins ‖High density lipoproteins ¶Alanine aminotransferase **Blood pressure

in two, cirrhosis in two, and cirrhosis plus CRD in one of them. Additionally, all of the lost six patients were Hb SS in nature.

Discussion

HT may result from a complex interaction of genes and environmental factors. It is a sign that heart and blood vessels are being overworked. In most people with HT, increased total peripheral resistance accounts for HT while cardiac output remains normal (18). The increased peripheral resistance is mainly attributable to structural narrowing of small arteries and arterioles, although a reduction in the number of capillaries may also contribute (19). HT is rarely accompanied by symptoms in the short-term. Symptoms attributed to HT may actually be related with associated anxiety rather than HT itself. However, HT may be a major risk factor for CHD, PAD, CRD, cirrhosis, COPD, stroke, and dementia-like end-organ insufficiencies in the long-term. For example, a reduction of the BP by 5 mmHg can decrease the risk of stroke by 34% and CHD by 21%, and reduce the likelihood of

dementia, heart failure, and mortality from cardiovascular diseases (20). On the other hand, we cannot detect any underlying cause in about 95% of patients with HT. Physical inactivity, sedentary lifestyle, animal-rich diet, excess weight, smoking, alcohol, chronic inflammations, prolonged infections, and cancers may be some of the underlying risk factors of HT.

Excess weight may be the major underlying cause of HT nowadays in the world. Adipose tissue produces leptin, tumor necrosis factor-alpha, plasminogen activator inhibitor-1, and adiponectin-like cytokines, acting as acute phase reactants in the plasma (21). Excess weight-induced chronic low-grade vascular endothelial inflammation plays a significant role in the pathogenesis of accelerated atherosclerosis in the whole body (22). Additionally, excess weight leads to myocardial hypertrophy terminating with a decreased cardiac compliance. A combination of these cardiovascular risk factors eventually terminates with increased risks of arrhythmias, cardiac failure, and sudden cardiac death. Similarly, the prevalence of CHD

and stroke increased parallel to the increased BMI in the other studies (23, 24), and risk of death from all causes including cancers increased throughout the range of moderate to severe weight excess in all age groups (25). The relationship between excess weight, elevated BP, and hypertriglyceridemia is described in the metabolic syndrome, and clinical manifestations of the syndrome include obesity, dyslipidemia, HT, insulin resistance, and proinflammatory and prothrombotic states (9). Similarly, prevalence of excess weight, DM, HT, and smoking were all higher in the hypertriglyceridemia group (200 mg/dL and higher) in another study (26).

SCD include a group of genetic disorders characterized by the presence of Hb S, which is the first discovered hemoglobinopathy, and it has been known for 100 years (27). Together with the hemoglobin E, it is the most commonly seen hemoglobinopathy in the world. Hb S causes erythrocytes to change their normal biconcave disc shape to a crescent or sickle shape during various stresses of the body. The erythrocytes can take their normal shapes after normalization of the stressful conditions, but after repeated cycles of sickling and unsickling, they are damaged permanently, and hemolysis occurs. So lifespan of the erythrocytes decreases from the normal 120 days to 15-25 days. This hemolysis is responsible for the anemia that is the hallmark of the SCD. Painful crises are the most disabling symptoms of the SCD. Although painful crises may not be life threatening directly (28), infections are the most common triggering factors of the crises. So the risk of mortality is significantly higher during the crises. On the other hand, pain is the result of a complex and poorly understood interaction between erythrocytes, endothelium, leukocytes, and platelets. Probably, leukocytosis contributes to the pathogenesis of the painful crises by releasing several cytotoxic enzymes. The adverse actions of neutrophils on endothelium are of particular interest with regard to stroke and cerebrovascular diseases in the SCD. For example, leukocytosis in the absence of any infection was an independent predictor of the severity of the SCD in a previous study (29), and it was associated with an increased risk of stroke in a cohort of Jamaican patients (30). Occlusions in vasculature of the bone marrow, bone infarctions, inflammatory mediators, and activation of afferent nerves may take a role in the pathophysiology of the severe pain. Due to the severity of pain, narcotic analgesics are usually required (31). According to our experience, the painful crises are the most significant problems for the patients, for their families, for health professionals, and even for other patients due to the severity and prolonged nature of the episodes.

