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Front Pages

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The ***Athens Journal of Health and Medical Sciences (AJHMS)*** is an Open Access quarterly double-blind peer reviewed journal and considers papers from all areas of medicine (including health studies and nursing research). Many of the papers published in this journal have been presented at the various conferences sponsored by the Health & Medical Sciences Division of the Athens Institute for Education and Research (ATINER). All papers are subject to ATINER's Publication Ethical Policy and Statement.

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Athens Journal of Health and Medical Sciences
Editorial and Reviewers' Board

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The current issue is the first of the tenth volume of the *Athens Journal of Health and Medical Sciences* (AJHMS), published by the **Health & Medical Sciences Division of ATINER.**

Gregory T. Papanikos
President
ATINER

Athens Institute for Education and Research

A World Association of Academics and Researchers

22nd Annual International Conference on Health Economics, Management & Policy, 19-22 June 2023, Athens, Greece

The Health Economics & Management Unit of ATINER will hold its **22nd Annual International Conference on Health Economics, Management & Policy, 19-23 June 2023, Athens, Greece s**ponsored by the Athens Journal of Health and Medical Sciences. The aim of the conference is to bring together academics, researchers and professionals in health economics, management and policy. You may participate as stream leader, presenter of one paper, chair of a session or observer. Please submit a proposal using the form available (https://www.atiner.gr/2023/FORM-HEA.doc).

Academic Members Responsible for the Conference

- **Dr. Paul Contoyannis**, Head, Health Economics & Management Unit, ATINER & Associate Professor, McMaster University, Canada.
- **Dr. Vickie Hughes**, Director, Health & Medical Sciences Division, ATINER & Assistant Professor, School of Nursing, Johns Hopkins University, USA.

Important Dates

- Abstract Submission: **21 March 2023**
- Acceptance of Abstract: 4 Weeks after Submission
- Submission of Paper: **22 May 2023**

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The Social Program Emphasizes the Educational Aspect of the Academic Meetings of Atiner.

- Greek Night Entertainment (This is the official dinner of the conference)
- Athens Sightseeing: Old and New-An Educational Urban Walk
- Social Dinner
- Mycenae Visit
- Exploration of the Aegean Islands
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1-4 May 2023, Athens, Greece

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Important Dates

- Abstract Submission: **21 March 2023**
- Acceptance of Abstract: 4 Weeks after Submission
- Submission of Paper: **3 April 2023**

Academic Member Responsible for the Conference

- **Dr. Vickie Hughes**, Director, Health & Medical Sciences Research Division, ATINER & Assistant Professor, School of Nursing, Johns Hopkins University, USA.
- **Dr. Carol Anne Chamley**, Head, Nursing Research Unit & Associate Professor, School of Health and Social Care, London South Bank University UK.
- **Dr. Andriana Margariti**, Head, Medicine Research Unit, ATINER & Lecturer, Centre for Experimental Medicine, Queen's University Belfast, U.K.

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Difficult Interpersonal Situations in Leadership as Arenas of Ethical Leadership and Learning

By Hannele Laaksonen[*] & Marjukka Tenhunen[±]

Leadership in the Finnish social and health care field has changed significantly since the beginning of the 21st century. Its principles have become closer to those of business organizations, which demand cost-effectiveness. Superiors are expected to achieve more with dwindling personnel resources. This may have led to unethical leadership, which has negative effects on workplace wellbeing and coping at work. The purpose of this study was to chart the experiences of master's degree students in leadership (N=54) regarding difficult leadership situations and what they learned from them. All the students had a bachelor's degree and at least three years of work experience. The data were collected as narratives written as part of a course on personnel leadership, which were then analyzed using deductive content analysis. Ethical leadership in difficult personnel situations was seen as good communication skills and treating all subordinates as equals. Through their own example, ethical leaders created a work environment where all felt understood and respected. The respondents also learned how to recognize features of unethical leadership through their experiences. Further research should focus on superiors' experiences of leadership, which factors lead to unethical actions and how unethical leadership can be avoided.

Keywords: *communication, ethical leadership, interaction, learning through work, unethical leadership*

Introduction

Healthcare has not been a desirable field in Finland in years, as nurses' job satisfaction and willingness to stay in their field were found to have decreased as early as 2015 (Hahtela et al. 2015). According to an Autumn 2020 study conducted by the labor union Tehy among its members (n=2750), the pandemic has further weakened nursing staff's commitment to their work, as 88% of respondents working in specialized health care were considering changing professions and nearly half were actively planning it. Nursing has become considerably less attractive as a profession, as 64% of the respondents would no longer choose it (AulaResearch 2020).

Employee wellbeing is influenced by leadership, the superior's way of acting in various situations and whether they trust their subordinates. A superior who is active, keeps their subordinates informed, gives feedback and support and provides a clear direction for the workplace community increases employee wellbeing and trust. Employees also expect supervisors to be benevolent towards all and a member and defender of the workplace community (Vidman and Stömberg 2021).

Ethical leadership is connected to good leadership and has been found to have a positive effect on employee self-direction. This can be used to lessen the work

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burden and improve physical work conditions. By emphasizing individuality, it is in fact possible to make the individual think of the organization's goals as their own (Islam et al. 2019, pp. 6, 10). One factor decreasing workplace wellbeing can be the superior having too many subordinates. As their number grows, interactions between subordinates and their superior decrease, both in quantity and quality. The positive effects of ethical leadership decrease the more subordinates the superior has. The effect can be seen in employee performance (Thiel et al. 2018).

Happy employees motivate each other to perform better. This improves performance and decreases employee turnover and work-related stress. When ethical leadership has positive results, it encourages superiors to continue leading in an ethical fashion. Important motivators for ethical leadership are one's internal satisfaction and increasing the workplace community's work satisfaction (Barkhordari-Sharifabad et al. 2018).

This article discusses difficult situations in personnel leadership in the social and health care field from the perspective of ethical leadership and the possibilities of learning from such situations.

Theoretical Background

Ethical Leadership

Qualities of good leaders are seen to be honesty, flexibility, self-confidence, approachability and the abilities to communicate, delegate and improve cooperation by teaching and training (McKibben 2017). Sapienza (2005) found similar results in her study of good leadership experiences. An influencing leader can activate everyone's good qualities and encourage the creation of a good workplace environment. The leader works as a role model in the workplace community and is caring but firm. Giving feedback is one of the leader's duties, but it should consist not only of criticism, but also thanks for well-performed work. Good feedback motivates and inspires the personnel to perform their duties well and possibly even better (Sapienza 2005).

The leader's role and personality are seen as having a significant effect on the workplace community's development and growth. Ethical management increases wellbeing for the personnel and the manager. Work satisfaction also increases organizational growth and development (Barkhordari-Sharifabad et al. 2018). Solving conflicts within the workplace community is an important part of ethical leadership. Conflicts can include disagreements, differences of opinion or competition (McKibben 2017). Conflicts can be caused by many things, such as misunderstandings, insufficient communication, silence, refusal to share information or a lack of respect. Other reasons can include disagreement over needs, goals and wishes (Yeung et al. 2014).

Faults that have led to grievances must be recognized and analyzed. The involved parties should be invited to a meeting and be encouraged to settle the matter (Sapienza 2005). Conflicts emphasize the differences between employees, but also increase mutual respect, encourage discussion and improve understanding

between different roles (McKibben 2017). A communication model received from a superior influences their subordinates and ideally creates a communication channel, in which the subordinate wants to play an active role (Islam et al. 2017). Another important leadership quality is including subordinates in discussions instead of dictating from above (Mannix et al. 2015).

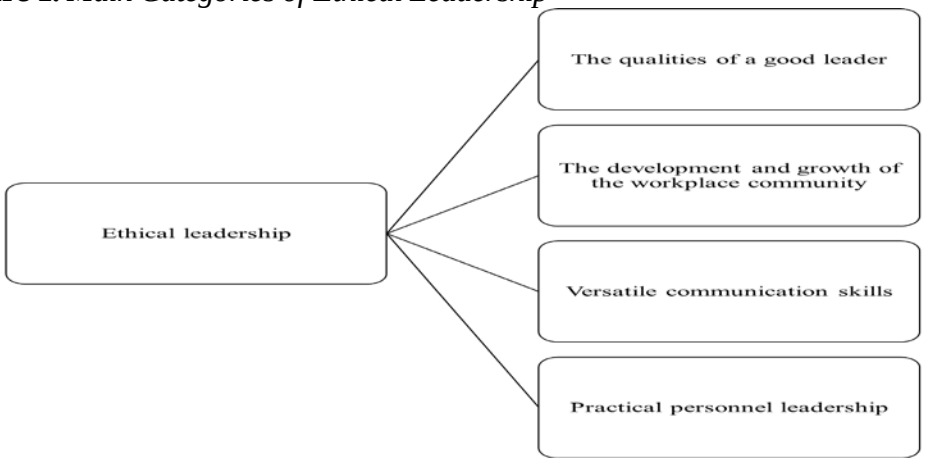
Ethical leadership has a positive effect on information sharing by emphasizing honesty and selflessness. It prevents immoral behavior, the withholding of information and the undesired consequences of negative emotions. The superior's own example in everyday activities is an important motivator to their subordinates (Zhao and Xia 2019). If there is a conflict between the organization's values and the superior's personal values, the superior must act in accordance with the organization's values and impart behavior consistent with the organization's values to their subordinates, even if their values might also differ from those of the organization. However, acting contrary to one's own ethical values may cause dissatisfaction and frustration (Barkhordari-Sharifabad et al. 2017).

An ethical superior is just, listens to their subordinates' ideas and concerns and is willing to give them a chance to influence decision-making. They also clarify responsibilities, expectations and performance goals and act in a human-oriented fashion by caring for, respecting and supporting their subordinates. Other features of ethical leadership are trustworthiness and consistent speech and action. Supervisors advance ethics by explaining and elaborating on the workplace community's ethical rules and by rewarding ethical behavior. As trustworthy, honest, friendly and considerate people, ethical leaders are capable of making just decisions based on ethical values, which enable a good work environment for all parties (Freire and Bettencourt 2020). Subordinates wish for justness particularly in personnel leadership; shifts and holidays should be distributed fairly, and all should have access to training (Barkhordari-Sharifabad et al. 2017).

An ethical leader is a person who creates a workplace atmosphere where ethical behavior is expected and valued. Acknowledging ethical problems and maintaining high ethical standards is thus easier. Creating an ethical atmosphere at the organizational level has a positive effect on both the expected and discretionary behaviors of employees. Expected behavior is professional behavior that derives from commonly-created norms and clearly-defined duties such as job descriptions and responsibilities (Zhang et al. 2019).

In conclusion, an ethical leader must have the qualities of a good leader, versatile communication skills, practical skills in personnel leadership and the ability to enable the workplace community's development and growth (Figure 1). These formed the main categories of ethical leadership used in this study.

Figure 1. *Main Categories of Ethical Leadership*



Unethical Leadership

Unethical leadership can be understood as behavior that is the opposite of ethical leadership, such as lacking respect, shouting and berating. An unethical leader can be insulting and is incapable of handling conflicts. Subordinates working under a bad leader are less industrious, which weakens both personnel and economic resources (Sapienza 2005). As conflicts have an immediate effect on customer work, positive solutions are necessary, as they are the only way of advancing safe and efficient work. Solving conflicts also builds positive relationships between colleagues and supervisors (McKibben 2017). Unethical behavior increases employee frustration, as it increases work demands and can lead to increased superficial action and decreased positive moods (Valle et al. 2018).

Blair et al. (2017) found a connection between narcissism and unethical leadership in their study. An unethical leader's behavior included unidirectional communication, unjust use of power, manipulative communication and false change leadership. Tafolli and Grabner-Kräuter's (2020) study found that ethical and responsible leadership decreased corruption within an organization. Unethical leadership can also manifest in undervaluing a person's professional skills, such as when a subordinate is ordered to perform tasks below their competence level, or when central professional duties are removed from them or replaced with simpler or less pleasant tasks (Meriläinen et al. 2019). This too is an unjust use of power towards subordinates.

Workplace bullying is a factor lowering employee wellbeing that supervisors should confront quickly, as it weakens the positive effects of ethical leadership. Workplace bullying also hinders effective leadership. Supervisors should intervene in workplace bullying early to avoid it weakening the employees' ethical values (Ahmad et al. 2020). Failing to confront workplace bullying lessens work wellbeing and can increase employee turnover.

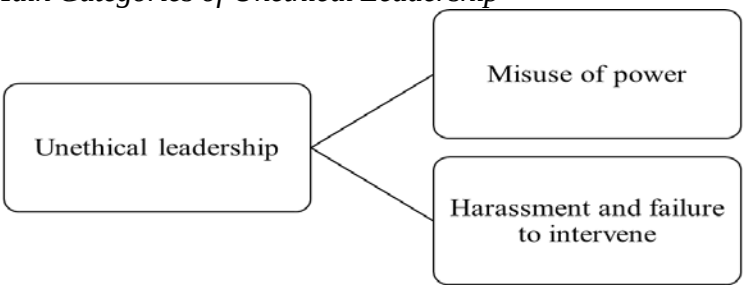
Einarsen et al. (2007) have defined unethical leadership as destructive leadership, which can be divided into three types of leadership styles. A tyrannic destructive leader only advances the interests of the organization and does it at the

expense of the employees. A supportive-disloyal leader supports employees in a way that is disloyal to the organization. The final form of destructive leadership is derailing leadership, which hurts both the employees and the organization.

Hoffren and Laulainen (2018) tested Einarsen et al.'s (2007) theory in the context of the Finnish social and health care field. Of the forms of destructive leadership, they found absent and passive leadership and leadership that fits the supportive-disloyal type. They did not discover tyrannic or derailing leadership but found that destructive leadership is entirely possible in the Finnish social and health care field, particularly because of the years-long structural changes in the field.

In conclusion, unethical leadership can be divided into *misuse of power* and *harassment and failure to intervene* (Figure 2), which formed the main categories of unethical leadership used in this study.

Figure 2. *Main Categories of Unethical Leadership*



Experiential Learning

Supervisors and subordinates can learn even from difficult experiences in personnel leadership. According to Kolb (2015), the theory of experiential learning is formed out of several assumptions. Ideas and thoughts are not unchanging, but something that is always reforming through experiences. It is believed that two people can never truly share the same thoughts, as they are formed by the individual's experiences. The individual's mind is never a "blank slate", as they always have some preformed notion of the relevant topic. Experiential learning is thus re-learning (Kolb 2015).

Personal experience is the center point of learning. The conclusions and validities derived from it are used as comparison for public discussion. When the individual shares their experience with others, it is shared both concretely and conceptually. The individual works in interaction with others, in which feedback received from others acts as the ground for goal-oriented action and its assessment. The individual is constantly creating operational models and testing them in this fashion (Kolb 2015).

Experiential learning can be understood as everyday learning, which does not require preset goals, but has happened and happens in various situations through reflection, experimentation and learning from colleagues and supervisors (Hagar and Halliday 2009, Nikolova et al. 2014). Everyday learning is suddenly realizing things in various unforeseen situations.

In her study of change in leadership, McGill (2017) interviewed 19 health care leaders. One important assisting factor in the development of leadership the respondents mentioned was learning from experience and reflection. Professional education forms the basis for one's development into a leader, but learning from experiences in which one has to take risks and leave one's comfort zone was seen as important in a leader's development. Challenges should be received bravely, even if they appear threatening (McGill 2017).

Gallagher and Tschudin (2009) describe one's growth into an ethical leader as consisting of three main elements of learning: adopting a multi-professional approach to gaining professional knowledge, receiving feedback on one's skills and developing intellectual and moral skills (Gallagher and Tschudin 2009). Experiential learning is part of an individual's continuing development. Experientiality is part of everyday life as the individual reforms their thinking and learning, constantly developing them further. Reflection gives new perspectives on processing experiences.

Methodology

The aim of this study is to chart difficult experiences in personnel leadership faced by master's degree students in leadership in the social and health care field and what could be learned from them. The study questions are:

1. What are difficult experiences in personnel leadership like?
2. What has been learned from the difficult experiences in personnel leadership?

The aim is to produce new information on what kinds of situations the respondents considered difficult experiences in personnel leadership from the perspective of ethical leadership and how they discussed unethical leadership in their learning experiences.

Target Group

The study's target group are master's degree students in leadership in the social and health care field (N=54), all of whom have at least three years of professional experience in the field. This work experience is required for those applying for a master's degree at a university of applied sciences in Finland. Nurses made up 65% of the respondents, while 35% were bachelors of social services, bioanalysts, physiotherapists and radiographers. Women made up 87% of the respondents (n=30).

Data Collection

The material was collected in 2016-2017. The assignment was presented to the students both orally and in writing in class, during which the assignment's

structure and electronic submission method were explained to them. The students submitted the task through an electronic platform, whose materials could be accessed only by the teacher in charge. The students were asked to write a narrative according to the following instructions:

> *Describe a workplace experience related to personnel leadership you found difficult. What did you learn from the experience you described?*

The following additional instructions were given:

> *Write a narrative with a beginning, middle and end. You may change names and places to ensure no one is exposed. You do not need to share your own role. The event must, however, be something that genuinely happened and was witnessed by you, whether as a subordinate, superior, bystander or participant.*

Data Analysis

The teacher in charge printed the narratives and removed identifying details so the data could be analyzed. The narratives (n=30) formed a data set 42 pages long. The narratives were written using the Arial font with a line spacing of 1.5. The narratives of difficult experiences in personnel leadership were analyzed through theory-based content analysis, whose theoretical framework was formed by the theory of ethical leadership that emerged from the literature review (Figure 1). The learning experiences were analyzed through theory-based content analysis, using the theory of unethical leadership that emerged from the literature review (Figure 2).

