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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

President's Message

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The current issue is the fourth of the eighth 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

21st Annual International Conference on Health Economics, Management & Policy, 20-23 June 2022, Athens, Greece

The Health Economics & Management Unit of ATINER will hold its **21st Annual International Conference on Health Economics, Management & Policy, 20-23 June 2022, 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/2022/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: **22 November 2021**
- Acceptance of Abstract: 4 Weeks after Submission
- Submission of Paper: **23 May 2022**
-

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2-5 May 2022, Athens, Greece

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Important Dates

- Abstract Submission: **4 October 2021**
- Acceptance of Abstract: 4 Weeks after Submission
- Submission of Paper: **5 April 2021**

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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Relationship between Stress Perceived and Gastrointestinal Symptoms in Intensive Care Nurses During COVID-19 Pandemic: A Cross-Sectional Study

By Tuğba Menekli[*], Runida Doğan[±] & Erman Yıldız[°]

The purpose of this study is to determine the relationship between perceived stress and gastrointestinal (GI) symptoms during the COVID-19 outbreak in the intensive care unit (ICU) nurses. This cross-sectional study was conducted with 170 nurses working in the ICUs of a hospital in eastern Turkey. Descriptive, chi-square and multiple linear regression analyses were used to analyze data. In the last three months, 48.2% of the nurses had complaints such as heartburn, 44.1% abdominal distension, 41.7% diarrhea/ constipation. The mean perceived stress level experienced by the nurses was found to be 29.30±5.73. Results from regression analysis included perceived stress score, gender, perceived health status, diet, having been infected with COVID-19 before and risk degree of the ICU in question in terms of COVID-19 revealed a statistically significant associated with scores obtained from GI symptoms. Perceived stress level, health perception status, having been infected with COVID-19 before and the high-risk status of the intensive care unit in question for COVID-19 were predictive factors for the occurrence of gastrointestinal symptoms. These findings may provide a basis for creating a healthy work environment where factors contributing to work-related stress are reduced and coping strategies are developed.

Keywords: *gastrointestinal symptoms, intensive care, nurses, stress*

Introduction

COVID-19 is an infectious disease that emerged in the city of Wuhan in China in late 2019 and caused a pandemic afterward (Bonilla-Aldana et al. 2020). Although most patients suffering from COVID-19 infection recover easily and without complications, it is reported that 14% of patients require hospitalization and oxygen support, and 5% require hospitalization at an intensive care unit (ICU). Therefore, ICUs are an important step in the fight against the COVID-19 pandemic which is rapidly enveloping the whole world (Bulut and Özyılmaz 2020, Rothan and Byrareddy 2020, Wang et al. 2020, Zhu et al. 2020). During the COVID-19 pandemic; Patients diagnosed with COVID-19 can be treated not only in COVID-19 ICUs, but also in other ICUs. Therefore, healthcare professionals working in all ICUs are at risk (Bulut and Özyılmaz 2020, Wang et al. 2020).

Among healthcare officials, nurses are professionals who communicate and spend time with patients most. Historically speaking, nurses are seen to be in the frontlines in the fight against all epidemics, not only in the fight against the

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COVID-19 pandemic. In the fight against the pandemic, nurses are at risk while performing treatment and care, and therefore, they experience intense stress. ICU nurses, taking key roles and tasks in the fight against the pandemic, face many difficulties in this process (Choi et al. 2020, Kıraner and Terzi 2020, Kıraner et al. 2020, Wu et al. 2020). Wearing personal protective equipment during long working hours, lack of adequate equipment, fear of getting infected with the illness for themselves and their families, serious increase in workload, prolonged working hours, inability to meet/postpone their basic needs during working hours are some of the problems that ICU nurses are exposed to during this period (Greenberg et al. 2020, Kıraner and Terzi 2020, Kıraner et al. 2020). Moreover, many nurses have been infected with COVID-19 and died in this period (Kıraner and Terzi 2020, Kıraner et al. 2020). These problems are a serious source of stress for ICU nurses. Stress, defined as the reaction of the organism against any change that puts pressure on the organism, appears as a factor that causes especially functional diseases of the gastrointestinal system, triggers these diseases and sometimes makes them chronic (Kim et al. 2017, Lee et al. 2011, Spoorthy et al. 2020, Turan et al. 2017). While experiencing stress, changes also occur in relation to a decrease in upper gastrointestinal system motility and an increase in acid secretion and lower gastrointestinal system motility (Gao et al. 2020, Turan et al. 2017). Gastrointestinal symptoms (GI) have negative effects on daily routines and quality of life, and result in higher rates of utilization of healthcare (Lee et al. 2011, Turan et al. 2017).