Due to the repeated infarctions and subsequent fibrosis, the spleen is commonly very small in adults. Eventually, a functional and anatomic asplenism develops due to the decreased antibody production, opsonization, and reticuloendothelial functions. Terminal consequence of the asplenism is increased risk of infections with Streptococcus pneumoniae, Haemophilus influenzae, and Neisseria meningitidis-like encapsulated bacteria. Therefore,

especially pneumococcal infections are common in early childhood, and are associated with a high mortality rate. The causes of death were infection in 56% of infants in a previous study (29). In another study, the peak incidence of death among children with the SCD occured between 1 and 3 years of age, and the deaths among patients less than 20 years of age were predominantly caused by pneumococcal sepsis (32). Adults, even those who appear relatively fit, are susceptible to acute multiorgan failures, sepsis, and sudden death during acute painful crises due to the severe immunosuppression.

SCD can affect nearly all organ systems of the body (33-35). Aplastic crises, sequestration crises, hemolytic crises, acute chest syndrome, avascular necrosis of the femoral and humeral heads, priapism and infarction of the penis, osteomyelitis, acute papillary necrosis of kidneys, chronic renal failure, occlusion of retinal arteries and blindness, pulmonary HT, bone marrow necrosis induced dactilitis in children, chronic punched-out ulcers around ankles, hemiplegia, and cranial nerve palsies are only some of the presentation types of the SCD. Eventually, the median ages of death were 42 years in males and 48 years in females in the literature (16), whereas they were 29.3 and 32.3 years, respectively, in the present study. The great differences may be secondary to delayed diagnosis, delayed initiation of hydroxyurea therapy, and inadequate RBC supports during emergencies in Antakya region of Turkey (36). Actually, RBC supports must be given immediately during all medical or surgical events in which there is an evidence of clinical deterioration in the SCD (37). RBC supports decrease sickle cell concentration in circulation, and suppress bone marrow about the production of abnormal RBC. So it decreases sickling-induced endothelial damage and inflammation all over the body. As a result of such a great variety of clinical presentation types, it is not surprising to see that the mean body weight and BMI were significantly retarded in patients with the SCD in the present study. On the other hand, as an opposite finding to some other reports (38-39), the mean body heights were similar in patients with the SCD and control cases in the present study. Probably due to the significantly lower mean body weight and BMI, mean values of the LDL, ALT, and systolic and diastolic BP were also lower in the SCD, which can be explained by definition of the metabolic syndrome again (40-42).

As a conclusion, body weight may be the major determining factor of systolic and diastolic BP in the body.

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BODY WEIGHT AND PLASMA LIPOPROTEINS

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Abstract

Background: Body weight may have some effects on plasma lipoproteins.

Methods: The study was performed in the Hematology and Internal Medicine Polyclinics on patients with sickle cell diseases (SCD) and routine check up cases.

Results: The study included 122 patients with the SCD (58 females) and 176 age and sex-matched control cases, totally. Mean age of patients with the SCD was 28.6 years. The mean body weight and body mass index were significantly retarded in patients with the SCD (71.6 versus 57.8 kg and 24.9 versus 20.7 kg/m2, respectively, p= 0.000 for both), whereas the mean body heights wasere similar in both groups (166.1 versus 168.5 cm, p>0.05). Parallel to the retarded mean body weight, mean values of the low density lipoproteins (LDL), high density lipoproteins (HDL), and alanine aminotransferase were also lower in patients with the SCD, significantly (p= 0.000 for all). Parallel to the retarded mean body weight again, mean values of the systolic and diastolic blood pressures were significanly lower in patients with the SCD (113.3 versus 118.8 and 72.3 versus 83.6 mmHg, respectively, p<0.01 for both).