The theory-based content analysis consists of four different principles of ethical leadership, which are: qualities of a good leader, the workplace community's development and growth, versatile communication skills and practical personnel leadership. The learning experiences are expressed as experiences of unethical leadership, in which the respondents have reflected on the difficult experiences and recognized unethical leadership as misuse of power and harassment and failure to intervene in various forms.

In theory-based content analysis, the researcher can start by picking phenomena that describe either a main or subcategory and place them in a predefined analytical framework. The researcher can use a loose analytical framework and place various classifications formed through the principles of inductive content analysis within it (Tuomi and Sarajärvi 2018, pp. 128–129). This analysis was begun by searching for reduced expressions connected with the main categories. The main categories of the analytical framework are principles of ethical leadership and learning experiences of unethical leadership formed based on theory, as described above. The original expressions, which were sentences or partial sentences, were reduced and then placed into main categories. The reduced expressions were then classified as subcategories through inductive content analysis. Table 1 is an example of this process.

Table 1. *An Example of Analysis: The Qualities of a Good Leader*

Main category	Original expression	Reduced expression	Subcategory
The qualities of a good leader	…to know how to stop to discuss…	Giving others time	Approachability
	…to know how to stop... to listen…	Being available to subordinates	
	The superior should be near	Visibility in the workplace community	
	…should be present…	Presence	
	...someone you can come and talk to...	Easy to approach	
	…should be able to explain why things are done in a certain way…	Justifying decisions	Internalizing values
	...showing an example of how we do things...	Teaching modes of operation	
	...difficult to understand values...	Internalizing ideology	
	...admitting mistakes...	Taking responsibility	
	…keeping people informed and asking how they're doing	Not hiding information	Good communication skills
	...the ability to discuss things constructively...	Views things objectively	
	...handled the discussion with the subordinate professionally	Professional communication	
	Needs to handle even difficult things	Daring to take responsibility	Resoluteness
	...there should have been much more resources for instruction	Incomplete instruction	Training and instruction
	...no clear program of training	Lack of training model	

The Study's Ethical Background and Reliability

The study was conducted following good scientific practice (TENK 2021). The study received appropriate permission from the university in which it was conducted. The respondents were informed of their participation's voluntariness and anonymity and of the study's purpose, aims and progress. They also received an explanation of the data storage procedures used in the study and how the results would be disseminated. Some of the respondents (N=54) could not share a single difficult experience in personnel leadership, which is why they only submitted thirty narratives. The study was conducted using good scientific practices such as honesty, diligence and sincerity. The theoretical framework is based on earlier studies of the topic.

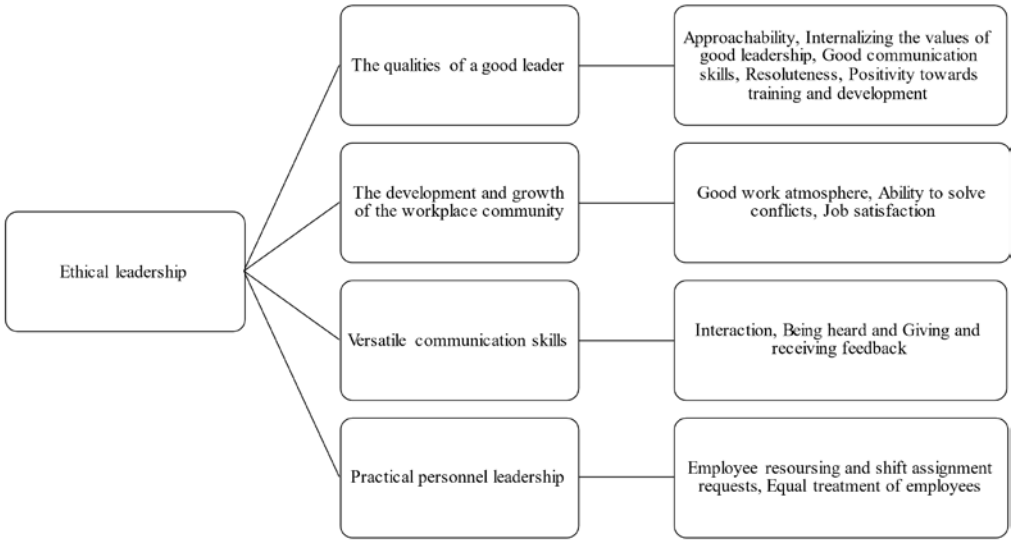
The study's reliability was increased by having the data analyzed by two researchers and by describing the phases of the analysis as accurately as possible. The research process and its results have been reported accurately and openly. The narratives that were studied have been stored in an appropriate fashion and all quotations taken from them are authentic. The discussion section compares the results to earlier studies and existing theoretical knowledge.

Results

Ethical Leadership

The main categories of ethical leadership derived through theoretical examination are *the qualities of a good leader, the development and growth of the workplace community, versatile communication skills* and *practical personnel leadership*. The difficult experiences of personnel leadership were examined through the method of deductive content analysis by defining the concept of ethical leadership and its main categories through the literature review. The data were then classified under the main categories, after which the data were collected into subcategories (Figure 3).

Figure 3. *The Categories of Ethical Leadership*



The Qualities of a Good Leader

The respondents described the qualities of a good leader as a*pproachability, internalizing the values of good leadership, good communication skills, resoluteness* and *positivity towards training and development*. In the narratives of difficult experiences, approachability was seen as a wish for the leader's presence in the workplace community and willingness to grant time to subordinates. Their presence was particularly desirable in situations of change, which often cause insecurity regarding the future and one's job in the workplace community. Internalizing values was seen as the superior's ability to ensure new workers were familiarized with the workplace's modes of operation and internalized the ideology mandated by the organization.

> "The superior should be someone you can come to talk to about things that trouble you."

> "The most important thing during the change was the role of the head nurse, who stood by their staff until the end."

Related to internalizing values is the superior's ability to justify decisions related to the workplace community's modes of action. One narrative described instructions that prohibited employees from interacting outside of official meetings. This had a detrimental effect on their sense of being valued as professionals and members of the workplace community.

> "The employees repeatedly said that they felt unappreciated as professionals."
> "They must be able to explain why things are done the way they are to commit employees to common goals..."

Good communication skills were seen as one of the qualities of a good leader. The abovementioned approachability is related to communication skills, but this subcategory relates particularly to openness, in which the superior does not hide information from their subordinates. This inspires trust regarding the superior's work for the good of the workplace community. Through openness the superior also presents himself as honest to the employees. These are important qualities, particularly when the organization is in the midst of change.

> "An as open as possible work environment, keeping everyone informed and asking how everyone is doing lowers resistance to change."
> "The time of blind obedience is over, these days you should be able to talk about things constructively."

Resoluteness was seen as particularly desirable when faced with difficult subjects. Early intervention can stop escalation and help retain employees. This can be difficult if the superior does not yet know all the members of the workplace community well, which can make it difficult to raise certain topics. Through resoluteness supervisors can, however, show that they care about their subordinates' lives and wellbeing.

Training and familiarizing new employees or students with the workplace was seen as pleasant and sharing information as rewarding in the narratives, as long as there were sufficient resources. The purpose of familiarization is to show the work's good sides and how pleasant and functioning the workplace is. The respondents saw situations where employees could not internalize the organization's ideology despite discussions as difficult. In these situations, the students believed the familiarization and guidance phase should have been longer, which would have enabled the employee to internalize the desired ideology.

The Workplace Community's Development and Growth

The subcategories formed under the main category of workplace community's development and growth were *good work atmosphere*, *ability to solve conflicts* and *job satisfaction*. According to the respondents, a good work atmosphere is influenced by the chemistry between employees and an open work environment. It

is the superior's duty to create an atmosphere that is open and tolerant of all employees. All have the right to be themselves within the workplace community. Many of the narratives showed how important the employees' team spirit is. It gives the strength to manage difficult situations and to celebrate good things as a community.

> "…afterwards we were happy about how well we handled the challenging situation together."
> "…collegiality and team spirit in the workplace community can carry its members through difficult times."
> "…taking care of your own personnel's wellbeing."

The narratives of difficult experiences in personnel leadership emphasized the superior's ability to resolve conflict situations. The conflicts mentioned were generally disagreements between employees. Workplace communities often have one or more strong personalities, who can easily take space from others. They may have earned authority among their colleagues, which is why others often bend to their will. Supervisors do not always learn of conflicts, because instead of being direct, employees may choose to discuss matters surreptitiously among themselves.

> "The group had a clear pecking order and employees were criticized for things like their appearance or sexual orientation."
> "…they can't talk about matters openly so they talk about what others have or haven't done behind their back."

The superior must always intervene in improper behavior, particularly when it concerns something other than assessing an employer's work performance. The superior must also intervene in all personnel problems within the workplace community. In these situations, the superior must remain impartial and objective. The narratives also mentioned a situation where the employee who was a target of inappropriate behavior did not want others to interfere in the matter. In this situation, the superior felt that they had no avenue for intervening in the matter. If the target does not wish for intervention, the topic may be addressed on a general level within the workplace community.

> "…sometimes there's a situation where a member of the workplace feels mistreated.
> "Sometimes the leader needs to make administrative decisions or change agreed-on practices, if the situation calls for it."

Work satisfaction is strongly tied to work atmosphere. The level of work satisfaction can be seen in the effects of change on the workplace community. Changes must be justified well to ensure employees understand why certain decisions have been reached. The respondents believe that the responsibility for work satisfaction lies with the entire personnel. Even one person who quarrels with others has a strong effect on work satisfaction and the work atmosphere. This can usually be solved through the creation of common ground rules and having the superior know their subordinates and their ways of acting.

> "The line must be drawn somewhere when it comes to behavior, and commonly created ground rules help with that."
> "Supervisors should however have an understanding of who can be given more power at the workplace."
> "A good work atmosphere consists of many things for which the entire personnel are responsible.

Versatile Communication Skills

The subcategories formed for the main category of versatile communication skills were *interaction, being heard* and *giving and receiving feedback*. Interaction between superior and subordinate is important to ensure openness and the ease of work. The narratives focused specifically on situations where employees were not listened to enough. Employees have the best information on how to best conduct practical work in units and how they could potentially be developed. In situations of change, employees should be included in planning.

On the superior's part, interaction should be timely, and information should move quickly. The narratives see no good sides to withholding information. Both written and oral communication should be considered carefully. "Reading between the lines" is always a risk of written communication. Oral communication allows for discussion and clarification, if necessary.

> "I feel that information should all be shared at the same time and properly and then go over it with subordinates instead of dropping bad news piecemeal."
> "When writing a note it's really important to consider how you put your words and what can be read between the lines."

The feeling of being heard is important to employees, both in positive and negative matters. This means supervisors should reserve time for listening to their subordinates talk about their situations. The narratives expressed a desire for the subordinate to be present and listening within the workplace community. The way the superior communicates their own message to their subordinates is also significant.

> "…the superior is present, listening, and when necessary, carrying the employees."
> "…an open atmosphere and being heard are keys to a functioning workplace community"
> "The superior must consider carefully how they transmit their message to the employees."

Only one of the narratives of difficult experiences in personnel leadership discussed giving and receiving feedback. Supervisors must be capable of receiving and even regularly asking for feedback on their own actions. This should be considered a way of improving oneself rather than an insult.

Practical Personnel Leadership

The narratives of difficult experiences in personnel leadership often discussed personnel resources and following requests on shift assignments. They depicted situations where employees had requested shifts the employer could not assign, because they did not follow good shift design practices. The employer has a duty to protect the employee by ensuring their work stamina and sufficient time for rest. The superior must explain to the employee the kinds of parameters that have been set for assigning shifts and why they have been reached.

Shift assignment requests may cause difficult situations to supervisors, as not all requests can be met because of the lack of resources. Today many workplaces have constant or partial overtime or substitution prohibitions, which further complicates the use of resources. Often supervisors would like to take additional resources but are forbidden to do so by their superiors.

> "…was unhappy with the planned shifts, thought about them often and counted others' night shifts, ..."
> "…the team leader is between 'a rock and a hard place' and so are superiors, regardless of their level."

The functioning of the workplace must be organized with existing resources as well as possible. If an employee expresses unhappiness with their shifts or feels they are treated unequally, the matter should be discussed with the superior. Especially in cases where shifts are changed to cover sudden illnesses, it is important that the person designing the shift lists knows their personnel resources. This helps avoid situations where tasks are assigned improperly or where individual employees are made to shoulder too much.

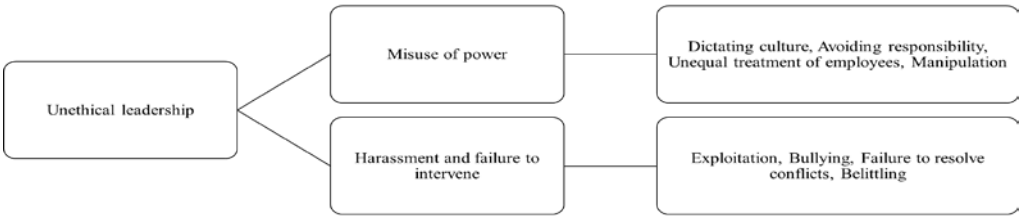
> "…because of an absence, an employee from outside our team had reassigned work based on the leader's instructions."
> "Someone who knows personnel resources should be on-call or reachable."

The equal treatment of employees as a value of ethical leadership is relevant to work management. To earn the employees' trust, supervisors should treat all employees equally and consistently. Equal treatment is often connected to sharing work assignments, approving shift requests or granting vacation days. It is the duty of the superior to take responsibility for their actions and decisions. When decisions are made in a consistent fashion, they are easy to justify to employees and there should be no doubts of preferential treatment.

Learning Experiences from the Perspective of Unethical Leadership

The main categories of the learning experiences were created based on the theory's facets of unethical leadership. The two classes are *misuse of power* and *harassment and failure to intervene* (Figure 4).

Figure 4. *Learning Experiences as Experiences of Unethical Leadership*



Misuse of Power

The respondents' narratives of difficult experiences in personnel leadership showed how organizations that dictate to their employees make them feel unappreciated as professionals. The employees are not allowed to participate in making decisions, nor are they allowed to interact. Interaction and discussing matters relevant to the workplace community are everyday parts of work. If supervisors forbid this, they show the employees that they do not care about them, as they do not allow them to influence decisions related to their work.

> "The workplace community's guidelines forbid employees from interacting outside of team meetings."
> "Work is not meaningful if the employee is ignored when making decisions."

These situations have taught that a dictating culture is not efficient. The employee should not merely accept things but should be able to question decisions. Supervisors must be capable of discussing matters in a constructive fashion and justifying decisions. The experiences also showed that supervisors cannot avoid responsibility for decisions. They must stand behind their decisions instead of e.g., blaming others. Difficult matters should be discussed as early as possible to prevent their escalation into major problems. The superior must conduct these discussions instead of giving the responsibility to a third party.

> "The responsibility was shifted somewhere else."
> "They could have consulted occupational health and asked for advice on how to go forward with the matter."

If an employee has concerns about a colleague's or a superior's wellbeing, they may discuss the matter privately with the person in question, but it would also be good to inform a superior. The respondents also wished for professionalism on the superior's part when handling difficult topics. Discussing things openly in the workplace community lessens needless speculation. Such matters can often remain concerns and topics of discussion within the workplace community, even though they could ask for a superior's support.

> "People tried to make it go away by not talking about it."

> "…the carelessly made inquiry made us feel like they wanted to brush the trash aside and then have us 'good' nurses carry on like nothing had happened."

Bearing responsibility is an important part of leadership, for which the respondents wish to be prepared. The difficult experiences have taught them how a superior can ideally work in such situations. The learning experiences suggested that unequal treatment exposes the workplace community to the creation of a negative atmosphere. If employees feel that a superior gives preferential treatment to certain employees, it reduces the superior's trust. Employees may fear telling the superior about personal matters in case they share them with others.

> "I want to bear responsibility to the end, both in good and bad situations and matters."
> "A superior must be capable of admitting their mistakes."
> "I also learned that trust in your superior is highly important…"
> "…the employees' unequal treatment constantly ruins the atmosphere…"

The superior's manipulation of employees is a serious breach and likely to break trust in the superior. The superior must guarantee the employee peaceful working conditions and the opportunity to interact with the workplace community without fear of reprisal. One sign of manipulation can be asking to report on other employees' talks during work. One of the respondents experienced this as a lesson on what manipulation can do to trust.

Harassment and Failure to Intervene

Harassment and failure to intervene appeared as exploitation, bullying, failure to resolve conflicts and belittling. Exploitation means that employees are afraid to share their opinions because the superior's authority is so strong. Expressing one's own views may lead to harassment on the superior's part. Accusations of bullying usually happen between colleagues, but superiors may also be guilty of it. Bullying can appear in in many forms: taunting, being excluded from the workplace community or inappropriate behavior. Superiors should systematically intervene in bullying and never dismiss the matter as interpersonal friction between colleagues.

> "For the entire time the shift was at work together, the older employee taunted this younger nurse. …at which point the older employee became quite mad and started yelling."
> "The nurse also accused others of workplace bullying."
> "If I'm ever in a similar situation as a superior, I hope I have the courage and understanding to intervene."
> "I also learned that one person can cause many challenges to a work unit and take up a large amount of the superior's time."

Failure to intervene in conflicts is one of the learning experiences in the narratives of difficult experiences in personnel leadership. Conflicts can be either between two employees or an employee and a superior. If there is no intervention, conflicts often escalate until they are too large to be easily solved. The learning

experiences suggested that such situations should not happen, if superiors have the courage to take responsibility and intervene. Unfortunately, some superiors may believe such situations should be left for the individuals to solve.