When the literature is examined, perceived stress is seen to be accepted as the most significant predictive factor for GI symptoms (Afshar et al. 2015, Lee et al. 2011, Turan et al. 2017). However, it is known that factors such as age, work-related stress and shift working also have an effect on GI symptoms (Eskin et al. 2013, Lee et al. 2011, Turan et al. 2017, Zandifar et al. 2020). Stress-related GI symptoms are common worldwide, and the incidence of GI symptoms varies between 35% and 70%. The most common GI symptoms are upper GI dysmotility symptoms (Çam and Nur 2015, Greenberg et al. 2020, Qin et al. 2014).

In this context, this study was conducted to determine the relationship between the perceived stress and GI symptoms during the COVID-19 outbreak in ICU nurses, who are in the frontlines in the fight against the pandemic. This study is unique in that it is the first study on this particular topic. It is believed that the results of this study will make a significant contribution to the literature.

Research Questions

1. What are the GI symptoms that ICU nurses experience during the COVID-19 pandemic?
2. Is the perceived stress in ICU nurses associated with GI symptoms during the COVID-19 pandemic?
3. What are the factors associated with GI symptoms that occur in ICU nurses during the COVID-19 pandemic?

Materials and Methods

Design

This cross-sectional study was performed in a hospital in eastern Turkey, providing health services. Reporting rigour was demonstrated using the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist.

Population and Sample

While the population of the study was composed of all nurses working at the ICUs of the Malatya Research and Training Hospital, the sample of the study consisted of 200 nurses who agreed to participate in the study and met the inclusion criteria. No sampling method was used. The data collection instruments were applied to all nurses, and 85% (n: 170) of the population participated in the study. The data of the study were collected by the researchers between October 2020 and January 2021 by the face-to-face interview method. There wasn't any lockdown for nurses that could create a hassle to travel to the hospitals throughout the study.

Inclusion Criteria

<u>All ICU Nurses</u>

- No history of GIS disease (such as gastritis, ulcer, reflux, ulcerative colitis Crohn's disease, irritable bowel syndrome and gastrointestinal cancers).
- Working on the day and hours of the study.
- Did not diagnosed with any psychological disorders or chronic diseases.
- Not on annual leave or on sick leave were included in the study.

Data Collection Tools

The data of the study were collected using a Personal Information Form, the Perceived Stress Scale (PSS) and the Gastrointestinal Symptoms Questionnaire.

Personal Information Form

In the form created by the researchers by reviewing the literature, the sociodemographic characteristics of the participants (age, gender, marital status, having or not having children, perceived health status, having been infected with COVID-19 before or not, diet) and information on their intensive care experience (ICU they worked for, duration of ICU experience, hours worked on a shift, number of patients cared for on a shift, risk degree of the ICU in question in terms of COVID-19, status of caring for ındividual diagnosed with COVID-19) were questioned, and the form consisted of 13 questions (Çam and Nur 2015, Lee et al., 2011, Zandifar et al. 2020).

Perceived Stress Scale (PSS)

This scale was developed by Cohen et al. (1983) to measure how stressful some situations in the last month of a person's life are perceived (Cohen et al. 1983). Feelings and thoughts in the last month are questioned by the scale. PSS has three forms consisting of 14, 10 and 4 items each. In this study, the 10-item PSS was used. Each item in the scale is evaluated with a 5-point Likert-type scoring ranging from "Never (0)" to "Very often (4)". PSS scores are obtained by reversing four positive items and then summing up all scale items. Possible PSS-10 scores are between 0 and 40. Higher scores indicate higher levels of perception of stress. In the adaptation of the scale into Turkish carried out by Eskin et al. (2013), the Cronbach's Alpha internal consistency coefficient of the scale was calculated as 0.84. The Cronbach's Alpha internal consistency coefficient in this study was determined to be 0.86.