Conclusion: Body weight may be the major determining factor of LDL and HDL values in the plasma.

Key words: Body weight, body mass index, low density lipoproteins, high density lipoproteins, metabolic syndrome

Introduction

Chronic endothelial damage may be the most common cause of end-organ insufficiency, early aging, and premature death in human beings (1-4). Much higher blood pressure (BP) of the afferent vasculature may be the major underlying mechanism by inducing recurrent injuries on vascular endothelium. Probably, whole afferent vasculature including capillaries are mainly involved in the process. Therefore the term of venosclerosis is not as famous as atherosclerosis in the literature. Due to the chronic endothelial damage, inflammation, edema, and fibrosis, vascular walls thicken, their lumens narrow, and they lose their elastic nature, which eventually reduces blood supply to the terminal organs and increases systolic BP further. Some of the well-known causes or signals of the inflammatory process are physical inactivity, sedentary lifestyle, animal-rich diet, smoking, alcohol, overweight, hypertriglyceridemia, dyslipidemia, impaired fasting glucose, impaired glucose tolerance, white coat hypertension, chronic inflammations, prolonged infections, or cancers for the development of terminal consequences including obesity, hypertension (HT), diabetes mellitus (DM), cirrhosis, peripheric artery disease (PAD), chronic obstructive pulmonary disease (COPD), coronary heart disease (CHD), chronic renal disease (CRD), mesenteric ischemia, osteoporosis, stroke, dementia, other end-organ insufficiencies, early aging, and premature death (5-7). Although early withdrawal of the underlying causes can delay terminal consequences, after development of HT, DM, cirrhosis, COPD, CRD, CHD, PAD, mesenteric ischemia, osteoporosis, stroke, dementia, other end-organ insufficiencies, and early aging, endothelial changes cannot be reversed completely due to their fibrotic nature. The underlying causes and terminal consequences are researched under the titles of metabolic syndrome, aging syndrome, or accelerated endothelial damage syndrome in the literature, extensively (8, 9). On the other hand, sickle cell diseases (SCD) are chronic inflammatory processes on vascular endothelium terminating with accelerated atherosclerosis induced end-organ failure and a shortened survival in both genders (10, 11). Hemoglobin S (Hb S) causes loss of elastic and biconcave disc shaped structures of red blood cells (RBC). Probably loss of elasticity instead of shape is the main pathology since sickling is rare in peripheric blood samples of the patients with associated thalassemia minor, and human survival is not affected in hereditary spherocytosis or elliptocytosis. Loss of elasticity is present during the whole lifespan, but exaggerated with inflammation, infections, and various stresses of the body. The hard RBC induced chronic endothelial damage, inflammation, and fibrosis terminate with disseminated tissue hypoxia all over the body (12, 13). As a difference from other causes of chronic endothelial damage, the SCD may keep vascular endothelium particularly at the capillary level (14), since the capillary system is the main distributor of the hard RBC into the tissues. The hard cells induced chronic endothelial damage builds up an advanced atherosclerosis in younger ages of the patients. Vascular occlusions induced ischemia and infarctions are the final consequences of the SCD, so the mean life expectancy is decreased by 25 to 30 years in the SCD (15).

Material and Methods

The study was performed in the Hematology and Internal Medicine Polyclinics of the Mustafa Kemal University on patients with the SCD and routine check up cases between March 2007 and April 2010. Only patients with the SCD on silent phase instead of the patients with painful crises were included into the study. SCD were diagnosed by the hemoglobin electrophoresis performed via high performance liquid chromatography. The control cases were age and sex-matched cases with the SCD. The medical history of all cases including already used medications was learnt, and a routine check up procedure including fasting plasma glucose (FPG), low density lipoproteins (LDL), high density lipoproteins (HDL), triglycerides, and alanine aminotransferase (ALT) values was performed. Body weight and height were measured, and body mass index (BMI) of each case was calculated by the same physician. Weight in kilograms is divided by height in meters squared (16). Systolic and diastolic BP were checked after a 5 minute rest in seated position by using the mercury sphygmomanometer (ERKA, Germany) with the same physician again, and no smoking was permitted during the previous 2 hours. Eventually, the mean body weight, height, BMI, FPG, LDL, HDL, triglycerides, ALT, and systolic and diastolic BP were detected in each group, and compared in between. Mann-Whitney U Test, Independent-Samples t Test, and comparison of proportions were used as the methods of statistical analyses.