> "… it started to get personal and words like 'racism' and 'bullying' started to appear."
> "However, the nurse and the superior's situation wasn't handled or discussed between them."
> "…tells about the inappropriate feedback they'd received to their superior, who just dismissed the matter by saying 'yeah, that's just their style of talking'."

The final learning experience mentioned by the respondents was belittling. Each employee is an important part of the workplace community. Employees should be given the chance of regularly discussing matters related to the workplace community, usually as part of a weekly or team meeting. Even if the superior has nothing to discuss, they should organize the meeting to facilitate communication. Employees generally expect such meetings and make time for them. Cancellations also usually lead to wasted time, as employees cannot easily perform other work in place of the meeting.

Discussion

The purpose of this study was to discover what kinds of contents of ethical leadership master's degree students with experience in the social and health care field had noticed in difficult experiences in personnel leadership and what they had learned of their experiences. The learning experiences were analyzed from the perspective of unethical leadership.

The results suggest that the respondents appreciate a just superior with good communication skills. They are expected to support the employees in both good and bad situations and to carry them through difficult times. Barkhordari-Sharifabad et al. (2018) note in their study that a superior who shows respect and empathy to their subordinates creates a positive atmosphere to the workplace community and increases staff satisfaction. By creating such an atmosphere, the superior encourages ethical behavior, which becomes expected and appreciated (Zhang et al. 2019).

The respondents wished for superiors to recognize the skills of their subordinates and to give them responsibility as necessary. To ensure equal treatment, supervisors must justify their decisions, so no one is left with doubts. Mannix et al. (2015) reached the same conclusion in their study of ethical leadership in nursing. The justified decisions of superiors required flexibility, adaptability and listening to subordinates' feedback. Good relations based on trust and encouragement between superiors and subordinates are also important (Mannix et al. 2015).

The results also emphasize the influence of ethical leadership on the creation of workplace atmosphere and the workplace community's wellbeing. Superiors have a great responsibility for the workplace community's wellbeing, particularly from the perspective of conflict resolution. The respondents wished for swift and decisive interventions from the superior, as was also found by Sapienza (2005).

According to McKibben (2017), conflict resolution also increases mutual respect and the understanding of employees' differing roles. The responsibility for workplace wellbeing belongs to each employee, with the superior acting as a uniting force.

The workplace atmosphere was also influenced by the length of a new employee's familiarization and training period, which was considered part of the superior's responsibility. The respondents wished that supervisors would implement a logical protocol of familiarization to ensure an even quality to the process. According to Barkhordari-Sharifabad et al. (2017, p. 5), there can be major differences between the individual's and organization's values and beliefs. In such cases the superior's responsibility in justifying the organization's values to their subordinates is emphasized.

The respondents hoped that superiors would share information quickly and accurately and would listen to employees. They wish to be heard regarding various matters and superiors must have time to listen. Freire and Bettencourt (2020) also claim that it is important for superiors to give employees the chance to influence decision-making and to listen to them.

The equal treatment of employees, following shift assignment requests and managing personnel resources in sudden situations emerged as part of practical personnel leadership. As many workplaces in the social and health care field operate in three shifts, employees often make requests that cannot be fulfilled, which may make them feel treated unjustly. Barkhordari-Sharifabad et al. (2017) mentioned the justness of shift and vacation assignments in their results.

The respondents' learning experiences of difficult experiences in personnel leadership were based on the main categories of unethical leadership, which were the misuse of power and harassment and failure to intervene. These could be recognized in the learning experiences as negative emotions towards the actions of a superior. As superiors misused their power, the employees felt that their work or thoughts on developing the workplace community were not appreciated. The respondents learned that superiors must discuss matters with employees before making decisions and to listen to their ideas, as was also found by Blair et al. (2017) in their study.

An authoritarian culture, where the superior dictates decisions, does not work in modern workplace communities. Superiors must be capable of taking responsibility for their decisions and justifying them to employees. The respondents wish to be superiors who bear their responsibility and can be trusted by employees. According to Gallagher and Tschudin's (2010) study, superiors who bully and belittle their subordinates may be successful leaders from the perspective of e.g., their ability to achieve goals, but their methods are ethically unsustainable.

Personal experience is the central point of learning (Kolb 2015), and learning and reflecting on experience is important to the development of leadership skills (McGill 2017). In this assignment, the respondents reflected on everyday experiences and analyzed what difficult experiences in personnel leadership had taught them. Everyday learning happens as part of work and does not require preset goals (Hagar and Halliday 2009, Nikolova et al. 2014).

The respondents learned from their experiences how important a superior's behavior can be on changes to the workplace atmosphere. The superior must stop potential bullying in the workplace community actively and effectively. The superior cannot be a bully themselves; in this case trust among employees is lost. Permitting workplace bullying lowers the employees' ethical values (Ahmad et al. 2020) and productivity (Sapienza 2005).

According to the results, some respondents had been forbidden from talking together outside of team meetings, which suggests tyrannic leadership, which has been studied by Einarsen et al. (2007). According to their analysis, the tyrannic leader only seeks the organization's advantage at the expense of the employees. Another facet of unethical leadership that arose from the responses was the superior's avoidance of responsibility and shifting blame to others. According to Freire and Bettencourt (2020), an ethical superior's goal is, on the contrary, to clarify responsibilities and goals in their unit. Their words and actions are consistent, and they keep their promises.

Limitations of the Study

The students who participated in the study worked at different workplaces in the social and health care field and had different bachelor's degrees. Their workplaces represented the field broadly, both in the public and private sectors. After gaining their degrees, all had worked in the field for a minimum of three years, but several of them had as much as fifteen years of experience. A small portion of the respondents may have already worked as superiors, but the majority still worked as employees. They were studying for a master's degree in leadership, which is why they were already familiar with various leadership models and were highly motivated to answer the assignment. Both of these factors increase the study's reliability. The students were informed of the possibility of not sharing their narrative for use in this study, but all chose to give their permission. Some of the students did not have a difficult experience in personnel leadership to share, which might suggest their careers had been short.

The received narratives and learning experiences were analyzed through theory-based deductive content analysis, which may have limited the results. The use of inductive content analysis might have produced different results. The data were grouped under main categories of ethical and unethical leadership that arose from the theory. The subcategories were then derived from the data through inductive content analysis. The received narratives and learning experiences could all be placed under the deductive models, but the analysis of qualitative study may give different results depending on the researcher's method of analysis. There is also a question of how reliably the main categories of ethical and unethical leadership could be derived from the theory. In this study, deductive content analysis gave clear results of the execution of ethical leadership and the identifying of unethical leadership.

Conclusions

The principles of ethical leadership emerge in difficult situations related to personnel leadership. The principles can be seen as the basis for the superior's ethically sustainable actions. The students' difficult experiences in personnel leadership have taught them how they themselves do not wish to act and what superiors' unethical actions are like. The experiences of unethical leadership still show strong hierarchical leadership. The social and health care field has sought to lessen hierarchy in its administration, but the results suggest that participatory leadership should be increased, and workplaces should expand employees' opportunities of influencing matters.

The responses mainly stressed learning from the employee's perspective. A broader study of what superiors learn from difficult experiences in personnel leadership and how they use learning experiences in their work would be interesting. This is related to the concept of learning at work, which has been studied widely, but less from the superior's perspective.

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How Can Virtual Reality Glasses and Virtual Learning Material be Useful for Final Stage Nursing Students?

By Mari Salminen-Tuomaala[*]

Purpose: to describe nursing students' experiences of learning with help of virtual learning materials and virtual simulations. The aim was to produce knowledge that can be used to develop virtual simulation teaching and counseling further and to support students' self-debriefing. Methods: This is a mixed method study conducted with 13 final-stage nursing students at a University of Applied Sciences in Finland. Following virtual simulations performed during an acute nursing course, the students completed a questionnaire with qualitative and quantitative items on their experiences and on the usefulness of the simulations. The findings are primarily based on an inductive content analysis of the students' responses to qualitative items. The quantitative data, analyzed by means of SPSS, was used to support the qualitative analysis. Results: Most participants found virtual simulation learning and the use of virtual reality glasses a welcome change and a meaningful and safe way to promote their theoretical and practical competencies. They appreciated the possibility to choose the topic and the time and place of study. The simulations had been useful in practicing assessment and decision-making skills. Problem-solving, simulation of rare incidents, game-like elements and step-by-step feedback were proposed. A few students disliked the artificial setting and some reported headache and nausea. Conclusion: Virtual simulations and virtual reality glasses can be effectively used to teach final-stage nursing students as part of a blended learning approach. Careful planning of the learning contents and a suitable level of challenge in the simulations increase student motivation.

Keywords: *experience, nursing student, acute nursing, virtual simulation, virtual reality, VR glasses*

Introduction

The use of simulation pedagogy has expanded rapidly in healthcare education over the past two decades. Built on the experiences from military, aviation and space industries, simulations have been used to enhance both technical and non-technical competencies (Flentje et al. 2018.) Simulations strive to imitate authentic nursing situations and contexts, providing students an opportunity to learn important practices and to promote their decision-making and critical thinking skills (Salminen-Tuomaala et al. 2020). Teachers can decide to concentrate on simulating specific nursing situations or extend the simulation to cover a wider range of clinical reality (Salminen-Tuomaala et al. 2018). The method is safe and it engages students in the learning process. The sessions start with preparation,

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which includes going through the study objectives, scenarios, roles and practical instructions. After the scenario, debriefing is held to allow students and teachers reflect and evaluate their own and each others' contributions (Ranta 2013).

Simulated learning has been found to provide a response to the demands for better patient safety (Motola et al. 2013) and students' opportunities to experience, evaluate and reflect on critical situations before entering a clinical setting (Sanford 2010). In addition to the development of technical competencies through repetition in a safe setting (Salminen-Tuomaala and Koskela 2022), simulation training has been claimed to incorporate the affective or emotional components of learning (Salminen-Tuomaala et al. 2020). Simulations have been used to practice such complex competencies as clinical reasoning, decision-making (Bogossian et al. 2015, Liaw et al. 2015, Oddvang et al. 2021), situational awareness and emotional intelligence (Salminen-Tuomaala 2020, Salminen-Tuomaala et al. 2020, Salminen-Tuomaala 2021). Situational awareness is important both in acute nursing situations, in which helping critically ill patients requires rapid decision-making and correct action, and in sensitive situations, which call for comfort and emotional support (White et al. 2021).

In recent years, simulation-based education has been increasingly complemented by elements of virtual reality (VR), a combination of hardware and software that can be used to block out the real world and create a sensory illusion of being immersed in another environment (Pottle 2019). In the Healthcare Simulation Dictionary (Lioce et al. 2020), virtual simulation is defined as follows:

> The recreation of reality depicted on a computer screen (McGovern 1994).
> A simulation involving real people operating simulated systems. Virtual simulations may include surgical simulators that are used for on-screen procedural training and are usually integrated with haptic device(s) (McGovern 1994, Robles-De La Torre 2011).
> A type of simulation that injects humans in a central role by exercising motor control skills (for example, flying an airplane), decision skills (committing fire control resources to action), or communication skills (as members of an air traffic control team) (Hancock et al. 2008).

VR, augmented reality and gaming have increasingly become a target of experimentation and study in teaching both technical and non-technical skills. Virtual simulations have been used to enhance lecture or web-based courses and to foster intradisciplinary and interdisciplinary education (e.g., Wankel and Blessinger 2012, Salminen-Tuomaala et al. 2020, Foronda and Bauman 2014). As simulations in general, virtual simulations allow mistakes to be made (Poulton et al. 2009) and high-risk situations to be replicated (Kidd et al. 2012). They have been very useful during the COVID-19 pandemic, when there have been limited clinical placements available (Wei 2021).

In all simulation-based education processes, instructor and peer feedback, reflection and debriefing are essential elements. Debriefing can be defined as discussion conducted to explore and analyze the performance with the aim of gaining insights that can improve clinical practice (Cheng et al. 2014). Shared discussion can open up new perspectives for the participants and observers of the

simulated process (MacLean et al. 2019) and facilitate reflection, a skill that will be necessary in the students' future work (Roca et al. 2020).

It is possible to practice post simulation debriefing, in-simulation debriefing, and video-assisted instructor debriefing. Simulated situations can be captured on video, to be used for reflection (Levett-Jones and Lapkin 2014, Paige et al. 2014). The idea of self-debriefing has also been introduced, for example to complement individual virtual simulations. Self-debriefing can be facilitated by structured models (Kuiper at al. 2008, MacKenna et al. 2021).

A systematic literature review of 80 studies spanning 1996 to 2018 (Foronda et al. 2020) revealed that most research (n = 69.86%) supported virtual simulation as an effective pedagogy for nursing students. In addition to improving cognitive learning outcomes, virtual simulation had an effect on the affective domain of learning (attitudes, values and student engagement). The learning benefits were found to increase with the time spent and amount of use. The review stressed the importance of looking for best practices and for a common understanding of terminology for virtual simulations (Foronda et al. 2020). Among other evidence of the effectiveness of the method are increased empathy towards people with mental health illness (Wan and Lam 2019) through virtual simulation and improved assessment skills through virtual gaming simulation (Verkuyl et al. 2017).

The use of narrative-based virtual patients has been recommended as a technique having potential for wide application in healthcare education (Guise et al. 2012, Wei 2021). These case-based computer games involve several alternative pathway options. This means that the user needs to make care and treatment decisions, which will affect the progress of the simulation. Adverse choices will cause the scenario to end or allow a second choice based on feedback (Cook et al. 2013). This technique should be based on a careful choice of learning objectives and on realistically designed narratives and authentic scenarios (Guise et al. 2012).

Finally, it should be noted that learning through technology may be influenced by preferences, such as visual or kinesthetic learning. As far as possible, students should be recognized as individuals and offered learning situations that take this diversity into consideration (Bradshaw and Hultquist 2021).

Research Purpose and Aim

The study purpose was to describe final-stage nursing students' experiences of learning with help of virtual learning materials and virtual simulations. The aim was to produce knowledge that can be used to develop virtual simulation teaching and counseling further and to support students' self-debriefing.

The research question was:

How helpful are virtual simulations as a learning experience?

Research Methods

Research Design

This mixed method study was conducted with 13 final-state nursing students at a University of Applied Sciences in Finland. The findings are primarily based on an inductive content analysis of material collected through an online survey. The quantitative data collected in the survey was used to support the qualitative analysis, although it is not suitable for generalization due to the limited number of participants.

Participants and Data Collection

The 13 participants (response rate 68.4%) were a group of final-stage nursing students at a University of Applied Sciences in Finland. Their age range was 22-30 years (mean 26, median 27 years), and most of them (85%) were women.

The participants had plenty of experience of simulation-based learning. During their nursing education, they had undertaken several courses taught through workshop and full scale simulations. They had also been introduced to small-scale virtual simulations through the Teams application during the Covid-19 pandemic. In May 2021, they had for the first time an opportunity to try out virtual reality (VR) glasses and virtual learning materials in a classroom situation.

During an acute nursing course in May 2021, all students completed at least one simulation alone, choosing one or several of the following topics: Cardiopulmonary resuscitation; assessment and examination of an acutely ill patient; care of an unconscious patient; and management of an acute situation in the patient's home context. Most students (7), performed the assessment and examination of an acutely ill patient, designed to practice the use of the ABCDE protocol. Four students chose the care of an unconscious patient, and two practiced cardiopulmonary resuscitation. The classroom situation was led by two teachers. Following the simulation, the students were instructed to conduct self-debriefing to determine their successes, challenges and development needs. Students' experiences of self-debriefing and the development of their professional identity were discussed later in a teacher-led seminar, arranged through a communications platform.

A few days after the virtual simulation, in May 2021, the students were contacted by e-mail and informed about the study. They received a link to a survey and reporting tool, which enables the collection of both qualitative and quantitative data (Webropol Services).[1] The questionnaire consisted of two background questions (age and gender); four qualitative items and 15 quantitative items.

The qualitative items were as follows, (1) What kind of virtual simulations did you perform during the acute nursing course?, (2) Describe your experiences of virtual simulations during the acute nursing course, (3) Describe your

[1]https://webropol.com/. [Accessed August 15-October 31 2021].

experiences of using VR glasses, and (4) Describe your experiences of acting in the virtual learning environment.

In the quantitative part of the questionnaire, students were requested to rate their learning experiences in various areas of acute care using a Likert scale (for example, 1= very much improvement; 2 = rather much; 3 = neither much nor little; 4 = rather little; and 5 = very little improvement.)

Data Analysis

Inductive content analysis was used to analyze the qualitative data. First, the work involved reading and re-reading the transcribed material and picking out semantic units that represented an answer to the research question. These phrases, saved into Word files, were then reproduced in a reduced form. Reduced expressions with similar contents were gathered under categories, which were grouped into four higher-level categories. To ensure the consistency of the coding process, the researcher returned to the original data several times during the analysis (Polit and Beck 2018). Table 1 illustrates how the inductive content analysis proceeded.

Table 1. *Virtual Simulation as a Motivating and Safe Learning Experience*

Sub-category	Generic category	Main category
Virtual simulation as a welcome change to previous learning methods	Experiences of virtual material and simulations as a learning method	Virtual simulation as a motivating and safe learning experience
Virtual simulation as a safe way to promote technical skills in acute care		
Virtual simulation as a good possibility to train the ABCDE protocol		
Virtual simulation as a meaningful way to test one's problem-solving skills		
Virtual simulation as a suitable way to develop situational awareness in acute situations		
Virtual simulation as a good way to develop decision making skills		
Virtual learning material had been concrete and open for various solutions		
Using VR glasses was easy and fast to learn	Experiences of VR glasses	
Using VR glasses experienced as an exciting situation		
Using VR glasses as an immersive experience		
Using VR glasses experienced as a visit to another reality		
Virtual environment as a safe learning environment	Experiences of the virtual learning environment	
Virtual environment contained a suitable amount of technological challenges		
Easy environment to navigate		
More game-like elements	Wishes for virtual simulation courses	
Step-by-step feedback before moving on to the next step of the process		
More virtual simulation scenarios of situations in emergency departments and in intensive care units		

The quantitative material was analysed using SPSS for Windows 27. The results section starts with quantitative data (percentages, frequencies and means).