Gastrointestinal Symptoms Questionnaire (GSQ)

GSQ consists of 16 items regarding the frequency of GI symptoms that may be disturbing in the last three months. The questionnaire is in the form of a 5-point Likert-type scale, and it is scored according to the frequency of symptoms ["Never (0)" – "Very often (4)"]. The symptoms consist of five categories as esophageal symptoms (heartburn and/or dysphagia), upper gastrointestinal dysmotility symptoms (at least one of the following symptoms: early feeling of satiety, postprandial bloating, abdominal distention, nausea or vomiting), intestinal symptoms (at least one of the following symptoms: diarrhea/constipation, more than 3 occasions of defecation per day, profuse or watery defecation, feeling of urgent need to defecate, fewer than 3 occasions of defecation per week, hard or lumpy defecation or feeling of stuffiness), diarrhea (more than 3 occasions of defecation per day, profuse or watery defecation or feeling an urgent need to defecate) and constipation (at least one of the following symptoms: fewer than 3 occasions of defecation per week, hard or lumpy defecation, feeling of anal obstruction) It is stated that the Cronbach Alpha internal consistency coefficient of the questionnaire is 0.75 (Drossman et al. 1993). The Cronbach Alpha internal consistency coefficient in this study was found to be 0.76.

Data Analysis

The data were analyzed using the SPSS 25.0 package program. Conformity of measurable data to normal distribution was tested by using Shapiro-Wilk test. The data were expressed as frequency and percentage for the descriptive analyses. Comparison of the categorical variables between groups with and without GI symptoms was performed using Chi-squared test. The perceived stress quartiles of those with and without GI symptoms were analyzed using Chi-squares test for comparison of the categorical variables between groups. Pearson correlation analysis was used to measure the relationships between GI symptoms and perceived stress. Multiple linear regression analysis was performed to determine

predictors of GI symptoms. Linear regression analysis was applied on the variables found to be significant in the binary analyses. The results were considered statistically significant when $p<0.05$.

Ethical Approval

In order to carry out the study, ethics committee approval was obtained from the X University Non-Invasive Studies Ethics Committee (XX), and institutional permission was taken from the hospital where the study was carried out. Verbal consent was received from the individuals participating in the study, and the individuals were informed that their personal information would not be shared with others, they were free to participate in the study, and they could leave the study at any time.

Scientific Basis and Validity

In the literature, it is reported that infectious diseases are some of the important sources of stress faced by healthcare professionals (Greenberg et al. 2020, Kıraner and Terzi 2020, Kıraner et al. 2020). It is stated that there is a relationship between perceived stress and GIS symptoms. High perceived stress levels increase the incidence of GI symptoms (Babaoğlu and Özdenk 2017, Çam and Nur 2015).

Results

Descriptive Characteristics

Table 1. *Distribution of the Nurses' Sociodemographic Characteristics and Intensive Care Experience (N=170)*

Sociodemographic Characteristics	**n (%)**	**Intensive Care Experience**	**n (%)**
Age		**Intensive care unit they worked at**	
20-25	50 (29.4)	Reanimation ICU	**40 (23.5)**
26-31	100 (58.8)	Cardiology ICU	**32 (18.8)**
32-37	20 (11.8)	Internal Medicine ICU	**19 (11.2)**
Gender		Cardiovascular Surgery ICU	**25 (14.7)**
Male	60 (35.3)	COVID-19 ICU	**54 (31.8)**
Female	110 (64.7)	**Duration of intensive care unit experience**	
Marital status		1-5 years	**47 (27.7)**
Married	75 (44.2)	6-10 years	**98 (57.6)**
Single	95 (55.8)	11-15 years	**25 (14.7)**
Having children		**Hours worked on a shift**	
Yes	50 (29.4)	8 hours	**102 (60.0)**
No	120 (70.6)	24 hours	**68 (40.0)**
Perceived health status		**Number of patients cared for on a shift**	
Good	50 (29.4)	1-5 individuals	**98 (57.6)**
Moderate	95 (55.8)	5-9 individuals	**72 (42.4)**

Bad	25 (14.8)	**Risk degree of the intensive care unit in question in terms of COVID-19**	
Infected with COVID-19 before		High risk	**60 (35.3)**
Yes	70 (41.2)	Moderately risky	**78 (45.9)**
No	100 (58.8)	Low risk	**32 (18.8)**
Diet		**Status of caring for COVID-19 patients**	
Adequate-Balanced Diet	73 (42.9)	Yes	**78 (45.9)**
Fast food diet	97 (57.1)	No	**92 (54.1)**
Total	**170 (100.0)**	**Total**	**170 (100.0)**