Results

The study included 122 patients with the SCD (58 females) and 176 age and sex-matched control cases (84 females), totally. The mean age of patients with the SCD was 28.6 years. When we compared the patients and control groups, the mean body weight and BMI were significantly retarded in patients with the SCD (71.6 versus 57.8 kg and 24.9 versus 20.7 kg/m2, respectively, p= 0.000 for both), whereas the mean body heights were similar in both groups (166.1 versus 168.5 cm, p>0.05). The mean values of the FPG were unchanged between the patients and control groups (93.9 versus 94.7 mg/dL, respectively, p>0.05), and the mean value of triglycerides was higher in patients with the SCD, but the difference was nonsignificant (120.1 versus 112.1 mg/dL, p>0.05). Parallel to the retarded mean body weight and BMI, the mean values of LDL (74.0 versus 109.6 mg/dL), HDL (24.4 versus 42.6 mg/dL), and ALT (34.9 versus 56.7 U/L) were also lower in patients with the SCD, significantly (p= 0.000 for all). Parallel to the retarded mean body weight again, mean values of the systolic and diastolic BP were significantly lower in patients with the SCD (113.3 versus 118.8 and 72.3 versus 83.6 mmHg, respectively, p<0.01 for both) (Table 1). On the other hand, six patients with the SCD (three females and three males with mean ages of 32.3 and 29.3 years, respectively) were lost due to intercurrent infections induced sepsis, and there were pulmonary HT in two, cirrhosis in two, and cirrhosis plus CRD in one of them. Additionally, all of the lost six patients were Hb SS in nature.

Table 1: Characteristic features and metabolic parameters of the study cases

Variables	Sickle cell patients	p-value	Control cases
Number	122		176
Female ratio	47.5% (58)	Ns*	47.7% (84)
Age (year)	28.6 ± 10.2 (14-59)	Ns	28.6 ± 8.2 (15-58)
Weight (kg)	*57.8 ± 11.0 (31-83)*	*0.000*	*71.6 ± 14.4 (43-111)*
Height (cm)	166.1 ± 9.1 (145-188)	Ns	168.5 ± 10.0 (137-195)
BMI‡ (kg/m²)	*20.7 ± 2.9 (14.7-29.9)*	*0.000*	*24.9 ± 4.3 (17.3-41.2)*
FPG‡ (mg/dL)	93.9 ± 13.8 (56-119)	Ns	94.7 ± 12.0 (63-160)
LDL§ (mg/dL)	*74.0 ± 29.8 (24-164)*	*0.000*	*109.6 ± 29.6 (43-231)*
HDL‖ (mg/dL)	*24.4 ± 7.8 (9-45)*	*0.000*	*42.6 ± 11.0 (24-91)*
Triglycerides (mg/dL)	120.1 ± 63.9 (31-348)	Ns	112.1 ± 65.0 (27-388)
ALT¶ (U/L)	*34.9 ± 20.5 (11-125)*	*0.000*	*56.7 ± 26.6 (20-168)*
*Systolic BP** (mmHg)*	*113.3 ± 14.9 (80-150)*	*0.008*	*118.8 ± 16.6 (80-170)*
Diastolic BP (mmHg)	*72.3 ± 9.9 (60-100)*	*0.000*	*83.6 ± 10.7 (60-110)*

*Nonsignificant (p>0.05)   †Body mass index   ‡Fasting plasma glucose   §Low density lipoproteins
‖High density lipoproteins   ¶Alanine aminotransferase   **Blood pressure