Research Ethics and Trustworthiness

The permission to conduct research was received from the Research and Innovation Director of a University of Applied Sciences. National guidelines (TENK 2013) on good scientific practice were observed carefully. The target group members were first informed about the study purpose and practices in a classroom situation and secondly by means of e-mail. It was stressed in the cover letter that participation was voluntary, withdrawal possible at any point, and anonymity secured at all stages of the research process. Accessing the link and completion of the survey was regarded as consent to participate.

Four quality criteria; credibility, confirmability, transferability and reflexivity, were used to promote the trustworthiness of the study (Polit and Beck 2018). Following good scientific practice (TENK 2013) and providing direct quotations increase the credibility of this study. The findings reflect the participants' voices and experiences. The credibility of the study is also enhanced by the researcher's long experience of teaching acute nursing and developing simulation-based learning. Confirmability refers to objectivity - having independent people agree about the accuracy, relevance or meaning of the data (Lincoln and Cuba 1985). The research process, participants and study context were carefully described to make it easier for readers of this study to assess both the confirmability and transferability of the findings. The quantitative data in this study is not suitable for generalization due to the limited number of participants. The findings on the qualitative data, however, appear to be transferable nationally, possibly also internationally.

Reflecting on her role (the criterion of reflexivity), the researcher was conscious that her long experience and conducting the study alone may have increased the risk of bringing pre-conceived assumptions and subjective interpretations into the study, thus decreasing confirmability. This may be a limitation. To counteract this limitation, the researcher returned to the original data repeatedly (Polit and Beck 2018).

Results

Quantitative Data

The majority of the nursing students (69 %, n=9) had never used VR glasses before. The remaining students had used the glasses a few times (n=2) or several times (n=2).

All students rated the virtual simulations as a good method to learn acute nursing (very good, 61.5%; rather good 38.5%) and almost everybody regarded the virtual setting as a good learning environment (very good, 53.8%; rather good, 38.5%). The students had found it easy to navigate the virtual environment (fully

agree, 38.5%; rather agree, 53.8%). They agreed that the virtual environment had felt 'authentic' (fully agree, 46.1%; rather agree, 38.5%), with authentic-feeling procedures (fully agree, 38.5%; rather agree 46.1%), and it had been relatively easy for them to live into the role of the nurse in the simulated situation (fully agree, 23.1%; rather agree, 53.8%).

In addition, the preparatory instructions preceding the simulation had been clear according to all students (100%), and learning about the objectives for the simulations had been a good experience (very good, 38.5; rather good 53.8%).

Table 2 shows students' responses to the benefits of virtual simulation in learning important areas of acute care. In general, the students found that their competencies had increased very much or rather much; nearly 85% of them agreed that following the simulation, they felt more confident about working as nurses in acute care settings. More than half of the students, 61.5%, also found that the simulation had affected their theoretical competence positively.

Table 2. *Usefulness of Virtual Simulations for Learning Acute Nursing*

Student's rating	very much improvement	Rather much	Neither much nor little	Rather little	Very little	Mean	Median
The virtual simulation improved my competence in assessing breathing	7.7%	69.2%	7.7%	15.4%	0%	2.3	2.0
The virtual simulation improved my competence in assessing circulation	7.7%	61.5%	15.4%	15.4%	0%	2.4	2.0
The virtual simulation improved my competence in assessing the level of consciousness	15.4%	69.2%	0%	15.4%	0%	2.2	2.0
The virtual simulation improved my competence in patient examination	15.4%	46.1%	30.8%	7.7%	0%	2.3	2.0
The virtual simulation improved my theoretical competence	15.4%	46.1%	38.5%	0%	0%	2.2	2.0
The virtual simulation increased my confidence to work as a nurse in acute nursing settings	23.1%	61.5%	15.4%	0%	0%	1.9	2.0

In this group of students, the virtual simulations seemed especially useful in learning to assess the level of consciousness (ca 85% very or rather much improvement). The students also felt better prepared to assess the patient's breathing (ca 77% very or rather much improvement) and circulation (ca 70% very or rather much improvement). Last, 61.5% of the students reported that the virtual simulations had improved their patient examination skills very much or rather much.

Qualitative Data

In this section of the results, the nursing students' experiences of virtual simulations are described through four categories: *Experiences of virtual material and simulations as a learning method; Experiences of VR glasses*; *Experiences of*

the virtual learning environment; and Wishes for virtual simulation courses. The quotations have been translated from Finnish into English by the author.

Experiences of Virtual Material and Simulations as a Learning Method

The students mainly described positive experiences of the virtual learning method and virtual material. Even though they had been introduced to new technology and had been expected to learn a new technique, they had found the method meaningful and useful for improving both theoretical and practical competencies.

To quote one of the students,

> "As an experience, it was meaningful and interesting. It reminded me of how to use the ABCDE protocol, and the motion during the practice certainly helped remembering and learning. The learning atmosphere was positive, encouraging and fun."

According to the students, the learning materials had been concrete and open for various solutions. The students appreciated the possibility to gain more confidence through repeating the simulations. They described how the virtual material had challenged them to become aware of the existing contradictory information and motivated them for independent decision-making. They had been encouraged to reassess situations and make decisions. They said, for example,

> "It makes you think about your own decisions."
> "Especially systematic monitoring of vital functions. It could also be done so that you had to first decide what should be assessed next, and then you would be told if it was correct or not, before moving on to the next stage, maybe that way you would think even more about the actual care."

The students appreciated the possibility to choose which topics they wanted to practice. They found that the teachers had provided them an opportunity to train in whichever area they had experienced their most pressing learning or development needs. The simulations on the care of unconscious patients and on care carried out in the home context were considered to be suitable for final-stage students, whereas resuscitation simulations were regarded as fit for beginners.

Experiences of VR Glasses

The students' experiences of using VR glasses varied, depending on their background. Some students had been nervous about how to learn to use the glasses and navigate the virtual environment. Their challenges had mostly been related to the use of motion controllers. Other students, however, had felt no hesitation in starting the simulations, because they had played computer games since their childhood. After the simulations, none of the students rated the technique as difficult to learn. They commented, for example,

> "You can learn to use the VR glasses fast."
> "You got the idea really fast, and it was easy to navigate the environment."

> "At first it was a bit tricky, of course, trying to pick things from the environment or to understand when it was enough to point or press with your finger, but you could learn pretty fast."

Moreover, the use of VR glasses in a virtual learning environment was considered to be a welcome change from lectures. The experience was described as immersive, as a visit to another reality, and as more authentic than learning with help of a manikin. To quote the students,

> "The outlook was authentic, the noises in the environment made it feel more authentic. The patient seemed authentic."
> "It was a nice change from ordinary simulations. It was helpful to see other students perform. It could have been even more challenging, I already have some VR experience and know how to navigate there."

Experiences of the Virtual Learning Environment

The students' experiences of the virtual learning environment and virtual reality were mostly positive; the learning was described as safe and interesting. According to most students, the learning environment contained a suitable amount of technological challenges. The students wrote, for example,

> "Easy, safe, because there is no harm to the patient. A fun way to learn."
> "You could learn fast how to navigate the environment and it was meaningful to watch others perform."

Secondly, the students appreciated the fact that now that they knew how to use the equipment, they could choose to participate from home, or practice alone whenever it suited them best. This was considered an asset during the prevailing COVID-19 pandemic.

A few students, however, found the environment 'artificial' and described their experience as 'sham'. For these students, the sensations produced by simulation or the artificially created environment had not felt as authentic as simulations conducted with real persons in the classroom situation. Moreover, some students had suffered from headache and slight nausea following the simulation.

Wishes for Virtual Simulation Courses

In their responses, the students made a number of proposals for future virtual simulation courses. More 'game-like' elements were suggested, and a few students wished for more sensory cues, challenging client questions and doctor's orders. Step-by-step feedback was proposed before moving on to the next stage of the process. According to the students, simulations could be used to practice a variety of situations in virtual emergency departments and clinics and in intensive care units. Several students wished for virtual training in resuscitation, care of trauma patients and various intensive care situations. In the students' own words,

> "First aid and emergency care situations."

"Resuscitation, examinations, how to act in various situations."
"Especially situations, where decision-making and problem-solving are required from nurses."
"Traffic accidents, pulmonary edema assessment, pneumothorax etc., care of cardiac patients, e.g., NSTEMI, preparing a sterile table for procedures…It would be nice to practice these for several times in a VR environment! Especially traffic injured patients, that makes me nervous at work, because they are relatively rare."

Discussion

Most participants in this study found virtual simulation learning and the use of VR glasses a welcome change and a meaningful and safe way to promote their theoretical and practical competencies. They appreciated the possibility to choose the topic and the time and place of study, and the opportunity to repeat the simulation, if necessary. A few students, however, disliked the "artificial" setting and/or reported headache and nausea. Unwanted symptoms seem to be relatively common and are thought to be caused by sensory mismatch (Weech et al. 2018).

Earlier studies support the finding that the possibility to practice for critical situations safely make simulations an effective way of learning and can improve students' confidence (Sanford 2010, Saab et al. 2021). The simulations seemed to have had both cognitive and affective learning outcomes, as in earlier studies on simulation-based learning (Foronda et al. 2020). The students found that the simulations had been useful in practicing assessment and decision-making skills and in learning to critically evaluate one's competencies through self-debriefing. Problem-solving scenarios, simulation of rare incidents, 'game-like' elements and step-by-step feedback were proposed. In an earlier study, VR, appreciated as an additional/supplemental resource to traditional teaching, was found to help learn psychomotor, decision-making, and problem-solving skills and to promote equity among students (Saab et al. 2021). Research has also shown that that simulations can increase participants' confidence in assessing and managing trauma patients (Kelley et al. 2021).

Looking at the findings, one must bear in mind that the novelty of any new learning system is likely to wear off sooner or later (Han-Huei Tsay et al. 2019). The use of a blended learning approach, or combining a wide range of more traditional teaching strategies with virtual teaching can help maintain the interest of students (Grønlien et al. 2021). Blended learning with hypermedia resources and project-based learning has also been found to increase participants' learning outcomes and interaction in learning management systems (Sáiz-Manzanares et al. 2020). As suggested in literature (Guise et al. 2012, Wei 2021) and by some participants in this study, narrative-based virtual patients and games with alternative pathway options could render the scenarios more authentic and motivating. Another factor that affects student motivation according to this study is careful planning of the learning contents. It is essential that the virtual simulations contain a suitable level of challenge, introduced when the time is right, and accompanied by clear instructions. If students work in their own time, teacher-led feedback sessions can to be arranged through a communications platform, or independent

structured self-debriefing can be carried out according to themes provided by the teacher.

Future research on the topic could involve a comparative study with larger samples, possibly with performance testing, to determine the effectiveness of virtual simulations compared to classroom simulations. Teachers' experiences of virtual simulations and VR glasses might also be worth looking into.

Limitations

The study had a small sample that only contained final-stage students undertaking a course in acute nursing in a single university. The quantitative data collected in the survey was only used to support the qualitative analysis and is not suitable for generalization due to the limited number of participants. Similar studies with larger samples, possibly in international collaboration, are recommended. The analysis was conducted by a single researcher, whose experience of simulation pedagogy may have affected the interpretations of the findings. Despite this, the researcher believes that the study presents relevant, authentic experiences of nursing students experimenting on VR glasses and virtual material.

Conclusion

Virtual simulations and VR glasses can be effectively used to teach final-stage nursing students as part of a blended learning approach. However, students should be recognized as individuals and offered learning situations that take their diversity into consideration. Careful planning of the learning contents and a suitable level of challenge increase student motivation. Virtual simulations allow independent learning and repetitions in a safe, near-authentic environment and they can improve students' confidence. The simulations are useful for practicing assessment and decision-making skills and in learning to critically evaluate one's competencies.

Implications

Virtual simulations can be used as part of a blended learning approach in both initial nurse education and in continuing education programs for nursing professionals. Simulations seem especially useful when preparing for situations, which require rapid assessment, situational awareness, problem solving and decision-making skills. Repeated training can help address challenging situations and facilitate the learning of schemes and protocols for acute nursing.

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Effect of the National Health Education Program among Saudi Patients in Saudi Arabia Primary Health Care Centers, 2019

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Health education (HE) is important in improving public health. Globally, the evaluation HE quality is an important obstacle to better interventions, and wider acknowledgment of As a result, the purpose of this research is to improve the quality of health education services by providing a current perspective on current evidence on the effect of the HE national program in primary health care centres (PHCCs) through the following objectives: To calculate the frequency of receiving HE To measure patient satisfaction with the provided HE service. To assess patient self-control and its determinants in chronic diseases. An analytical cross section study targeted randomly selected 1590 Saudi PHCCs visitors from the main five regions in the Kingdom of Saudi Arabia (KSA). Through exit interview using a pretested, well-structured questionnaire composed of four parts. The majority of participants were females (73.5%) and married (69.1). Of those, 64.9% had chronic diseases. The frequency of receiving HE was 51.1%. The health-educated patients significantly had better self-chronic disease control and an improvement in health status. The HECs shows a significant self-patient control of chronic diseases and patient satisfaction than HE services. HE interventions must be multidimensional to be effective in improving patients' clinical outcomes through the increase and maintenance of healthy behaviours.

Keywords: *health education, Saudi patients, primary health care centres, Saudi Arabia*

Introduction

Recently, the health education (HE) conceptual basis is regarded to be of the utmost significance (WHO 2012). HE is an integral part of being healthy, both as a process and a product. It is directed towards improving health literacy, has a role in health promotion (HP), and disease prevention, and advocates improvements in the sophistication of healthy behaviors (Glanz et al. 2008). His efforts to affect

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behavior must be multidimensional. Because health-related behaviors are determined by multiple factors (Hahn and Truman 2015).

Nurses, community workers, dietitians, and multidisciplinary teams were the most frequent educators (Loveman et al. 2008). Education by one person may focus more on the patient's ability than on the quality of HE. Nevertheless, there is no clear conclusion on whether having one educator is best due to a lack of information (Steinsbekk et al. 2012).

Various methods can be used to educate the patients, like verbal education, written information (handouts, articles in popular magazines, etc.), group-based learning, audiotapes, videotapes, computer-assisted education, and the internet (Zirwas and Holder 2009). Although face-to-face sessions are the most common and effective delivery format (Fan and Sidani 2009), the telephone or individualized counseling can also be used. Using mixed delivery models produces a moderate effect on knowledge levels (Ricci-Cabello et al. 2014). Today's patients are more educated, computer-well-informed, and much richer, so it is essential to clear all their rightly or wrongly earned doubts with patience and compassion (Marketing Monitor 1998, p. 6).

So far, education programs are designed to meet national or international education standards (Haas et al. 2012, Scarborough et al. 2011). Successful education increases patient satisfaction (Zirwas and Holder 2009). That affects clinical outcomes (improved adherence to treatment), patient retention, medical malpractice claims, and the timely, efficient, and patient-centered delivery of quality health care (Zirwas and Holder 2009, Prakash 2010).

Delivery of patient-focused care: HE requires providing care in a particular way, not just sometimes or usually, but always. It must be every patient, every time (TARP 1986, Tabbish 2001). One's confidence or belief (Bandura 1977) is a strong indicator of future behavior. Self-efficacy is a key internal motivational process that can be affected by environmental and personal variables and that influences the motivational outcomes of choices, effort, persistence, and achievement (Schunk and Di Benedetto 2020). Changes in self-efficacy are part of measures of patient self-management (Ritter and Lorig 2014).

Globally, there is an increasing consideration of the assessment methods for monitoring health services and the quality of health care provision in health institutions (Salam et al. 2014). In the Saudi vision of 2030, the significance of HP is a national priority. In the context of HP, HE provides an important preventive strategy. Indeed, the leading causes of death in KSA are coronary heart disease (25.4%) and diabetes (36%), which lend themselves well to HE interventions (Twinn 2001, Nutbeam 1979). According to Twinn (2001), however, it's still hard to figure out how to measure the effectiveness of HE.

The HE quality evaluation is an important obstacle to better interventions and wider acknowledgment of the importance of HE in improving public health (Nutbeam 1979). If you want to make sure that the local health services are meeting people's needs, you need to know what people think about the care and treatment they get.

This study aimed to improve the quality of the health education services by providing a contemporaneous perspective on current evidence on the effectiveness

of the MOH national program for health education all over KSA primary health care centers (PHCCS) through the following objectives.

Subjects and Methods

The National Health Education Program is a national program provided by the General Directorate of Clinical Health Education, the Assisted Agency of Primary Care, the Public Health Agency, and the Ministry of Health in Riyadh, Saudi Arabia. The program started in 2017 by providing HE to 432,000 patients through HE clinics at PHCCs, with the target of educating 36 patients per week at each HE clinic. The HE program had two phases: the first phase (100 health education clinics), where the total number of patients who received HE was 244,800; the first phase (72,000) (from June to December 2017); and the second phase (from January to December 2018). The second phase began in 2018 with;

60 health education clinics and educated 43,200 patients.
200-health education service (in which the infrastructure was not suitable for unavailable clinics). 144,000 patients were educated.

Study Setting

The randomly selected six PHCCS include the following: from the randomly selected countries from the main five regions of KSA; the number of total population nearly weighted according to the total population, and the attendance rate during data collection to the PHCCs (a week per region).