It was found that 58.8% of the nurses were at the ages of 26-31, 64.7% were female, 55.8% were single, 70.6% did not have any children, 55.8% stated their perceived health status as moderate, 58.8% had not been infected with COVID-19 before, and 57.1% adopted a fast-food diet. It was also found that 31.8% of the nurses worked at COVID-19 ICUs, 57.6% had 6-10 years of working experience, 60.0% had 8 hours of work on a shift, 57.6% cared for 1-5 patients on a shift, 45.9% stated that the ICU where they were working was moderately risky in terms of COVID-19, and 54.1% had provided care to ındividual diagnosed with COVID-19. The mean perceived stress level of the nurses was found to be 29.30±5.73 (Table 1).

Distribution of Gastrointestinal Symptoms

Table 2. *Distribution of Gastrointestinal Symptoms (N=170)*

Gastrointestinal Symptoms	**Never n (%)**	**Rarely – Sometimes n (%)**	**Often – Very Often n (%)**
Abdominal Pain	27 (15.9)	100 (58.8)	43 (25.3)
Esophageal Symptoms			
Dysphagia	49 (28.8)	77 (45.3)	44 (25.9)
Heartburn	37 (21.8)	51 (30.0)	82 (48.2)
Upper GI Dysmotility Symptoms			
Early Feeling of Satiety	69 (40.6)	65 (38.2)	36 (21.2)
Postprandial Bloating	35 (20.6)	78 (45.9)	57 (33.5)
Abdominal Distention	30 (17.7)	65 (38.2)	75 (44.1)
Nausea	43 (25.3)	98 (57.6)	29 (17.1)
Vomiting	61 (35.9)	94 (55.3)	15 (8.8)
Intestinal Symptoms			
Diarrhea / Constipation	19 (11.2)	80 (47.1)	71 (41.7)
Number of Daily Defecations >3	95 (55.9)	50 (29.4)	25 (14.7)
Profuse or Watery Defecation	71 (41.8)	79 (46.5)	20 (11.7)
Feeling of Urgent Need to Defecate	66 (38.8)	81 (47.6)	23 (13.6)

Number of Weekly Defecations <3	74 (43.5)	53 (31.2)	43 (25.3)
Hard or Lumpy Defecation	45 (26.5)	86 (50.6)	39 (22.9)
Feeling of Anal Obstruction	99 (58.2)	60 (35.3)	11 (6.5)
Fecal Incontinence	102 (60.0)	59 (34.7)	9 (5.3)

It was found that, in the last three months, 48.2% of the nurses had heartburn, 41.7% had diarrhea/constipation, 44.1% had abdominal distention, 33.5% had postprandial bloating, 25.9% had dysphagia, 25.3% had abdominal pain and fewer than 3 weekly defecations, 22.9% had hard or lumpy defecation, 21.2% had early feeling of satiety, 17.1% had nausea, 14.7% more than 3 defecations per day, 13.6% had a feeling of urgent need to defecate, 11.7% had profuse or watery defecation, 8.8% had vomiting, 6.5% had feeling of anal obstruction, and 5.3% had fecal incontinence problems often or very often (Table 2) .

The Occurrence of Gastrointestinal Symptoms

Table 3. *The Occurrence of Gastrointestinal Symptoms (N=170)*

	Items	**No Symptoms n (%)**	**1-2 Symptoms n (%)**	**≥3 Symptoms n (%)**
GI Symptoms	16	33 (19.4)	95 (55.9)	42 (24.7)
Esophageal Symptoms	2	39 (22.9)	109 (64.1)	22 (13.0)
Upper GI Dysmotility Symptoms	5	57 (33.5)	94 (55.3)	19 (11.2)
Intestinal Symptoms	8	21 (12.4)	104 (61.2)	45 (26.4)
Diarrhea Symptoms	3	58 (34.1)	70 (41.2)	42 (24.7)
Constipation Symptoms	3	35 (20.6)	82 (48.2)	53 (31.2)

*All symptoms counted if reported to occur often or very often.