Discussion

Cholesterol, triglycerides, and phospholipids are the major lipids of the body. Cholesterol is an essential structural component of animal cell membrane, bile acids, adrenal and gonadal steroid hormones, and vitamin D. Triglycerides are fatty acid esters of glycerol, and they are the major lipids transported in the blood. The bulk of our body's fat tissue is in the form of triglycerides. Phospholipids are triglycerides that are covalently bound to a phosphate group. Phospholipids regulate membrane permeability, remove cholesterol from the body, provide signal transmission across the membranes, act as detergents, and help in solubilization of cholesterol. Cholesterol, triglycerides, and phospholipids do not circulate freely in the plasma, instead they are bound to proteins, and transported as lipoproteins. There are five major classes of lipoproteins including chylomicrons, very low density lipoproteins (VLDL), intermediate density lipoproteins (IDL), LDL, and HDL in the plasma. Chylomicrons carry exogenous triglycerides from intestine to liver via the thoracic duct. VLDL are produced in liver, and carry endogenous triglycerides from the liver to the peripheral organs including adipocytes and muscle tissue. In the capillaries of adipocytes and muscle tissue, 90% of triglycerides are removed by a specific group of lipases. So VLDL are converted into IDL by removal of triglycerides. Then IDL are degraded into LDL by removal of more triglycerides. So VLDL are the main source of LDL in the plasma. LDL deliver cholesterol from the liver to the parts of body. Although the liver removes the majority of LDL from the circulation, a small amount is uptaken by scavenger receptors on macrophages which may migrate into arterial walls and become the foam cells of atherosclerotic plaques. HDL remove fats and cholesterol from cells, including within artery wall atheroma, and carry the cholesterol back to the liver and steroidogenic organs such as adrenals, ovaries, and testes for excretion, re-utilization, and disposal. All of the carrier lipoproteins in the plasma are under dynamic control, and are readily affected by diet, illnesses, drugs, body weight, and BMI. Thus lipid analysis should be performed during a steady state. But the metabolic syndrome alone is a low grade inflammatory process on vascular endothelium all over the body. Thus the metabolic syndrome alone may be a

cause of the abnormal lipoproteins levels in the plasma. On the other hand, although HDL are commonly called 'the good cholesterol' due to their role in removing excess cholesterol from the blood and protecting the arterial walls against atherosclerosis (17), recent studies did not show similar results, and low plasma HDL levels may alert searching of additional metabolic or inflammatory pathologies in the body (18-20). Normally, HDL may show various anti-atherogenic properties including reverse cholesterol transport and anti-oxidative and anti-inflammatory properties (18). However, HDL may become 'dysfunctional' in pathological conditions which means that relative composition of lipids and proteins, as well as the enzymatic activities of HDL are altered (18). For example, properties of HDL are compromised in patients with DM due to the oxidative modification and glycation of HDL, as well as the transformation of HDL proteomes into proinflammatory proteins. Additionally, the highly effective agents of increasing HDL levels including niacin, fibrates, and cholesteryl ester transfer protein inhibitors did not reduce all cause mortality, CHD mortality, myocardial infarction, or stroke (21). While higher HDL levels are correlated with cardiovascular health, medications used to increase HDL did not improve the health (21). In other words, while high HDL levels may correlate with better cardiovascular health, specifically increasing one's HDL values may not increase cardiovascular health (21). So they may actually be just indicators instead of being the main actors of the process. Beside that, HDL particles that bear apolipoprotein C3 are associated with increased risk of CHD (22). Similarly, BMI, FPG, DM, and CHD were the lowest between HDL values of 40 and 46 mg/dL, and the prevalence of DM was only 3.1% between these values against 22.2% of the others in another study (23). In another definition, the moderate HDL values may also be a result instead of a cause of the better health parameters. On the other hand, the greatest number of deteriorations in the metabolic parameters was observed just above the plasma triglycerides value of 60 mg/dL in another study (24).