Study Design and Participants

A descriptive (comparative cross-section) study targeted the visitors/clients of the Primary Health Center in KSA. The target population was adults between the ages of 18 and 70 years old, both Saudi and non-Saudi, living in Saudi Arabia (SA) and visiting the PHC during the time of data collection (May and June 2019). The exclusion criteria were as follows; refusal to participate in the study, aged less than 18 years or more than 70 years. Excluding those who cannot communicate, refuse, or are unconscious, those with complicated medical or mental health conditions such as psychosis were excluded.

Sample Size

The sample size was estimated according to the following equation:

$$n= Z^2 P (1 - P) / d^2,$$

with a 95% confidence level and an 80% power of the study. The calculated sample size was 522 participants. In this study, we tripled this figure to 15664. The

total population is nearly weighted based on the total population and the attendance rate at the PHCCs during data collection (one month per region).

Sampling Technique

A multi-stage sampling method was used. The sample was collected from all the administrative regions:Weighted according to the number of populations that received first phase HECs 770 (49.2%), second phase [HECs 314 (20.7%), HES 480 (30.2%). per proportion of population density, and the % of urban to rural in KSA, to be {474 (30.3%). 318 (20.3%) West (Makkah Al-Mokaramah), 254 (16.2%) East (Eastern Region), 39 (4.5%) 125 (14.6%), Eastern Region, 184 (11.7%), Asser, 68 (4.3%), and then 90% from within the city and 10% from outside the city (Ministry of Health Statistical Year Book 2018).Simple random sampling is used in crowded places (PHCCS) and the visitors/patients may be diseased, or occupied, or refuse.

The data collection tool was a comprehensive, pre-coded, well-structured, Arabic questionnaire on Google Forms. It was the data collection tool after being pretested by piloting on 74 patients, and validated by six experts as regards its content. Reliability was estimated at 0.94, and the clarity of different items, which included four main parts: 1) addresses the PHCC patients' socio-demographics, reasons for and frequency of visits, and expectations. 2) Assess the national structured planned higher education services. 3) In terms of insufficient time for HE cessions, discussing problems with educators, trusting health educators, and satisfaction from HE cessions themselves, patient satisfaction was measured using a four-item likert scale (dissatisfied = 1, border line = 2, satisfied = 3, and strongly satisfied = 4). 4) Chronic patient self-control was measured using the Self-Efficacy for Managing Chronic Disease 5-Item Scale (SES5G), which is a reliable and valid instrument to assess patients' self-efficacy for managing chronic diseases (Ritter and Lorig 2014).

Eleven trained and qualified data collectors conducted face-to-face interviews or self-administered questionnaires under the supervision of the data collection team.

Statistical Analysis

SPSS version 25 was used to analyze the data, and a level of significance ($p < 0.05$) was used. The qualitative data were presented as frequency and percent, while the quantitative data were presented as mean, standard deviation, median, and range. test was used to test the association between categorical variables. The T-test, ANOVA (Analysis of Variance), and Kruskal-Wallis tests were used to test the association between quantitative variables. Pearson's correlation coefficient (r) was used to test the association between two continuous variables.

Ethical Issues

Ethical approval for the study was granted by the Institutional Review Board at King Fahad Medical City, Riyadh, Saudi Arabia through the relevant MOH health authorities. Written informed consent was obtained from each participant.

Results

The majority of participants were females (73.5%), married (69.1%), aged 30–45 years old (64.9%), had chronic diseases (60%), reviewed the PHCCs sometimes (when necessary) and for emergency situations (40.9%), and expected a high level of services (48.9%) (Table 1).

Only 71.6% knew the importance of HE. The main sources of knowledge about HE were health care providers (61.1%), social media, and internet web sites (32. 4%). Approximately 10% of PHCC patients receive HE.Nine hundred and four (54.9%) of the PHCCs Saudi patients knew about the presence of HE services. Of those, 806 (51.1%) were guided to the services, mainly by HCPs (92.1%), to the patients 706 (87.6%), through face-to-face 692 (85.9%), provided by one HCP, and 566 (70.1%). The main HE topics provided in the HE sessions were balanced dietary intake (62.5%), physical activity (43.1%), and psychological support (17.1%) (Table 2).

The majority of them were satisfied with the health education process, with the least satisfied scores being at (discussing problems, then sufficient time) (Table 3).

The mean of all the five domains of patient self-control for managing chronic diseases was significantly higher among educated patients (36.58.9 (11-50)) than among non-educated patients (32.1±10.1 (5-50). There was statistically significant improvement in the patient self-control of chronic disease score among educated CVD, DM, and obese patients ($p < 0.05$). There was a statistically significant improvement in all domains of patient self-control of chronic diseases (Tables 4-5).

The mean of all the five domains of patient self-control for managing chronic diseases, and the total patient satisfaction score were significantly ($p<0.05$) higher among the patients from the 1st phase of HECs , and 2nd phase of HECs(2018) compared to the 2nd phase of HESs (2018) (Table 6).

The mean patient self-control of chronic disease score and the patient total satisfaction score were significantly different ($p < 0.0001$). The mean total score of the patient self-control of chronic disease was significantly higher among patients who received more than five health education cessions (41.88.8 (16-50) compared to patients who received a single cession 34.3±8.1 (11-50) (Table 7). There was a direct and significant relationship between patient self-control and satisfaction ($r=0.41$, $p=0.00$*).

Table 1. *Sociodemographic Characteristics of the PHCCs Patients/Visitors*

	F	%
Sex		
Male	415	26.5
Female	1149	73.5
Age		
<30y	542	34.7
30-<45y	595	38.1
>45y	427	27.3
Marital status		
Widow	75	4.8
Single	351	22.4
Married	1080	69.1
Divorced	58	3.7
Level of education		
lliterate	141	9.0
Primary-preparatory	332	21.2
High school or above	1090	69.8
Working status		
Working	415	26.5
Not working	1149	73.5
History of chronic diseases		
No	552	35.2
Dyslipidemia	168	16.6
CVD	20	1.9
Hypothyroidism	60	5.9
Obesity	206	20.3
D.M	374	36.9
Hypertension	256	25.2
Asthma	80	7.9
Liver-kidney disorders	2	0.1
Others	314	31.0
Frequency rate, cause, and expected level of services at the PHCCs		
Frequency rate of visits		
Sometimes-when need	938	24.2
1st time	136	40.9
Frequent (always)	490	34.9
Cause of visit		
Chronic disease	378	24.2
New, emerging disease	640	40.9
Follow up -screening	546	34.9
Expected level of service		
Good Service	673	42.9
Excellent Service	760	48.6
Poor service	96	6.1

Table 2. *The Health Education Services Among Saudi PHCCs Patients/Visitors*

	F	%
Knowing the presence of HE services at the PHCCs	904	54.9
Guided to the HECs /HESs	806	51.1
Referral to the HECs /HESs by (no=806)		
HCPs	742	92.1
Family/friend	60	7.4
Others	4	0.49
The HE received by (no= 806)		
The patient	706	87.6
Family member	96	11.4
Other (care givers)	4	0.49
The main Health Education Topics provided in PHCCs		
Don't know	26	3.2
Breast feeding (importance , and techniques)	10	1.2
Vaccinations	43	5.3
Infectious diseases (influenza-----	6	0.7
Balanced nutrition	503	62.5
Psychological ,and Mental health	137	17.1
Physical activity	347	43.1
Diseases (symptoms, treatment)	6	0.7
Dental health	23	2.7
Sources of information about the importance of health education		
Knowing importance of health education	580	71.6
Health care providers	492	61.1
Social media	261	32.4
Schools	36	4.5
Family members	5	0.6
T.V	2	0.2
Brochures	1	0.1
Others	27	3.3
Books	42	5.2
Internet web sites	261	32.4
MOH web site	64	7.9
The used methods for HE; (no=806)		
Face to face	692	85.9
Group education	104	12.9
Through the phone	40	4.9
Brochures	176	21.9
The HE provided by (no=806)		
Different specialties (health education-physiatrist-nutrition)	72	8.9
Different HCPs of the same specialty	168	20.8
One HCP	566	70.1
Number of HE cessions s (no=806)		
Once	300	37.2
2-5 times	202	25.1
>5 times	304	37.7
Patients were involved in the HE plan/decision making (no=806)		
Yes	327	40.6
No	208	25.8
To some what	271	33.6

Table 3. *The Patient Satisfaction from the Health Education Process*

	Total score Mean±SD	**Strongly satisfied F (%)**	**Satisfied F (%)**	**Borderline F (%)**	**Dissatisfied F (%)**
Sufficient time	3.06±0.7	190(23.0)	508(61.5)	96(11.6)	20(2.4)
Discussing problems	3.1±0.6	218(26.4)	498(60.3)	80(9.7)	18(22.7)
Trusted health educator	3.18±0.63	236(28.6)	514(62.2)	48(5.8)	14(1.7)
Satisfied from health educator itself	3.28±0.61	326(37.0)	440(53.3)	44(5.3)	6(0.7)
Total satisfaction score	Mean± SD 12.66±2.27 Range 4-16				

Table 4. *The Relationship between the Received Health Education and the Domains of Patient Self-control for Managing Chronic Diseases*

The domains of patient self-control for managing chronic diseases	**Total Median Mean±SD**	**Not educated T=758 Median Mean±SD**	**Educated T= 806 Median Mean±SD**	**p**
Control pain or fatigue	6 6.76±2.2	6 6.3±2.3	7 7.2±2.04	0.04*
Control the emotional and psychological stress	7 6.73±2.49	7 6.4±2.7	7 7.1±2.1	0.03*
Control any other symptoms or health problems	6.5 6.67±2.3	6 6.2±2.5	7 7.1±2	0.02*
Manage his daily lifes'different tasks required	7 7.10±2.35	7 6.7±2.5	8 7.5±2.0	0.01*
Reduce the effect of the disease on your daily life by using other non - medication methods	7 7.02±2.58	7 6.5±2.8	8 7.5±2.2	0.03*
Self-patient chronic control Mean±SD Range	34.24±9.8 5-50	32.1±10.1 5-50	36.5±8.9 11-50	0.00*

*p<0.05 there was a statistical significant difference.

Table 5. *Relationship Between Patient Self-control of Chronic Diseases Score at Different Diseases and the Patient Education*

	Cardiovascular diseases (CVD) Mean±SD	**Asthma** Mean±SD	**Diabetes Mellitus** Mean±SD	**Obesity** Mean±SD	**Hypothyroidism** Mean±SD	**Others** Mean±SD	**Multiple** Mean±SD
Total	34.9±10.6	31.8±9.1	37.0±8.4	31.9±9.6	35.2±10.7	35.5±8.1	33.2±6.5
Not educated	33.9±11.1	36.6±9.8	33.7±9.1	29.1±12.4	34.7±10.9	35.4+_9.4	32.9±7.7
Educated	35.6±10.2	35.9±2.4	36.6±9.1	35.6±10.2	35.5±9.9	35.7±6.4	33.1±7.9
P	0.04*	0.79	0.04*	0.00*	0.88	0.12	0.61

*p<0.05 there was a statistical significant difference.

Table 6. *Relationship between the Patient Self-control of Chronic Disease and the Type of Health Education Service in PHCCS*

The total score of	**1st phase of HECs(2017) Mean±SD Range**	**2nd phase of HECs(2018) Mean±SD Range**	**2nd phase of HESs(2018) Mean±SD Range**	**P**
patient self- control for managing chronic diseases scale	34.9±9.2 20-50	33.03±10.1 5-50	30.4±9.9 5-45	0.03*
Patients satisfaction	12.9±3.3 6-14	11.1±2.4 5-14	6.01±1.1 4-8	0.00*

*p<0.05 there was a statistical significant difference.

Table 7. *Relationship between the Patient Self-control of Chronic Disease and the Number of Health Education Cessions in PHCCS*

	Once Mean±SD Range	2-5 times Mean±SD Range	More than 5 times Mean±SD Range	P
Patient Self-control of chronic diseases	34.3±8.1 11-50	53.2±8.1 5-50	41.8±8.8 16-50	0.03*

*p<0.05 there was a statistical significant difference.

Discussion

Assessing patients' thoughts about care and treatment is an important step towards improvement of the quality of care, to ensure whether the local health services are meeting patients' needs and identify possible barriers to service delivery (Riegel et al. 2009).

Results showed that adherence to HE intervention activities contributed to enhancement of self-control of chronic disease. Furthermore, the deterioration of scores was minimal in the compliant group and in weight, physical activity, and self-rated health status. Similar results can be found as regards adherence to health promotion activities (Freund et al. 2013). So far, Dickson and his colleagues (2013) have recommended a certain level of physical activity, and Ausili and his colleagues (2016) say that people should do a lot of physical activity and swim a lot.

Selfcare is defined as a naturalistic decisionmaking process addressing both the prevention and management of chronic illness, with core elements of selfcare maintenance, selfcare monitoring, and selfcare management. In this scientific statement (Soundarya et al. 2004).

The main HE topics provided in the HE sessions were balanced dietary intake (62.5%), physical activity (43.1%), and psychological support (17.1%). The evidence supporting specific self-care behaviors such as diet and exercise is effective in improving self-care and outcomes (Riegel et al. 2009). This is consistent with another study in Saudi Arabia that found that increasing physical activity, quitting smoking, and controlling glycemic and blood pressure levels can reduce or delay the prevalence of NCD complications (Kapour R 2020).

These results showed that health education is effective for improving patient self-control for obesity, DM, and CVD as chronic diseases, so self-care is fundamental to the prevention and management of chronic illnesses. (Riegel et al. 2009, WHO 1983). According to previous research, selfefficacy is a key influencer of enhanced selfcare in cardiac patients and their comorbid conditions (including concomitant HF and diabetes mellitus) (Prakash 2010).

There was There was a direct and significant relationship between patient self-control and satisfaction ($r = 0.41$, $p = 0.00$*). This can be attributed to how successful education increases patient satisfaction as it affects clinical outcomes (WHO 2013) through improved adherence to treatment and patient retention. Medical malpractice claims concern the timely, efficient, and patient-centered provision of high-quality health care.

The majority were satisfied with the health education process, with the lowest satisfaction scores being in the following domains (discussing problems with the educator, then adequate time of the HE cessions), as health education programmers are based on the needs of patients that were identified, allowing for open discussion about health concerns and the identification of various educational areas that might be relevant to the patients (WHO 2013).

We reported that the educated patient significantly had a higher mean of the total self-control of chronic diseases scores in all its five domains, in agreement with the WHO's Global Action Plan (2103–2020) for prevention and control, which recommends "empowering patients with NCDs to seek early detection and manage their own condition better, and providing education, incentives, and tools for self-care and self-management" (Prakash 2010). Patient education is important to help them manage their conditions, help them with daily care, and help them build the skills they need to deal with everyday problems, such as choosing food or getting enough exercise (Wagner 1998).

Health education is an effective therapeutic tool in controlling NCDs, especially CVD and DM in aggrement with (Al-Esawi and Amer 2021) as it decreases the frequency of their related complications and improves the overall quality of life.

The mean total score of the patient's self-control of chronic diseases was significantly higher among patients who received more than five health education cessions 41.8±8.8 compared to patients who received a single cession (34.3±8.1) because the more cessions act on the patient's reorientation and motivation regarding chronic diseases to create awareness, delay the complications, improve nutrition, reduce cost, and increase the ability to adapt, and cope with the illness (Soundarya et al. 2004).

Asiri et al. 2021): From 2010 to the present, NCDs, such as CVDs, obesity, and diabetes, have been the main causes of death in Saudi Arabia. education through well-structured health education cessions (content, duration, and setting) by a well-trained team is an effective national project. It's easy to use tools that measure patient satisfaction and help people with long-term illnesses control their own health.

The first study was done to find out how the National Health Education Program had an effect on Saudi patients from all over the kingdom's Saudi Arabia

Primary Health Care Centers. It had a large sample and data was collected by a qualified team of health workers.

Conclusions

Obesity, diabetes mellitus, and cardiovascular disease are chronic conditions that can be managed with health education. Effective health education necessitates the use of qualified, educated healthcare providers as well as a proper, well-prepared environment. Patient satisfaction and patient self-control of chronic disease scores are important indicators of successful health education programs. Patient education is essential.

Recommendations

We recommend distributing the results and using them to guide policymakers in increasing the effectiveness of the HE program. HEC should be provided in all healthcare settings. Community and patient education on preventive measures remains the best, affordable control measure to improve the quality of life and reduce the burden of diseases, especially NCDs. Capacity building of chronic disease health centers, strengthening patients' associations, and more research to study the effect of health education on patients with chronic diseases were needed. In the future, more quality studies will be done to make sure that the local health services meet the needs of patients and find out what might be blocking them from getting the services.