Among the nurses, 137 (80.6%) reported multiple GI symptoms. Among these nurses, 42 (24.7) nurses reported over three GI symptoms. In particular, 149 (87.6%) nurses reported bowel symptoms, 131 (77.1%) reported esophageal symptoms, and 113 (66.5%) reported upper GI dysmotility symptoms (Table 3).

Comparison of Gastrointestinal Symptoms by Perceived Stress Levels

Table 4. *The Relationship between Gastrointestinal Symptoms and Perceived Stress Levels (n=170)*

	r*	**p****
GI Symptoms	0.780	0.021
Esophageal Symptoms	0.756	0.019
Upper GI Dysmotility Symptoms	0.881	0.034
Intestinal Symptoms	0.748	0.015
Diarrhea Symptoms	0.843	0.040
Constipation Symptoms	0.802	0.016

*Pearson correlation test; ** <0.05.

There was statistically significant relationship between GI symptoms and Perceived stress scores obtained from the participants (p>0.05) (Table 4).

Table 5. *The Results of the Multiple Regression Model Created with Perceived Stress Level and Some Variables that Affect the Occurrence of GI Symptoms (n=170)*

Variables	β	t	p	VIF
Constant	0.914	0.604	0.025	
Stress	0.823	1.236	0.016	1.003
Gender (female)	0.520	0.689	0.019	1.082
Perceived health status (bad)	0.705	1.310	0.037	1.304
Diet (Fast food diet)	0.632	1.020	0.042	0.952
Previous COVID-19 infection status (yes)	0.468	0.735	0.010	0.866
Risk degree of the intensive care unit in question in terms of risk (high)	0.767	0.301	0.023	1.283

R=0.818; R^2=0.704; F=29.216; p<0.05.

Multiple linear regression analysis was performed to explain the predictive effect of some descriptive features of individuals participating in the study on GI symptoms. The model was found to be statistically significant in terms of the significance level corresponding to the F value (F=29.216; p<0.05). When the t coefficient and significance levels of the independent variables were examined; perceived stress score (p=0.016), gender (p=0.019), perceived health status (p=0.037), diet (p=0.042), having been infected with COVID-19 before (p=0.010) and risk degree of the ICU in question in terms of COVID-19 (p=0.023) appear to have a statistically significant effect on scores obtained by GI symptoms. It was seen that 62.4% of the change on the scores obtained with GI symptoms was explained by the scores obtained in nurses' these features (R=0.818; R^2=0.704) (Table 5).

Discussion

Although there are many studies in the literature examining the effects of perceived stress on GI symptoms (Babaoğlu and Özdenk 2017, Çam and Nur 2015, Lee et al. 2011, Özdenk and Kazım 2019), there is no study examining the effects of perceived stress experienced by nurses and some factors on GI symptoms during the COVID-19 pandemic period. Therefore, the findings of the study are discussed here along with the results of other similar studies.

It was seen that the majority of the nurses participating in this study were 26-31 years old, female and single, did not have any children, and approximately half of them stated their perceived health status as moderate and had not been infected with COVID-19 before. In a study examining the perceived stress levels experienced by oncology nurses, it was seen that almost all nurses were male, their mean age was 34.94±9.00, and approximately half of them were married (Onan et al. 2015). The reason why some sociodemographic characteristics of nurses differ from each other in studies is thought to be the fact that mostly young nurses work at ICUs in Turkey.

In our study, it was found that 80.6% of the nurses experienced at least one GI symptom, and 24.7% experienced at least three GI symptoms in the last three months. It was determined that the vast majority of the nurses experienced the symptoms of heartburn, diarrhea/constipation and abdominal distension, respectively, often or very often in the last three months. When the literature was examined, studies on this topic carried out mostly on students were found. In these studies, it was found that 70.2% of nursing students, 78.7% of nursing/ midwifery students and 65% of students of schools of education experienced at least one GI symptom (Babaoğlu and Özdenk 2017, Çam and Nur 2015, Lee et al. 2011). Previous studies have reported that upper GI dysmotility symptoms are the most common type of GI symptoms (Babaoğlu and Özdenk 2017, Çam and Nur 2015, Lee et al. 2011). The difference in the results of the studies is thought to have been caused by the difficulty in ICU working conditions during the COVID-19 process and different personal characteristics. As a matter of fact, 40% of the nurses are on duty for 24 hours in this study. This condition is thought to affect feeding, toilet habits and increase gastrointestinal symptoms.