Excess weight may be the main cause of metabolic syndrome in the world, nowadays. Adipose tissue produces leptin, tumor necrosis factor-alpha, plasminogen activator inhibitor-1, and adiponectin-like cytokines, acting as acute phase reactants in the plasma (25). Excess weight-induced chronic low-grade vascular endothelial inflammation plays a significant role in the pathogenesis of accelerated atherosclerosis in the whole body (26). Additionally, excess weight leads to myocardial hypertrophy terminating with a decreased cardiac compliance. Combination of these cardiovascular risk factors eventually terminate with increased risks of arrhythmias, cardiac failure, and sudden cardiac death. Similarly, the prevalence of CHD and stroke increased parallel to the increased BMI in the other studies (27, 28), and risk of death from all causes including cancers increased throughout the range of moderate to severe weight excess in all age groups (29). The relationship between excess weight, elevated BP, and hypertriglyceridemia is described in the metabolic syndrome, and clinical manifestations of the syndrome include obesity, dyslipidemia, HT, insulin resistance, and proinflammatory and prothrombotic states (30). Similarly, prevalence of excess weight, DM, HT, and smoking were all higher in the hypertriglyceridemia group (200 mg/dL and higher) in another study (31).

Increased BP may result from a complex interaction of genes and environmental factors. Increased BP may be a sign that heart and blood vessels are being overworked. In most people with HT, increased total peripheral resistance accounts for HT while cardiac output remains normal (32). The increased peripheral resistance is mainly attributable to structural narrowing of small arteries and arterioles, although a reduction in the number of capillaries may also contribute (33). HT is rarely accompanied by symptoms in the short-term. Symptoms attributed to HT may actually be related with associated anxiety rather than HT itself. However, HT may be a major risk factor for CHD, PAD, CRD, cirrhosis, COPD, stroke, and dementia-like end-organ insufficiencies in the long-term. For example, a reduction of the BP by 5 mmHg can decrease the risk of stroke by 34% and CHD by 21%, and reduce the likelihood of dementia, heart failure, and mortality from cardiovascular diseases (34). On the other hand, we cannot detect any absolute cause in the majority of patients with HT. Physical inactivity, sedentary lifestyle, animal-rich diet, excess weight, smoking, alcohol, chronic inflammations, prolonged infections, and cancers may be important as the causes of HT in them, actually.

SCD include a group of genetic disorders characterized by the presence of Hb S, which was the first discovered hemoglobinopathy in the world (35). Together with hemoglobin E, it is the most common hemoglobinopathy at the moment. Hb S causes RBC to change their normal biconcave disc shape to a crescent or sickle shape during various stresses. The RBC can take their normal shapes after normalization of the stressful conditions, but after repeated cycles of sickling and unsickling, they are damaged permanently, and hemolysis occurs. So lifespan of the RBC decreases from the normal 120 days to 15-25 days. This hemolysis is responsible for the anemia that is the hallmark of the SCD. Painful crises are the most disabling symptoms of the SCD. Although painful crises may not be life threatening directly (36), infections are the most common triggering factors of the crises. So the risk of mortality is significantly higher during the crises according to our experiences. On the other hand, the severe pain may be the result of a complex interaction between RBC, endothelium, white blood cells (WBC), and platelets. Probably, leukocytosis contributes to the pathogenesis of the painful crises by releasing several cytotoxic enzymes. The adverse actions of WBC on endothelium are of particular interest with regard to the stroke and cerebrovascular diseases in the SCD. For example, leukocytosis in the absence of any infection was an independent predictor of the severity of the SCD in a previous study (37), and it was associated with an increased risk of stroke in a cohort of Jamaican patients (38). Occlusions in vasculature of the bone marrow, bone infarctions, inflammatory mediators, and activation of

afferent nerves may take a role in the pathophysiology of the severe pain. Due to the severity of pain, narcotic analgesics are usually required (39). According to our experiences, the painful crises are the most disturbing problems for the patients, for their families, for health professionals, and even for other patients due to the severity and prolonged nature of the episodes.