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Knowledge and Awareness of Childhood Asthma in a Population in the United Arab Emirates

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Asthma is one of the most common chronic respiratory disease affecting young children. Parents, care providers and teachers face all the issues of asthma management. Antibiotics became a marker of irrational and overuse of these drugs in many countries which can result from many factors, such as unregulated drug availability, relaxed health policies concerning regulations on antibiotics use, obtaining of antibiotics without prescription, patients' knowledge and attitudes towards antibiotic use, self-medication, physicians' knowledge and experiences and patient-prescriber interaction. This study aimed to assess the knowledge and awareness of childhood asthma, its symptoms, triggers, prevention, management, education and antibiotic use in adults in a population in the UAE. Seven hundred questionnaires were distributed among population in Ras Al-Khaima, UAE. The knowledge about childhood asthma was evaluated using a validated questionnaire consisted of 34 questions. Six hundred and sixty three completed questionnaires were returned making the response rate of 94.7%. The overall mean (+/- SD) of knowledge score was 22.43 (+/- 4.1). A score of 70% and above was judged to be good, 50%-69% fair and <50% was poor. In all, 45.6% of the respondents had good Knowledge towards childhood asthma, 46.5% had fair Knowledge while 8% had poor Knowledge. Regarding the participants knowledge about asthma triggers, our study showed that 57.3% knew the triggers for asthma, 78.4% were knowledgeable about the fact that infectious respiratory diseases increase the chances of asthma progression, 88.4% correctly answered that exposures to sudden changes in environment (dust or cold weather) affect the progression of asthma, 88.8% believed that direct or indirect exposure to cigarette smoke could lead to acute attacks of asthma and 85.4% recognized that exposure to perfumes , incense or paint fumes could lead to acute asthma attack. The childhood asthma knowledge among Ras Al-Khaima population is quiet good which may indicate that the important role that has been taken by Ministry of Health in educational programmes. The population age group above 30 years old had lack of asthma knowledge which is important to improve their awareness about childhood asthma because it enhances their understanding of this disease which will reflect on people who interact with children in order to recognize asthma. Future educational efforts should seek to provide parents, care providers and teachers with accurate information about asthma with particular concern for sport and asthma. This will have a significant impact on the management of this chronic respiratory disorder. Educational campaigns are necessary to enhance and measure general public awareness of asthma, its differential diagnosis against other respiratory infections, environmental triggers, risk factors as well as treatment options.

Keywords: *asthma, knowledge, awareness, education, communication*

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Introduction

Bronchial Asthma is characterized by reversible airway obstruction as a result of hyperactivity of the airways passage to allergens (Walker et al. 1990). The hyperreactivity may result into obstruction of airflow that presents asthma symptoms i.e., wheezing, difficulty in breathing, coughing, chest tightness, chest pain, shortness of breath and mucus (Walker et al. 1990). These symptoms can either settle by themselves or resolved through treatment with bronchodilators and corticosteroid (Walker et al. 1990, Lanier and Nayak 2008). Asthma is one of the most common chronic respiratory diseases in children. Many studies have shown that the prevalence of asthma varies considerably from one country to another (ISAAC 1998, Lai et al. 2009, Gazotti et al. 2013). This fact could be associated with lack of information on the disease and ignorance of the disease among patients, families, health professionals, and school staff that might not recognize asthma as a potentially serious illness and may underestimate the symptoms of the disease (Akcay et al. 2014, Jaramillo and Reznik 2015).

In the International Study of Asthma and Allergies in Children (Pearce et al. 2007), 13.8% of 13-14 year old children worldwide had asthma at some time in their lives. Meanwhile, there are few available data on the prevalence of asthma in the UAE. Also, in 2011, a study (Bener et al. 1994) has shown that the prevalence of asthma among school children in UAE was (13.6%). On other hand, a study has reported a prevalence of physician-diagnosed asthma of 13% (Burke et al. 2003).

Asthma is composed of a variety of heterogeneous phenotypes that differ in presentation, etiology and pathophysiology. There are risk factors for each phenotype of asthma include genetic, environmental and host factors. In spite of the fact that a family history of asthma is common, it is neither sufficient nor necessary for the development of asthma (Burke et al. 2003).

Parental smoking has been persistently associated with early childhood wheezing (Stein et al. 1999, Lewis et al. 1995, Lau et al. 2002, Tariq et al. 2000) and there is a relation between smoking exposure and decreased airway caliber in early life (Dezateux et al. 1999). Moreover, Childhood asthma risks are correlated with food intake during maternity, cytokine responses and concentration of nitric oxide in exhaled air in newborns (Devereux et al. 2002, Macaubas et al. 2003, Frey et al. 2004).

The risk of breastfeeding and childhood atopy and asthma have been on spotlight for the last few years. Several studies (Bergmann et al. 2002, Oddy 2000) have shown that breast feeding protects the body from asthma, others have reported higher rates of allergy and asthma among breastfed children (Sears et al. 2002, Wright et al. 2000). A meta-analysis (Gdalevich et al. 2001) and several individual studies (Oddy 2000, Sears et al. 2002, Wright et al. 2000, Gdalevich et al. 2001, Kull et al. 2004) showed that absolute breastfeeding for at least 3 months was related with lower rates of asthma in children with age 2 to 5 years old, with the greatest effect occurring among those with a parental history of atopy. Another study shows that removal of milk, eggs and fish from the maternal diet was linked with lowering atopic dermatitis in infancy (Businco et al. 1983, Lovegrove et al. 1994). On the other hand some studies showed no association (Sigurs et al. 1992,

Hattevig et al. 1999). Moreover, some studies (Muraro et al. 2004, Martinez et al. 1995) followed children to 4 years and have determined that there is no effect of maternal dietary restriction during lactation on the consequent development of atopic diseases, including asthma (Muraro et al. 2004).

A study has indicated an association between diminished airway function in the first few weeks of life and asthma in later life (Young et al. 2000). Asthmatic children who have wheezing and continuing to adulthood have a fixed diminution in lung function as early as age 7 or 9 years (Sears et al. 2003, Erzen et al. 1997). Recent studies of preschool children have reported abnormal lung function in children with persistent wheezing as young as age 3 years (Erzen et al. 1997). Nonetheless, some infants who developed continual wheezing have normal lung function shortly after birth, which suggests a vital period of exposures within the first few years of life, before the development of these persistent abnormalities in expiratory flows (Martinez et al. 1995). Maternal smoking within utero nicotine exposure has been associated with this type of lung dysfunction (Dezateux et al. 1999, Martinez et al. 1995) but the effects of other exposures have been not fully studied.

Patient awareness and education are important in prevention and control of acute exacerbations and consequences of bronchial asthma. It was reported that satisfactory treatment of asthma depends on the correct evaluation and intervention by the physician or the parent, in a timely manner with the patient. In the last few years, a significant improvement was seen in the pathophysiology and technology knowledge about asthma due to educational programmes. Moreover, patient education programmes gives a clear picture in managing and understanding of a disease such as bronchial asthma which lead to increase patients compliance in chronic diseases. One of those programmes is self-management awareness programme for asthma in children in order to improve healthcare practices, reduce morbidity, and lower the cost of care.

A systematic review and meta-analysis have reported that education programmes in childhood asthma was associated with improved lung function, self-efficacy, reduced absenteeism from school, and number of visits to an emergency department (Uevara et al. 2003). Moreover, it shows that education was also associated with a reduced number of nights disturbed by asthma. On other hand, an evaluation of educational programmes effectiveness test was done in Girl Scouts ages 5-17 years in northeastern Ohio, USA (Volsko et al. 2013). Educational components were in compliance with the guidelines established by the National Heart, Lung, and Blood Institute's National Asthma Education and Prevention Programme. They found that 21% of the participants were diagnosed and treated for asthma, 48% resided with an asthmatic, and 72% knew someone with asthma.

Al-Harbi et al. (2020) studied Saudi Arabian adults and found that the mean score for asthma knowledge was 15.6 out of 25. Asthma knowledge significantly correlated with age (P=0.002), asthma status of the participants (P=0.001), having children with asthma (P=0.005) or knowing friends or family with asthma (P=0.029) but not with other socioeconomic factors such as gender, marital status, occupation, level of education and number of children in the family (P>0.05).

Mohammed et al. (2020) studied Iraqi parents of children 1-12 years. Duration of asthma since diagnosis ranged from 2 months to 11 years with about half of children present with symptoms between 1-2 years. The mean score for the first section (myths and beliefs regarding asthma) with regard to parents' level of education showed significantly higher knowledge score that was noted among groups with higher education. In the second section of the score (knowledge about asthma), the mean was significantly greater for the groups of parents who completed their university studies. They concluded that there was a significant correlation between level of education of parents and score of Asthma Knowledge Questionnaire, as the parents present with higher education can obtain knowledge easier, but despite of that most parents were highly educated but a lot of them have misconception and lack of information regarding use if inhalers and factors that triggering asthma of their children which necessitate to provide more effective education programmes

Fasola et al. (2022) studied mothers of asthmatics children answered a knowledge/practice questionnaire. The study hypothesized that Latent Class Analysis (LCA) could help identify underlying mother profiles with similar knowledge/practices. Mothers of asthmatic children answered a knowledge/ practice questionnaire. LCA identified two classes: Class 1, "poor knowledge" (33%); Class 2, "good knowledge" (67%). Classification accuracy was 0.96. Mothers in Class 2 were more likely to be aware of asthma-worsening factors and indicators of attacks. Mothers in Class 1 were more likely to prevent exposure to tobacco smoke (91.1% vs. 78.8%, p=0.005). For attacks, mothers in Class 2 were more likely to go to the emergency department and follow the asthma action plan. Mothers in Class 2 more frequently had a high education level (79.5% vs. 65.2%, p=0.004). Children in Class 2 more frequently had fully controlled asthma (36.7% vs. 25.9%, p=0.015) and hospitalizations for attacks in the previous 12 months (24.2% vs. 10.7%, p=0.003). They concluded that LCA can help discover underlying mother profiles and plan targeted educational interventions.

Noureddin et al. (2019) have assessed the knowledge of asthma and identified the attitude and practice of mothers of asthmatic children in Sudan, concerning their use of inhalers, compliance to preventers and the severity of the disease in their children. Mothers of asthmatic children was enrolled. Any mother with a child diagnosed with bronchial asthma for more than 3 months, and who attended the outpatient clinic of paediatric asthma in hospitals was eligible to be included. Asthma was believed to be infectious by 7% of the respondents. Seventeen percent of the mothers thought asthma was preventable by a vaccine, 21% found inhaler use unacceptable. Half of the mothers did not use the inhaler correctly. Most of the mothers (69%) did not use the inhaler if symptoms were mild and 53% didn't use preventers. The severity of asthma was found to be significantly associated with the attitude and practice of mothers ($P < 0.05$). They concluded that sustained efforts are required to increase knowledge about all dimensions of asthma and its management among patients and to disperse myths and misguided judgments regarding the disease and its treatment.

Al-Khamis and Hashim (2019) studied teachers in Saudi Arabia. They found 59.6% of teachers had a high level of asthma knowledge as they were able to

answer ≥75% of the knowledge questions correctly. Teachers' level of asthma knowledge was not significantly associated with age, but significantly associated with years of teaching experience, educational level and contact with an asthmatic individual. Most of the respondents were at a high level of awareness concerning asthma symptoms, triggering and treatment (73.2%, 60.9%, 60.7%), respectively, while only 19.4% had high knowledge level about sport and asthma.

Willers et al. (2011) found that dyspnea was the most commonly reported symptom (9.0%) in children. Of the children with IgE data, 32.1% were sensitized to inhaled allergens, while 16.6% were sensitized to milk or egg. The methacholine provocation test was positive in 42.9% of the children. No consistent associations were found for long-term dietary consumption or consumption at early or later age on outcomes at 8 years of age except for fruit. Increased long-term fruit intake was significantly inversely associated with asthma symptoms and sensitization to inhalant allergens.

Khalkhal et al. (2014) studied children in Iran and found that antibiotic consumption during the first year of life increased the odds ratio of asthma symptoms at 2-8 years of age and the strength of association was similar after adjusting for a family history of asthma or atopic disorder, preterm delivery, birth order, and delivery method. They suggested that antibiotic consumption in children was associated with an increased risk of childhood asthma; an additional confirmative study is needed.

Al-Rawas et al. (2009) studied Omani children and found that 15.4% had current asthma. Bakhour use more than twice a week was three times more likely to affect breathing compared to no bakhour use and this effect was 2.55 times higher in asthmatics compared to non-asthmatics. In addition, bakhour caused worsening of wheeze in 38% of the asthmatics, making it the fourth most common trigger factor after dust (49.2%), weather (47.6%) and respiratory tract infections (42.2%). However, there was no significant association between bakhour use and the prevalence of current asthma. They concluded that Arabian incense burning is a common trigger of wheezing among asthmatic children in Oman.

Lau et al. (2000) carried out a prospective birth-cohort study in order to assess the relevance of mite and cat allergen exposure for the development of childhood asthma up to age 7 years in German cities. Assessments included repeated measurement of specific IgE to food and inhalant allergens, measurement of indoor allergen exposure at 6 months, 18 months, and 3 years of age, and yearly interviews by pediatricians. Pulmonary function and bronchial hyper-responsiveness were tested. They found that at age 7, the prevalence of wheezing in the past 12 months was 10·0% and 6·1% parents reported a doctor's diagnosis of asthma in their children. Sensitization to indoor allergens was associated with asthma, wheeze, and increased bronchial responsiveness. They concluded that there was no relation between early indoor allergen exposure and the prevalence of asthma, wheeze, and bronchial hyper-responsiveness.

Hallstrand et al. (2005) performed an analysis with 1001 monozygotic and 383 dizygotic same-sex twin pairs within the University of Washington Twin Registry. Twin correlations examined the association of asthma and obesity. They found that a strong association between asthma and BMI was identified in the

sample population. Substantial heritability was detected for asthma (53%) and obesity (77%), which is indicative of additive genetic influences on each disorder. The best-fitting model of shared components of variance indicated that 8% of the genetic component of obesity is shared with asthma. They concluded that the co-variation between obesity and asthma was predominantly caused by shared genetic risk factors for both conditions.

Koeppen-Schomerus et al. (2001) studied 4910 twin pairs who were born in England and Wales in 1994 and 1995. Data on asthma status were obtained from the twins' parents by postal questionnaire. They found that asthma causes are 68% heritability, 13% shared environment, and 19% non-shared environment. They concluded that asthma is highly heritable in 4 year olds, whereas shared environmental influences were not statistically significant.

Hill et al. (2016) studied children in the USA and found that the peak age at diagnosis of eczema, asthma, rhinitis, and food allergy was between 0 and 5 months (7.3 %), 12 and 17 months (8.7 %), 24 and 29 months (2.5 %), and 12 and 17 months (1.9 %), respectively. On other hand, in the cross-sectional cohort, eczema and rhinitis prevalence rates were 6.7 % and 19.9 %, respectively. Asthma prevalence was 21.8 %; higher than previously reported. Food allergy prevalence was 6.7 %, with the most common allergenic foods being peanut (2.6 %), milk (2.2 %), egg (1.8 %), shellfish (1.5 %), and soy (0.7 %). They concluded that food allergy was associated with the development of respiratory allergy.

Idris et al. (20167) found that there was a higher risk of asthma in those who had carpet at home. The exposure to lorry fumes doubled the prevalence of asthma. The prevalence of asthma was significantly associated with the distance of the house to the congested road. Also, Parents' educational level and family income may have an effect of prevalence of asthma, A total of 31.4% of children who had asthma had a father with lower educational level compared with 44.9% among children without asthma. They stated that environmental air pollutants increased the risk of asthma among children in Malaysia. Exposure to congested roads, lorry fumes, and indoor carpet were associated with asthma among children in this study. They recommended that parents or caregivers of children with asthma should be given adequate education on the prevention of asthmatic attack among these children.

Gosavi et al. (2016) studied 50 asthmatic patients in Bangalor in order to measure the asthma control using modified Mini Asthma Quality of Life Questionnaire (MAQOL) and sputum eosinophil count and to identify the role of factors like age, duration of asthma, severity, compliance, technique of inhalation and knowledge of asthma action plan on asthma control. A global score of <80% was considered as poor control. The proportion of patients under each factor, in poorly-controlled group (PC) was compared with the well-controlled group (WC). They found that (66%) patients were in PC category with a mean global asthma score of 58.46 ± 2.881 vs 85.2 ± 1.19 in the WC group (34%). The mean duration of asthma was 16.76 ± 2.761 years in PC vs 7.882 ± 2.065 years in WC. The severity score was 7.265 ± 0.4434 in PC vs 6.706 ± 0.64 in WC. Eight patients in PC and six in WC were unaware of the treatment plan. One in PC group and three in WC were unaware of technique of inhalation. One in PC group and three in WC

were non-compliant. They concluded that there is a need for an objective monitoring in asthma and the treatment strategies need to be modified accordingly.

Chu et al. (2015) studied Chinese singleton children who were followed up to 7 years of age. The prevalence of asthma was 5.5% in this population. However, the asthmatic children had a higher proportion of unmarried, asthmatic mothers, mothers with drug allergy history, male infants and black race. A total of 10,534 (26.4%) mothers were treated with antibiotics one month prior to last menstrual period (LMP) or during pregnancy. The vast majority of them used one type of antibiotics (22.5%). Penicillin was the most commonly used antibiotic (15.6% of all mothers) followed by sulfonamides and trimethoprim (10.1% of all mothers). Most mothers received antibiotic treatment in the second (12.8% of all mothers) or third (12.7% of all mothers) trimesters. Maternal use of penicillin or chloramphenicol was associated with a significantly increased risk of childhood asthma after adjusting for potential confounders. Penicillin or chloramphenicol use in first trimester was significantly associated with childhood asthma. They concluded that maternal exposure to certain antibiotics is associated with childhood asthma by 7 years of age.

Mahboub et al. (2012) studied a random sample of 1,220 participants in the UAE. They found that prevalence of individual respiratory symptoms from the European Community Respiratory Health Survey (ECRHS) screening questionnaire in all participants were generally ranging 8-10%, while participants 20-44 years presented lower prevalence in all symptoms. Participating women reported more individual symptoms than men. Overall, there were 15.4% of participants who fulfilled our screening criteria for asthma, while for consistency with ECRHS, there were 12.1% of participants who fulfilled the ECRHS asthma definition, being 9.8% of those 20-44 years, that is 8.6% of male and 11.8% of female young adults participating. They concluded that asthma is common in the UAE, and gender differences are not observed in reported asthma symptoms in young adults.

Mahboub et al. (2010) found that the current level of asthma control in the UAE is not ideal. Therefore, it is required to increase the awareness among patients and update doctors about asthma control guidelines in order to reach an optimal asthma control, and thus reducing the burden of the disease.