According to this study, the perceived stress level was determined to be high. When a nursing study conducted before the COVID-19 pandemic period was examined, it was seen that the perceived stress experienced by nurses was much lower (Onan et al. 2015). When studies carried out during the pandemic period were examined, it was seen in a study conducted with healthcare workers that 81.7% of the participants reported moderate or high levels of perceived stress (Chekole et al. 2020). Likewise, in a study conducted with healthcare workers, the highest stress levels were found to be among nurses (Babore et al. 2020). Again, in a study conducted by Pasay during the pandemic period, it was determined that a moderate level of stress was perceived by the participants (Pasay-An 2020). The COVID-19 pandemic period has caused physical, psychosocial and politico-economic effects on ICU nurses. Nurses firstly had to manage an epidemic whose nursing management they had never experienced before, and they were also exposed to a high risk of contamination from nursing interventions with the highest risk of droplet spread (Benke et al. 2020, Kıraner and Terzi 2020, Kıraner et al. 2020, Pasay-An 2020). The results of this study and other studies conducted during the pandemic period were similar. It is thought that the increase in the perceived stress level experienced by nurses in studies is related to the difficulties that ICU nurses experience during this period.

In this study, it was determined that, as the perceived stress scores by the nurses increased, the incidence of GI symptoms also increased. A positive significant relationship was found in the correlation analysis conducted between perceived stress and GI symptoms. There are many studies in the literature indicating that there is a relationship between GI symptoms and perceived stress (Babaoğlu and Özdenk 2017, Çam and Nur 2015, Lee et al. 2011, Özdenk and Kazım 2019). Stress threatens homeostasis and consequently causes the balance of the GI system to deteriorate (Babaoğlu and Özdenk 2017, Lee et al. 2015, Özdenk and Kazım 2019, Pasay-An 2020). The similarity between this study and other studies in the literature confirmed that stress is a predictive factor for GI symptoms.

In the current study, some variables that may be determinant in predicting the GI symptoms of ICU nurses and their perceived stress were modeled by multiple linear regression Analysis. According to the regression analysis results, the occurrence of GI symptoms was increased by the higher the average score, previous COVID-19 infection status, the high-risk status of the ICU in question for COVID-19, poor perceived health status, malnutrition and being female, respectively. Similar to this study, other studies have concluded that increased stress quartiles and poor health status were predictors of GI symptoms (Çam and Nur 2015, Lee et al. 2011, Özdenk and Kazım 2019). The perception of health is based on individuals' general evaluations of their own health conditions, and it is a simple but powerful indicator that reflects the multidimensionality of health and enables the individual to evaluate their biological, mental and social state by themselves (Altay et al. 2016). The result of this study supported this information. In the literature, it was reported that permanent damage occurred in many systems in those who underwent COVID-19, and as for the gastrointestinal system, GI symptoms such as diarrhea, vomiting and abdominal pain were observed in a considerable number of patients (Xiang et al. 2020, Xiao et al. 2020). Similarly, in this study, it was found that the nurses who had been infected with COVID-19 before had more GI symptoms. It is thought that the finding here that working at a highly risky ICU in terms of COVID-19 was a determining factor on GI symptoms may have been due to rush working hours, lack of adequate protective equipment, increased daily stress, inability to take care of one's personal health and the risk of disease transmission faced by loved ones (Kıraner and Terzi 2020, Kıraner et al. 2020). It has been reported that GI diseases often occur in individuals who adopt a fast-food diet (Bonham et al. 2016, Nea et al. 2018, Xiang et al. 2020). It is reported that nurses adopt a fast-food diet, a low-quality diet or irregular eating habits due to reasons such as prolonged standing, shift working, excessive workload, time pressure, difficult or complex tasks, insomnia and insufficient rest breaks on shifts depending on the intensity of service (Bonham et al. 2016, Nea et al. 2018). The result that GI symptoms were seen more frequently in the nurses who adopted a fast food diet, which was also concluded in this study, confirmed this information (Cho et al. 2013, Nea et al. 2018).