Due to the repeated infarctions and subsequent fibrosis, the spleen is usually very small in adults. Eventually, a functional and anatomic asplenism develops due to the decreased antibody production, opsonization, and reticuloendothelial functions. Terminal consequence of the asplenism is increased risk of infections with Streptococcus pneumoniae, Haemophilus influenzae, and Neisseria meningitidis-like encapsulated bacteria. Particularly, pneumococcal infections are common in early childhood, and are associated with a high mortality rate. The causes of death were infection in 56% of infants in a previous study (37). In another study, the peak incidence of death among children with the SCD occured between 1 and 3 years of age, and the deaths under the age of 20 years were predominantly caused by pneumococcal sepsis (40). Adult patients, even those who appear relatively fit, are susceptible to sepsis, acute multiorgan failures, and sudden death during acute painful crises due to the severe immunosuppression in them.

SCD can affect nearly all organ systems of the body (41-43). Aplastic crises, sequestration crises, hemolytic crises, acute chest syndrome, avascular necrosis of the femoral and humeral heads, priapism and infarction of the penis, osteomyelitis, acute papillary necrosis of kidneys, CRD, occlusion of retinal arteries and blindness, pulmonary HT, bone marrow necrosis induced dactilitis in children, chronic punched-out ulcers around ankles, hemiplegia, and cranial nerve palsies are only some of the presentation types of the SCD. Eventually, the median ages of death were 42 years in males and 48 years in females in the literature (15), whereas they were 29.3 and 32.3 years, respectively, in the present study. The great differences may be secondary to delayed diagnosis, delayed initiation of hydroxyurea therapy, and inadequate RBC supports during emergencies in Antakya region of Turkey (44). Actually, RBC supports must be given immediately during all medical or surgical events in which there is evidence of clinical deterioration in the SCD (45). RBC supports decrease sickle cell concentration in circulation, and suppress bone marrow in the production of abnormal RBC. So it decreases sickling-induced endothelial damage and inflammation all over the body. Due to the great variety of clinical presentation types, it is not surprising to see that the mean body weight and BMI were significantly retarded in patients with the SCD in the present study. On the other hand, as an opposite finding to some other reports (46-47), the mean body height was similar in patients with the SCD and control cases, here. Probably due to the significantly lower mean body weight and BMI, mean values of the LDL, HDL, ALT, and systolic and diastolic BP were also lower in patients with the SCD,

which can be explained by definition of the metabolic syndrome (48-51).

As a conclusion, body weight may be the major determining factor of LDL and HDL values in the plasma.

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PALLIATIVE CARE AND PROSTATE CANCER SCC PATIENT

Case Report

Abdolreza, 73 years old, was diagnosed with prostate cancer soon after marrying for the second time. He underwent a TURP and had localised radiotherapy to his prostate area. Abdolreza has a past history of hypertension.

Abdolreza and his wife Rezan live in a rural area.
Four years after his original diagnosis of prostate cancer, Abdolreza presented with moderately severe abdominal pain. A CT scan revealed secondaries in several pelvic lymph nodes. A bilateral orchidectomy was performed and he was referred to a radiation oncologist for review. He and his wife Rezan seek the services of a Palliative Care nursing team. Abdolreza remains optimistic about his condition until he is reviewed by his oncologist several weeks after undergoing the bilateral orchidectomy.

A bone scan, PSA and ALP are ordered and the results are as follows:

Bone Scan: multiple sites of active disease in the spine, pelvis, ribs and proximal appendicular skeleton.

PSA: 75 (Normal < 4.0 ng/ml) ALP: 410 (Normal range 30-120 U/L)

The radiation oncologist informed Abdolreza that his recent orchidectomy was unsuccessful as the bone scan revealed the cancer had spread to many bones throughout his body. He is left with the impression that nothing can really be done for his condition. He is advised that he and his wife Rezan seek the services of a Palliative Care nursing team.

On the first home visit by the Palliative Care nurse Abdolreza is weak can hardly stand up. He tells of increasing back pain over the previous three days which is exacerbated by lying down, coughing or straining.