Al-Rawas et al. (2008) studied Omani children and found that over the period of six years, the Sharqiya (Eastern) region continued to have the highest prevalence of self-reported asthma diagnosis and all asthma symptoms in both age groups, with a significant increase in the prevalence of wheeze in the past 2 months and asthma diagnosis in the young group, and a significant increase in night cough in the older group. All other regions had lower prevalence rates in 1995 in both age groups, and showed either no significant change or a decline in one or two of the self-reported asthma symptoms. The prevalence of asthma diagnosis among wheezy children remained unchanged across all regions. In addition, asthma under-diagnosis remains a problem with only 60% of children with severe wheeze reporting asthma diagnosis in both surveys. They concluded that the geographic variation in the prevalence of self-reported of asthma symptoms among Omani school children persists with further increase in the Sharqiya region and asthma has not improved over time.

Janahi et al. (2006) did a cross-sectional study of 3,283 school children in Qatar living in both urban and rural areas based on ISAAC questionnaire. They found high prevalence of diagnosed asthma (19.8%), allergic rhinitis (30.5%), eczema (22.5%), and chest infection (11.9%). The frequency of asthma, allergic rhinitis, and eczema among parents reflected the same pattern as seen in their children. In general, males had more asthma, allergic rhinitis, and chest infections than females. The prevalence rate of asthma and allergic rhinitis decreased with age. The prevalence rate of asthma was significantly higher in mothers (11.8%) than in fathers (9.0%), in contrast, the frequency of allergic rhinitis symptoms was comparable (mothers, 18.5%; fathers, 17.5%). The prevalence rate of asthma (19.8%) in Qatari schoolchildren was very close to that in the neighboring Gulf country, Oman (20.7%), and higher than in some developing countries. They concluded that the genetic factors related to the high rates of consanguinity may play an important role in the high prevalence rates noted in the Qatari population, but changes in lifestyle and environmental factors cannot be discounted as possible causes of the high prevalence noted in their study.

Desalu et al. (2016) investigated asthma control measurement (ACM) tools in the management of asthma among doctors working in family and internal medicine practice in Nigeria. They found that majority (69.6%) had poor knowledge score of ACM tools. Almost, 26% assessed their patients' level of asthma control and 34 (17.5%) at every visit. Twenty percent have used ACM tools in their consultation, 15.0% of them used GINA defined control while 10 (5.2 %) used asthma control test (ACT). The use of the tools was associated with pulmonologists, having attended CME within six months and graduated within five years prior to the survey. The results highlight the poor knowledge and use of ACM tools and the need to address the knowledge gap.

Al-Harbi et al. (2016) studied Saudi Arabian children and adults and found that the awareness of bronchial asthma questions showed that 67% of total sample thought that it could be a fatal disease, and only 13.2% thought that there is a difference between bronchial asthma and chest allergies in children. Eighty six percent thought that the symptoms of bronchial asthma include dyspnea and nocturnal cough, and 45.7% thought that fever, a runny nose and throat inflammation are not symptoms. Sixty two percent thought that infectious respiratory diseases may increase bronchial asthma progression. Moreover, 40% thought that the use of antibiotics doesn't help in diminishing bronchial asthma complications, and some thought that the patient can stop medication after an acute asthma attack. Thirty four percent thought that inhaled medication for asthma does not cause addiction. They concluded that bronchial asthma knowledge in the Saudi Arabian population is insufficient, and efforts should be carried out to spread bronchial asthma management.

The aim of our study was to determine the prevalence of bronchial asthma in a population in Ras Al-Khaima, the UAE and to assess knowledge of childhood asthma, its symptoms, triggers, prevention, management and education.

Materials and Methods

Study Setting and Design

This study was a cross-sectional, performed using a Modified Structured Asthma Knowledge Questionnaire in Arabic and English languages, conducted in the city of Ras Al-Khaima in the UAE. A convenience sample was used comprising 663 participants. Participants were randomly selected from both genders males and females and from different age groups and different nationalities. The first author (pharmacist, Master student) has collected the data. All questionnaires have been completed by the participants in their homes. Participation in the study was voluntary, the background of the survey was explained, and the participants signed an informed consent form. Prior to the study, the questionnaire was validated by subject experts for its content and relevance. The questionnaire was field-tested several times on a pilot sample of 85 individuals to clarify any ambiguities and to determine the reliability of the questionnaire.

In our survey, we collected information from local and non-local population. Furthermore, Emiratis were 252 (38%) while the majority of the subjects were Non-Emiratis 411(62%). Almost 73% of the subjects were females and 27.1% were males. On other hand, (66.8%) of our sample were from age group 18 to 30 years old; most of them were students (60.8%).

Data Collection

A self-administered questionnaire was used as a tool to collect the data from the participants. The questionnaire was designed for two objectives: to determine the prevalence of bronchial asthma in Ras Al-Khaima city and to assess the knowledge of childhood asthma, its symptoms, triggers, prevention, management and education. The questionnaire has been divided into four sections: The first section is individuals' demography consisted of age, gender, marital status, education, place of residence, job, if the person suffers from asthma, and whether they have a family member with asthma. The second section covers symptoms, warning signs of asthma, triggers & prevention of asthma. The third section covers asthma management, and the forth section covers self-education and communication about asthma.

Statistical Analysis

We performed analysis of the demographic data and expressed them in percentages and frequencies using SPSS Version 20. Cronbach's alpha to validate the questionnaire was good ($0.9 > \text{alpha} >= 0.8$). The level of statistical significance was defined as $P < 0.05$.

Results

Demographic and Participants' Characteristics

Seven hundred questionnaires were distributed among population in Ras Al-Khaima. Six hundred and sixty three 663 were returned making the response rate of 94.7%. Details of demographic characteristics of participants are shown in Table 1.

Prevalence of Asthma Among Study Participants

The prevalence of bronchial asthma among study participants was 8.7% (n=58) and 44.2% of them had family history of asthma (Figure 1, Table 1).

Figure 1. *Prevalence of Bronchial Asthma Among Study Participants*

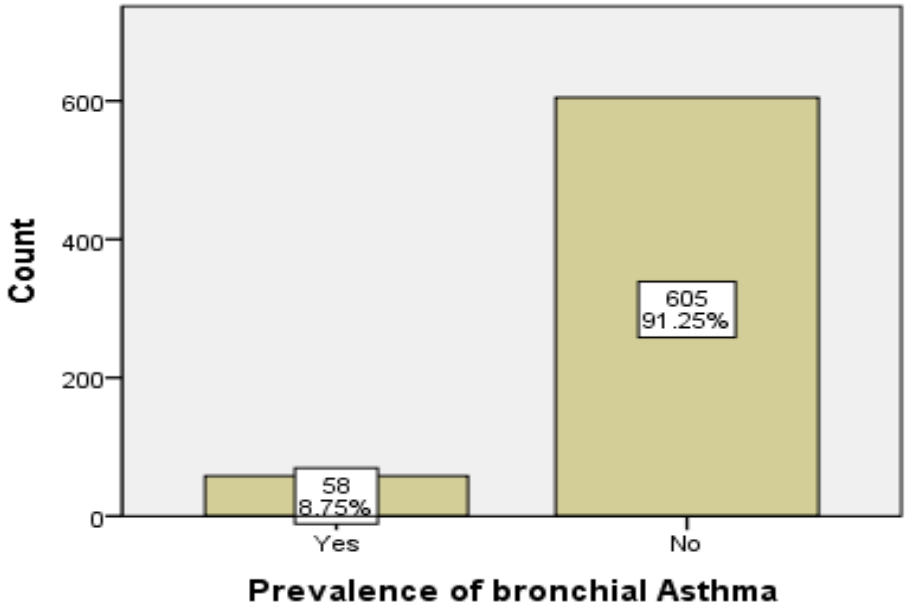


Table 1. *Demographic and Social Characteristics of the Participants*

Demographic (n=663)	**n**	**(%)**
Gender:		
Male	180	(27.1%)
Female	483	(72.9%)
Age group:		
< 18	74	(11.2%)
18-30	443	(66.8%)
> 30	146	(22%)
Marital status:		
Single	490	(73.9%)
Married	173	(26.1%)
Occupation:		
Student	403	(60.8%)
Employed	224	(33.8%)
Non-employed	36	(5.4%)

Educational Level:		
Less than university education	128	(19.3%)
University education	492	(74.2%)
Post graduate education	43	(6.5%)
Nationality:		
UAE local	252	(38%)
Non-UAE Local	411	(62%)
Place of birth:		
In UAE	403	(60.8%)
Outside UAE	260	(39.2%)
Suffer from bronchial Asthma:		
Yes	58	(8.7%)
No	605	(91.3%)
Family History of Asthma		
Yes	293	(44.2%)
No	370	(55.8%)

Knowledge about Childhood Asthma

Participant's knowledge about childhood asthma was evaluated using a validated questionnaire consisted of 34 questions categorized under four headings namely childhood asthma, its symptoms, triggers, prevention, management and education. Tables 2-5 present the descriptive analysis of the knowledge of respondents.

Table 2 shows participants knowledge about Asthma symptoms and warning signs. A clear majority of respondents (86.7%) knew that Asthma is a chronic disease with acute exacerbations on exposure to allergens. About 71.3% of the respondents knew the symptoms of asthma and 92% identified dyspnea and nocturnal cough as symptoms of asthma. Genetic, hereditary and environmental factors were identified as important factors in the progression of asthma by 80.7% of the respondents. For important question regarding the difference between asthma and chest allergies in children, only 23.4% of participants correctly answered the question. A considerable proportion of respondents (41.6%) had wrongly answered that fever, runny nose and throat inflammation were symptoms of asthma. Moreover, 79.8% of the respondents were not knowledgeable about Asthma Control Test (ACT).

Table 2. *Symptoms of Childhood Asthma*

Items in Questionnaire	**Yes (%)**	**No (%)**
Do you know the symptoms of asthma?	473 (71.3%)	190 (28.7%)
Do you know Asthma Control Test (ACT)?	134 (20.2%)	529 (79.8%)
Asthma is a chronic disease with acute exacerbations on exposure to allergens.	575 (86.7%)	88 (13.3)
Genetic. Hereditary and environmental factors play a role in the progression of asthma.	535 (80.7%)	12 (19.3%)
There is a difference between asthma and chest allergies in children.	508 (76.6%)	15 (23.4%)
Asthma can be fatal disease.	483 (72.9%)	18 (27.1%)
Symptoms of asthma include dyspnea and nocturnal cough.	610 (92%)	53 (8%)
Symptoms of asthma include fever, runny noise.	276 (41.6%)	387 (58.4%)
Asthma's severe symptoms include children's inability to talk sentences or to lie on their back, aggression, and altered consciousness.	376 (56.7%)	287(43.3%)

Regarding knowledge about asthma triggers (Table 3), our study showed that 57.3% (n=380) knew triggers for asthma, 78.4% (n=520) were knowledgeable about the fact that infectious respiratory diseases increase the chances of asthma progression, 88.4% correctly answered that exposures to sudden changes in environment (dust or cold weather) affect the progression of asthma, 88.8% believed that direct or indirect exposure to cigarette smoke could lead to acute attacks of asthma and 85.4% recognized that exposure to perfumes, incense or paint fumes could lead to acute asthma attacks. Awareness about asthma preventive behaviors was assessed by the question "Do you think that asthmatic patient should avoid sports activities and physical education classes?" Our finding concluded that 47.2% of study participants correctly answered these questions.

Table 3. *Triggers of Childhood Asthma*

Items in Questionnaire	**Yes (%)**	**No (%)**
Do you know triggers for asthma?	380 (57.3%)	283 (42.7%)
Eating fish at an early age helps in Slowing down progress of asthma.	309 (46.9%)	354 (53.4%)
Infectious respiratory diseases increase the chances of asthma progression.	520 (78.4%)	143 (21.6%)
Exposures to sudden changes in environment affect the progression of asthma.	586 (88.4%)	77 (11.6%)
Direct or indirect exposure to cigarette smoke could lead to acute attacks of asthma.	589 (88.8%)	74 (11.2%)
Exposure to perfumes incense, or paint fumes could lead to acute asthma attacks.	566 (85.4%)	97 (14.6%)
An asthmatic child should avoid sports activities and physical education classes.	350 (52.8%)	313 (47.2%)
Asthmatic children should avoid certain foods such as fish, eggs and bananas.	265 (40.0%)	398 (60.0%)

Regarding knowledge about management of childhood asthma (Table 4), 48.0% of the respondents believed that frequent use of antibiotics helps in diminishing the complication of asthma and 73.3% agreed that treatment of asthma in children younger than 6 years of age. Only 37.3% of the respondents had correctly answered that patient can stop taking medication after an acute asthma attack. The knowledge regarding the steam inhalation for asthma treatment was lacking. Almost, 59% of the respondents believed that steam inhalation for treatment of asthma is better than mask or tube. Moreover, 33.5% of respondents considered using mask for patient older than 5 years of age is not necessary. In addition, conflicting findings regarding the inhaled medication and asthma's prophylactic treatment among respondents were observed. About 43.7% of the respondents believed that inhaled medications for asthma can cause addiction and 59.7% believed that asthma's prophylactic treatment can cause dangerous side effect if used without an acute asthma attack.

Table 4. *Management of Childhood Asthma*

Items in Questionnaire	**Yes (%)**	**No (%)**
The frequent use of antibiotics helps in diminishing the complication of asthma.	318 (48.0%)	345 (52.0%)
An asthmatic patient should constantly follow-up with physician for better results.	596 (89.9%)	67 (10.1%)
The patient should be educated about how to manage an acute	606 (91.4%)	57 (8.6%)

asthma attack.		
There is no need for treatment of asthma in children younger than 6 years of age.	177 (26.7%)	486 (73.3%)
The patient can stop taking medication after an acute asthma attack (beta-agonists and inhaled steroids).	247 (37.3%)	416 (62.7%)
One patient's asthma medication can be used by another asthmatic without a referral to a doctor.	148 (22.3%)	515 (77.7%)
Steam inhalation for treatment of asthma is better than mask or tube.	390 (58.8%)	273 (41.2%)
There is no need for using mask if the patient is older than 5 years of age.	222 (33.5%)	414 (66.5%)
An asthmatic patient can be treated in primary care clinic without referral to a pulmonology clinic, since it's a common disease (excluding sever disease).	342 (51.6%)	321 (48.4%)
Inhaled medicines for asthma can cause addiction.	290 (43.7%)	373 (56.3%)
Asthma's prophylactic treatment can cause dangerous side effect if used without an acute asthma attack.	396 (59.7%)	267 (40.3%)
Asthma could lead to increased school absenteeism in children.	510 (76.9%)	153 (23.1)

Regarding the asthma education and communication (Table 5), it can be observed that there was a positive attitude. The overall percentage of correct answers was from 52% to 91.3%. The highest percentage came from the fact that most of participants were aware of the fact that the patient's physician should inform them about the symptoms of asthma and how to handle the disease. However, 52% of respondents read or did search about the topic of asthma.

Table 5. *Asthma Education and Communication*

Items in Questionnaire	**Yes (%)**	**No (%)**
The patient's physician should inform him or her about the symptoms of asthma and how to handle the disease.	605 (91.3%)	58 (8.7%)
For better treatment of asthma, specialized centers are required to provide education and awareness to the patients and the community.	570 (86.0%)	93 (14%)
There is a need for including scientific content about asthma in student's curricula.	537 (81.0%)	126 (91%)
There is a need for creating educative programs for schools, aiming to increase awareness about asthma.	561 (84.6%)	102 (15.4%)
Have you ever read or search about the topic of asthma.	345 (52.0%0	318 (48%)

Assessment of Knowledge towards Childhood Asthma

A 34-item questions package was used to assess the knowledge of childhood asthma, its symptoms, triggers, prevention, management and education among population. A correct option was scored 1 while incorrect response was scored zero. A total score of 34 was obtainable. Knowledge scores for participants were calculated and summed up to give the total knowledge score. Knowledge score ranged between 0 and 34. For study participants, the overall mean of knowledge score was 22.43 (± 4.1). A score of 70% and above was judged to be good, 50%-69% fair and <50% was poor. In all, 45.6% of the respondents had good

Knowledge towards childhood asthma, 46.5% had fair Knowledge while 8% had poor Knowledge (Figures 2 and 3).

Figure 2. *Distribution of Participant's Knowledge Category*

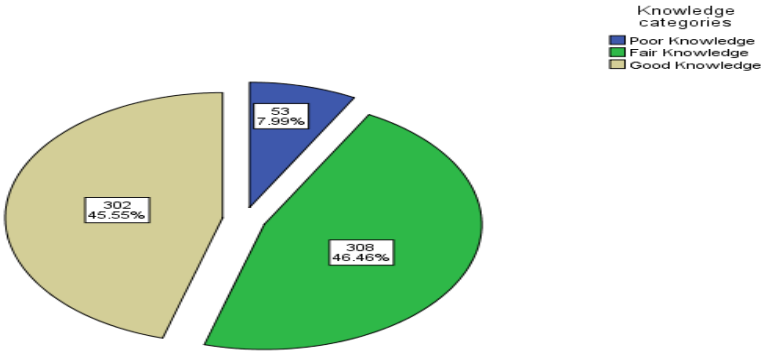
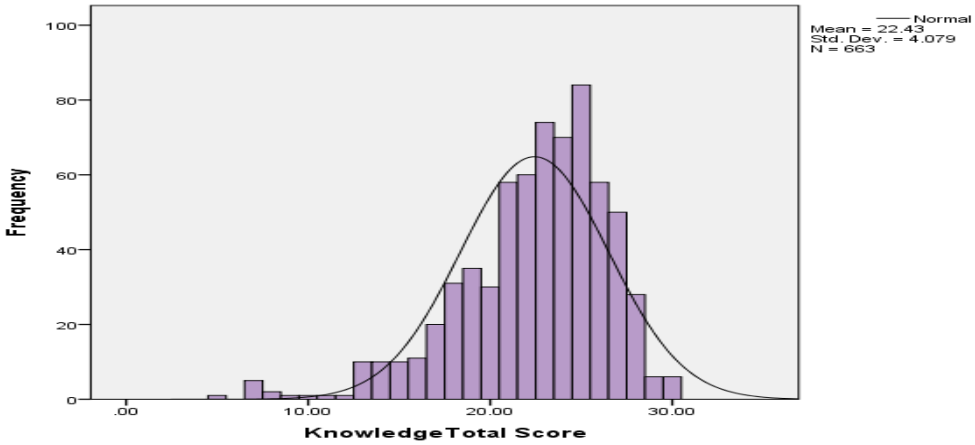


Figure 3. *Distribution of Participants' Knowledge Score*



Association of Demographic Characteristics and Mean Knowledge Score

The results of questions related to knowledge of Childhood Asthma among participants were analyzed using $\chi 2$ test (Tables 8-10). The univariate statistical associations between the mean score of knowledge and socio-demographic characteristics of responders are shown in Tables 6-7. Among the demographic variables, age of the respondents was significantly associated with mean knowledge score (P=0.007) in which participants with age ranged between 18-30 years scored remarkably better than participants aged 30 years and over (P=0.008). However, no significant difference was found between other age groups.