Limitations

The fact that the sample consisted of ICU nurses working at only one hospital was a limitation of the study. The result of the study may not be generalized to all ICU nurses. In addition, the cross-sectional design of the study did not allow the examination of causality and it was not possible to analyze the long-term evolution of specific changes. A longitudinal study can solve this problem. Other factors that could contribute to stress of the nurses were not evaluated in the study. There weren't any information regarding psychological, behavioral, cognitive, reactions occurring before, during, or after pandemic. There weren't any other psychological assessment for the nurses except for Perceived Stress Scale.

Conclusion

It was found that the incidence of GI symptoms and the incidence of perceived stress were high in the nurses who participated in this study. Perceived stress level, perceived health status, previous COVID-19 infection status and working at a highly risky ICU in terms of COVID-19 were found to be significant predictive variables in the occurrence of GI symptoms.

Implications for Nursing Practice

In line with these results, it is recommended to evaluate nurses in terms of GI symptoms, provide the necessary support for ICU nurses in stress management and coping strategies to reduce perceived stress, improve their working conditions and conduct studies in larger nurse groups. These findings may also provide a basis for creating a healthy work environment where factors contributing to work-related stress are reduced and coping strategies are developed. Improvement in the environment can be initiated by the nurse administrators by establishing policies and procedures. For ICU nurses, activities such as professional mediation and social support as well as increasing peer support systems at workplaces can be inexpensive measures to reduce perceived stress and associated GI symptoms (Yıldız 2021). In this context, consultation and liaison psychiatric nurses can develop a plan to increase nurse awareness on strategies for stress reduction and coping behaviors, as they have a deep-rooted knowledge of the nature of psychiatric dynamics (Alharbi and Alshehry 2019, Yıldız 2021).

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Does Nursing Education in Turkey Affect the Attitudes Toward Ageing and Elderliness?

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The aim of this study is to explore the attitudes of nurse students in Turkey, towards ageing and elderliness and to determine differences in terms of year of study. The study uses a comparative design with data collected from February to March 2020. A random sample of 306 nursing students was selected. A demographic data form and the Attitudes toward Ageing and Elderliness Scale (ATAES) were used to collect data. Of the students, 47.7% reported that they cared for older adults in their clinical practice and 53.6% confirmed that they had successfully completed the theoretical lessons on elderly care. Theoretical education (Hedge's g = 0.23) and clinical practice (Hedge's g = 0.34) on elderly care have minimal effects on the attitudes toward ageing and elderliness. Theoretical education and clinical practice as conducted currently in a university in Turkey, failed to improve attitudes toward ageing and elderliness.

Keywords: *ageing, elderliness, nursing, nursing education, nursing students*

Introduction

Ageing is a natural biological process of life that starts in the womb and ends with death (Craik and Salthouse 2011). Elderliness is a distinctive period of later life with specific characteristics (Hakverdioğlu Yönt et al. 2015). However, the terms ageing and elderliness have a negative image in many societies. Although the term "elderliness" may be associated with many positive terms such as kindness, wisdom, dependability, affluence, freedom, political power, eternal youth, and happiness in the community, it may also refer to negative terms such as illness, uselessness, asexuality, declining mental functions, isolation, poverty, and depression (Palmore 1999).

Ageing and progressive physical degeneration can easily lead to prejudice or discrimination against older adults in the community. So, the younger generation may fear ageing and consider elderliness in a negative light both for themselves and others (Bousfield and Hutchison 2010, Meisner 2012). These prejudices on ageing and elderliness feed and enhance ageism (Bergman et al. 2013).

The World Health Organization (WHO) defines ageism as stereotyping and discriminating against people according to their age and approaching and categorizing them with prejudice (WHO 2020). Ageism has harmful effects on the overall wellbeing of older adults (Nelson 2016, Gendron et al. 2016). Moreover, in these adults, ageism can cause resistance for help from others and this further

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speed their decline in health. The literature refers to this phenomenon as "social death" (Seale 1996).

The attitudes of nurses towards ageing and elderliness are of vital importance as they are the health care professionals in most frequent contact with older patients. A Canadian projection anticipates that up to 75% of nurses' time will be spent on older adults in the near future (Holroyd et al. 2009). Yet, a systematic review by Khodabandeh et al. (2018) on elderly health care in Iran identified ten items which pose age-related challenges i.e., negative attitudes of nurses in aged care; lack of appropriate national programs for the care of the elderly; lack of knowledge and lack of standard care plans; undiagnosed chronic diseases; lack of adherence to treatment; irregular drug use depression; malnutrition; isolation from family and society and perceived misbehavior.