On examination Abdolreza is distressed when moving from a sitting position to lying down in bed. He is tender over his thoracic vertebrae at the level of T11 and T12. Flexion and extension of his back is reduced. Straight leg raising is limited to 70 bilaterally and is painful. Power of his hips and knees (flexion and extension) is assessed as being grade 4 out of 5 bilaterally, with decreased tone bilaterally. Knee jerks are present, but weak. Both plantar responses are downgoing.

Some subjective altered sensation is present but there are no objective sensory signs. Abdolreza's bladder is not distended and his anal tone is normal. His gait is ataxic.

Radiotherapy is usually the treatment of first choice for SCC, in conjunction with oral steroids. It is particularly appropriate when compression is present at multiple levels. Back pain tends to resolve in 60-80% of patients as a result of having radiotherapy. The steroids reduce oedema, which is due to compression. Neurological signs need to be monitored carefully. If continued deterioration occurs, neurosurgery may be indicated, particularly if the patient is not terminally ill and/or does not have compression at multiple levels.

In general however the results of treatment with dexamethasone and radiotherapy, compared to dexamethasone, laminectomy and radiotherapy are equivalent from a neurological point of view.

A posterior laminectomy is the emergency treatment of choice for SCC patients with rapid neurological deterioration.

The contraindications to having a posterior laminectomy are listed below:

- established paraplegia (> 72 hrs)

- complete and rapid paralysis secondary to spinal cord infarction

- restricted mobility

- severely debilitated patients.

You inform Abdolreza his back pain and weakness need to be urgently investigated in hospital.

After being in a hospital, several hours drive from home, for 11 days, Abdolreza becomes increasingly despondent. He requests the radiotherapy be ceased due to a lack of response. He expresses a strong desire to return home to die in peace. He refuses to swallow any medication and keeps saying he just wants to go home.

A long discussion between Abdolreza, Rezan and the radiation oncologist ensues. The radiation oncologist's registrar informs them that Abdolreza will be discharged the following day. He adds the hospital staff 'don't think Abdolreza will live through the weekend'.

Caring for a dying person at home is a twenty four hour task which requires a broad range of skills. A palliative care nurse and a general practitioner is in an ideal situation to manage a dying patient at home, and to coordinate their care. Members of a community based palliative care service can offer additional assistance.

THE PALLIATIVE CARE NURSE SHOULD BE ABLE TO:

• assess symptom control

• provide information and support to patient and family (including advice about preventing pressure sores and what to expect as death approaches)

• attend to patient hygiene e.g. mouth care

• use complementary therapies (e.g. foot massage, therapeutic touch)

• discuss food and fluids according to needs

• set up syringe driver if required

• perform enemas, if patient is constipated

• stay with the family following death and involve them in the laying out process if they wish.

Abdolreza arrives home by ambulance at 4pm on Friday. Rezan telephones you and you visit soon after the palliative care nurse has been. She telephones to discuss Abdolreza's condition and also writes extensive notes in a home based medical record. This is an excellent vehicle for communication, if available. It can record important aspects of the patient's medical, social and psychological assessments and should be used by the general practitioner in order to ensure continuity of care is maintained. In this way, all members of the palliative care team have access to each other's notes.

At review the following day, Rezan reports that Abdolreza continues to be pain free.

One of the palliative care nurses has been to visit and continues to give ongoing support to both Abdolreza and Rezan. Despite being on Lactulose 30 mg bd, Abdolreza is constipated. A rectal examination reveals hard faeces. An enema given by the palliative care nurse gives a satisfactory result.

Abdolreza's condition deteriorates over the next couple of days. He becomes profoundly weak, is bed bound and develops Cheyne-Stokes breathing

All treatment is ceased except for morphine, which is adminstered by continuous subcutaneous infusion. Abdolreza is visited twice daily by a palliative care nurse.

Abdolreza remains peaceful and conscious for the next five days, during which time he is bedridden and slowly deteriorates. He is still able to respond with a smile when greeted just a few hours before his death. His conscious state deteriorates a short time before he dies.