Also, significant differences (P=0.001) was found between the respondents in terms of educational level. The results showed that the respondents with university education scored significantly higher than respondents with less than university education (P=0.016) as well as with the respondents with postgraduate education (P=0.021). Non-UAE females who had family member suffers from asthma were

characterized with higher mean score of Knowledge and they reach statistical significance (P=0.007), (P=0.001), (P=0.001), respectively.

Comparing mean scores of Knowledge between students, employees and nonemployees, there was no significant difference (P=0.56) between the mean of 3 groups. Similarly, there was no significant difference between single and married participants (P=0.375). Furthermore, considering place of birth and being asthmatic patients, the results showed that there was no significant difference among study participants, (P=0.100) and (P=0.158), respectively.

Table 6. *Factors Affecting Respondent Knowledge Towards Childhood*

Knowledge Score	Mean ± (S.D)	F/t Value	Significance (p value)
Gender: Males Females	 21.7 ± (4.5) 22.7 ± (3.8)	2.687	0.007
Age Group:** <18 18-30 >30	 22.2 ± (0.471) 22.7 ± (0.193) 21.5 ± (0.336)	5.032	0.007
Marital Status: * Single Married	 22.56 ± (4.03) 22.04 ± (4.18)	1.451	0.375
Occupation: ** Students Employed Unemployed	 22.6 ± (4.12) 22.4 ± (3.64) 21.7 ± (4.14)	2.896	0.56
Level of Education: ** Less than University University Postgraduate	 21.6 ± (3.67) 22.7 ± (4.02) 20.9 ± (5.18)	7.113	0.001
Nationality: * UAE National Non-UAE National	 21.6 ± (3.69) 22.9 ± (4.23)	3.867	0.001
Place of Birth: * UAE Non-UAE	 22.2 ± (3.92) 22.7 ± (4.29)	1.649	0.100
Asthma Disease: * Yes No	 23.15 ± (3.83) 22.36 ± (4.09)	1.413	0.158
Asthma Family History: * Yes No	 23.09 ± (3.89) 21.9 ± (4.14)	3.739	0.001

*P < 0.05 is considered significant, * Independent t test, ** One way ANOVA, SD: Standard deviation.

Table 7. *Participants Knowledge on Childhood Asthma Stratified by Their Gender*

Question (Correct Response)	All	Males	Females	P value
Do you know Asthma Control Test (ACT) (Yes)	134 (20.2%)	46 (25.6%)	88 (18.2%	0.036
Symptoms of asthma include dyspnea and nocturnal cough (Yes)	610 (92.0%)	156 (86.7%)	454 (94.0%)	0.002
Exposures to sudden changes in environment affect the progression of asthma (Yes)	586 (88.4%)	148 (82.2%)	438 (90.7%)	0.002
Direct or indirect exposure to cigarette smoke could lead to acute attacks of asthma (Yes)	589 (88.8%)	150 (83.3%)	439 (90.9%)	0.006
The patient's physician should inform him / her about the symptoms of asthma (Yes)	596 (89.9%)	151 (83.9%)	445 (92.1%)	0.002
An asthmatic patient should constantly follow-up with physician for better results (Yes)	605 (91.3%)	157 (87.2%)	448 (92.8%)	0.025

The patient should be educated about how to manage an acute asthma attack (Yes)	606 (91.4%)	157 (87.2%)	449 (93.0%)	0.019
There is no need for treatment of asthma in children younger than 6 years of age (No)	486 (73.3%)	116 (64.4%)	370 (76.6%)	0.002

*p <0.05; #Significance; n (%): Frequency (Percentage)

Table 8. *Participants Knowledge on Childhood Asthma According to their Gender Stratified by their Age*

Question (Correct Response)	All	<18%	18-30%	>30%	P value
There is a difference between asthma and chest allergies in children (No)	155 (23.4%)	29 (39.2%)	93 (21.0%)	33 (22.6%)	0.003
Symptoms of asthma include fever, runny noise (No)	387 (58.4%)	47 (63.5%)	274 (61.9%)	66 (45.2%)	0.001
The frequent use of antibiotics helps in diminishing the complications of asthma (No)	345 (52.0%)	39 (52.7%)	244 (55.1%)	62 (42.5%)	0.030
Eating fish at an early age helps in slowing down progress of asthma (Yes)	309 (46.6%)	33 (44.6%)	192 (43.4%)	84 (57.5%)	0.011
Asthmatic children should avoid certain foods such as fish, eggs and bananas (No)	398 (60.0%)	52 (70.3%)	289 (65.2%)	57 (39.0%)	0.001
There is no need for treatment of asthma in children younger than 6 years of age (No)	486 (73.3%)	57 (77.0%)	338 (76.3%)	91 (62.3%)	0.003
There is no need for using mask if the patient is older than 5 years of age (No)	402 (60.6%)	52 (70.3%)	277 (62.5%)	73 (50.0%)	0.005
Inhaled medications for asthma can cause addiction (No)	344 (51.9%)	34 (45.9%)	245 (55.3%)	65 (44.5%)	0.043

*p <0.05; #Significance; n (%): Frequency (Percentage)

Table 9. *Participants Knowledge on Childhood Asthma According to their Gender and Stratified by Their Education*

Question (Correct Response)	All	Less than University	University	Postgraduate	P value
Do you know the symptoms of asthma(Yes)	473 (71.3%)	82 (64.1%)	366 (74.4%)	25 (58.1%)	0.010
Do you know triggers for asthma(Yes)	380 (57.3%)	56 (43.8%)	302 (61.4%)	22 (51.2%)	0.001
Do you know Asthma Control Test (ACT) (Yes)	134 (20.2%)	17 (13.3%)	99 (20.1%)	18 (41.9%)	0.001
Asthma is a chronic disease with acute exacerbations on exposure to allergens (Yes)	575 (86.7%)	103 (80.5%)	439 (89.2%)	33 (76.7%)	0.005
There is a difference between asthma and chest allergies in children (No)	155 (23.4%)	40 (31.3%)	100 (20.3%)	15 (34.9%)	0.006
ymptoms of asthma include dyspnea and nocturnal cough (Yes)	610 (92.0%)	112 (87.5%)	461 (93.7%)	37 (86.0%)	0.023
Symptoms of asthma include fe fever, runny noise (No)	387 (58.4%)	64 (50.0%)	308 (62.6%)	15 (34.9%)	0.001
The frequent use of antibiotics helps in diminishing the complications of asthma (No)	345 (52.0%)	48 (37.5%)	281 (57.1%)	16 (37.2%)	0.001
An asthmatic patient should constantly follow-up with physician for better results (Yes)	596 (89.9%)	110 (85.9%)	451 (91.7%)	35 (81.4%)	0.026
There is no need for treatment of asthma in children younger than 6 years of age (No)	486 (73.3%)	82 (64.1%)	382 (77.6%)	22 (51.2%)	0.001

The patient can stop taking medication after an acute asthma attack (Yes)	247 (37.3%)	62 (48.4%)	169 (34.3%)	16 (37.2%)	0.013
One patient's asthma medication can be used by another asthmatic, without referral to a doctor (No)	515 (77.7%)	100 (78.1%)	390 (79.3%)	25 (58.1%)	0.006

*p <0.05; #Significance; n (%): Frequency (Percentage)

Table 10. *Participants Knowledge on Childhood Asthma Stratified by their Nationality*

Question (Correct Response)	All	UAE National %	Non-UAE National %	P value
Do you know the symptoms of asthma (Yes)	473 (71.3%)	160 (63.5%)	313 (76.2%)	0.001
Do you know triggers for asthma (Yes)	380 (57.3%)	126 (50.0%)	254 (61.8%)	0.003
Asthma is a chronic disease with acute exacerbations on exposure to allergens (Yes)	575 (86.7%)	205 (81.3%)	370 (90.0%)	0.001
There is a difference between asthma and chest allergies in children (No)	155 (23.4%)	73 (29.0%)	82 (20.0%)	0.008
Symptoms of asthma include fever, runny noise (No)	387 (58.4%)	123 (48.8%)	264 (64.2%)	0.001
The frequent use of antibiotics helps in diminishing the complication of asthma (No)	345 (52.0%)	97 (38.5%)	248 (60.3%)	0.001
Eating fish at an early age helps in slowing down progress of asthma (Yes)	309 (46.6%)	133 (52.8%)	176 (42.8%)	0.013
Exposure to perfumes , incense or paint fumes could lead to acute asthma attacks (Yes)	566 (85.4%)	224 (88.9%)	342 (83.2%)	0.045
An asthmatic children should avoid sports activities and physical education classes (NO)	313 (47.2%)	96 (38.1%)	217 (52.8%)	0.001
Asthmatic children should avoid certain foods, such as fish, eggs and bananas (No)	398 (60.0%)	110 (43.7%)	288 (70.1%)	0.001
There is no need for treatment of asthma in children younger than 6 years of age (No)	486 (73.3%)	164 (65.1%)	322 (78.3%)	0.001
The patient can stop taking medication after an acute asthma attack (beta-agonists and inhaled steroids (Yes)	247 (37.3%)	117 (46.4%)	130 (31.6%)	0.001
One patient's asthma medication can be used by another asthmatic, without referral to a doctor (No)	515 (77.7%)	184 (73.0%)	331 (80.5%)	0.024
Steam inhalation for treatment of asthma is better than mask or tube (No)	236 (35.6%)	73 (29.0%)	163 (39.7%)	0.005
Inhaled medications for asthma can cause addiction (No)	344 (51.9%)	117 (46.4%)	227 (55.2%)	0.028
Have you ever read or search about the topic of asthma (Yes)	345 (52.0%)	115 (45.6%)	230 (56.0%)	0.010

*p <0.05; #Significance; n (%): Frequency (Percentage)

Discussion

Most of the participants have a good level of knowledge of asthma. The UAE considered as one of the most countries in the gulf that attracts people from different nationalities. Our community has a great mixture of people from more than 40 countries from all over the world. Every individual comes from a different culture with a variety of disease awareness and knowledge.

A study have recorded that the prevalence of asthma among school children in UAE was 13.6% (Bener et al. 1994), while an ISAAC center reported a prevalence of physician-diagnosed asthma of 13% in 3,200 children aged 6-13 years in the seven Emirates of the UAE (Al-Maskari et al. 2000, Mahboub et al. 2012). Another study was conducted in asthmatic patients in the UAE (Mahboub et al. 2010) showed that 64% of sudden severe attacks of asthma were reported in 2009. About 53% of the children and 17.1% of the adults missed school and work, while 17.8% ever owned a peak flow meter and 30% ever had a lung function test. Similarly, 17% had scheduled follow-up and 66% were followed-up by general practitioners. Researchers should use their research knowledge transfer of their results to physicians and consultants. After all, researchers should use their research knowledge transfer of their results to physicians and consultants.

Triggers for Asthma

In our study majority of respondents knew that Asthma is a chronic disease with acute exacerbations on exposure to allergens. A previous study in Saudi Arabia has obtained nearly the same results (Al-Harbi et al. 2016). A study done in Spain on 7,494 teachers showed that 6.8% of teachers were capable of pointing out the three main symptoms of asthma (Varela et al. 2016). Genetic, hereditary and environmental factors were identified as important factors in the progression of asthma by 80.7% of the respondents which have been proven in many studies on families and twins that genetic plays an important role in the development of asthma and allergy (Lawrence et al. 1994). On other hand, a study done in turkey revealed that 51.1% knew asthma is a genetic disease and 58% said it is not an infectious disease (Yıldız et al. 2013). Additionally, only 23.4% answered the question if there is difference between asthma and chest allergies in children. A considerable proportion of respondents (41.6%) wrongly answered that fever, runny nose and throat inflammation were symptoms of asthma. Moreover, 79.8% of the respondents were not knowledgeable about Asthma Control Test (ACT).

Regarding the participants knowledge about asthma triggers, our study showed that 57.3% knew the triggers for asthma, 78.4% were knowledgeable about the fact that infectious respiratory diseases increase the chances of asthma progression, 88.4% correctly answered that exposures to sudden changes in environment (dust or cold weather) affect the progression of asthma, 88.8% believed that direct or indirect exposure to cigarette smoke could lead to acute attacks of asthma and 85.4% recognized that exposure to perfumes, incense or paint fumes could lead to acute asthma attack. Nearly similar finding has been shown in another study; 87% thought the same (Al-Harbi et al. 2016). Also, in another study done in Saudi Arabia (BinSaeed 2014) showed that 86.1% thought that smoking harms children with asthma, 47.2% of study participants have correctly answered a question if asthmatic patient should avoid sport activities and physical education classes.

Management of Childhood

In our study, regarding the knowledge of management, 48% of the respondents believed that frequent use of antibiotics helps in diminishing the complication of asthma. However, 40.8% of parents in the Saudi Arabian study (Al-Harbi et al. 2016) had the same thought. Many studies conducted world-wide suggested that antibiotic consumption in children was associated with an increased risk of childhood asthma (Kummeling et al. 2007, Alm et al. 2008, Khalkhal et al. 2014). Moreover, 73.3% agreed with treatment of asthma in children younger than 6 years of age. On other hand, 37.3% of the respondents had correctly answered that patient can stop taking medication after an acute asthma attack. But what clearly lacking, was the knowledge regarding the steam inhalation for asthma treatment in which 58.8% of the respondents believed that steam inhalation for treatment of asthma is better than mask or tube. Moreover, 33.5% of respondents considered using mask for patient older than 5 years of age is not necessary.

There are conflicting reports regarding the inhaled medication and Asthma's prophylactic treatment among respondents. About 43.7% of the respondents in our study believed that inhaled medications for asthma can cause addiction. On the other hand, in the another study (BinSaaed 2014), the answer to the question whether asthma medications caused drug dependency, only 27% answered "No" while 55.2% said "they do not know".

Asthma Education and Communication

In the present study, the overall percentage of correct answers on asthma education and communication were between 52% and 91%. The highest percentage showed that most of participants were aware of the fact that the patient's physician should inform them about the symptoms of asthma and how to handle the disease which indicate that Ras Al-Khaima society have a good knowledge . However, 52% of our respondents searched about the topic of asthma while 55.2% of the Saudi study (Al-Harbi et al. 2016) sample was familiar with asthma.

Association between Demographic Characteristics and Mean Knowledge Score

In the present study, among the demographic variables, age of the respondents was observed to be significantly associated with mean knowledge score (P=0.007) in which participants with age ranged between 18-30 years scored remarkably better than participants aged 30 years and over (P=0.008). Similar results have been found in previous study (Al-Harbi 2016); asthma knowledge was very highly significant with age (P<0.001, CI [−0.60, 1.41]), illustrating that the higher the age group the higher the awareness score. However, no significant difference was found between other age groups.

Also, in the present study, significant differences (P=0.001) was found between the respondents in terms of educational level. The results showed that the respondents with university education scored significantly higher than respondents

with less than university education (P=0.016) as well as with the respondents with postgraduate education (P=0.021). Non-UAE females who had family member suffers from asthma were characterized by higher mean score of knowledge which was significant. The results indicate that non-UAE national have more knowledge than the UAE national as they came from different background. The present study confirms the Iraqi study (Mohammed et al. 2020) who found that there was a significant correlation between level of education of parents and score of Asthma Knowledge Questionnaire, as the parents present with higher education can obtain knowledge easier.

A recent study (Fasola et al. 2022) have used Latent Class Analysis (LCA) in mothers and concluded that LCA can help discover underlying mother profiles and plan targeted educational interventions. However, the severity of asthma was found to be significantly associated with the attitude and practice of mothers (Noureddin et al. 2019). Thus, sustained efforts are required to increase knowledge about all dimensions of asthma and its management among patients and to disperse myths and misguided judgments regarding the disease and its treatment.

Conclusion

The childhood asthma knowledge among the Ras Al-Khaima population in the UAE is quiet good which indicates the importance of the role of the Ministry of Health in the UAE in educational programmes to improve asthma knowledge and awareness. Moreover, the population age group above 30 years old had lack of asthma knowledge which is important to improve their awareness about childhood asthma because it enhances their understanding of this disease which will reflect on people who interact with children in order to recognize asthma. On other hand, attracting attention to childhood asthma and its consequences will promote collaboration among the health care, social, education and environmental service sectors and policy makers.

Furthermore, Educational programmes must cover all age groups in the society starting from parents, caregivers, students and patients. Also, educational programmes must be held for physicians and nurses on patient satisfaction and use of health services.

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