Therefore, in order to support and protect vulnerable older adults from the harmful effects of ageism, it is essential to improve both the staff nurses and nursing students' attitudes toward ageing and elderliness.

The majority of nursing curricula worldwide include modules on this subject focusing mainly on prevention and treatment of diseases in old people's care. These include social gerontology, psychology, social work, legal aspects, ethics, and more. However, because of the nature of the profession, in some cases staff and students may already have attained negativity towards caring for older people. Such attitudes may be due to social, psychological and physical features associated with elder clients. Thus, embracing positive attitudes towards the elderly should be of major focus in geriatric nursing education (Perez et al. 2016).

However, Holroyd et al. (2009) found that in the second and fourth year of nursing studies, positive attitudes toward ageing decreased whereby negative attitudes increased. Furthermore, a study in Spain by Sarabia-Cobo and Pfeiffer (2015) reported that there was a high prevalence of negative stereotypes toward ageing among student nurses. In contrast, Gonçalves et al. (2011) showed that nursing students' attitudes toward ageing and older adults are more positive when compared with psychology students. Moreover, their study also indicated that student nurses had a greater interest in working with older adults than psychology and social work students. Therefore, whether a change in nursing education approach can improve and sustain positivism towards the aged, remains unclear.

The aim of this study is to explore the attitudes of nurse students towards ageing and elderliness and to determine differences in terms of year of study.

Literature Review

Nursing is an occupation that emerged as a result of the need for care of patients, almost as old as human history (Egenes 2017). The most important element that gives a professional identity to a profession is vocational education (Jackson 2017). Education is the main factor to become a qualified nurse (Kermansaravi et al. 2015). The positive effect of nursing care on the treatment process has been proven by scientific research; as the quality of education increases, the quality of care increases (Karaca and Durna 2019).

Nursing education in Turkey has made significant progress over the decades. Besim Ömer Pasha, who was the first military physician in Turkey, decided to apply the method used in the training of female nurses in Japan in Istanbul and invited the daughters of well-known families of the city to the "Voluntary Nursing Course". This course was the first nursing education in Turkey. In 1925, the Red Crescent Nursing School was established under the Red Crescent Association. In the following years, schooling in nursing progressed very slowly and in 1960, the Ministry of Health started to open Health Vocational High Schools. Since 1961, there has been an increase in nursing education institutes. The number of health vocational high schools has increased rapidly, thus meeting the workforce need in hospitals (Kocaman and Yürümezoğlu 2015, Ulusoy 1998, Bahçecik and Alpar 2009).

The nursing education in higher education first started with Ege University School of Nursing in 1955, followed by Hacettepe University and Istanbul University Florence Nightingale School of Nursing in 1961. The number of nursing undergraduate programs in Turkey until 1995 was only 11. However, in 1996, with the closure of high schools giving nursing education, the number of nursing undergraduate programs increased from 11 to 70 overnight (Kocaman and Yürümezoğlu 2015). Since then, the number of schools and students has continued to increase in a way that is not compatible with the infrastructure of the schools and the number of educators. This increase has brought with it concerns due to conditions such as the lack of academic staff and infrastructure that may adversely affect the quality of education (Ulusoy 1998).

Nursing education need to adapt to the changing world to meet the people's demands. In recent decades, elderly population is increasing in Turkey and world. This increase causes various problems in economic, social, and family life. These problems can also affect health services, health expenditures, health insurance institutions, and occupational care. Older people may be considered as a social and economic burden by society. As a social consequence of the elderly people encountering these problems, negative attitudes towards elderly people can be developed (Ergöl 2011). The attitude of the health professionals, especially nurses which is the main profession caring for older adults, towards the elderly is as important as the society's attitude towards the elderly and aging. Because, with the prolongation of life span, management of chronic diseases and increased access to health services, and the increase in the education level of the society, the use of health services by the older adults has increased in recent decades and it is projected that it will continue to increase in the future (McKinlay and Cowan 2006, Bujnowska-Fedak and Pirogowicz 2014, Ren et al. 2019).

The attitudes of nurses, who are the most populous occupational group in health care, toward aging and elderliness has gain more importance in recent decades with the increase of the elderly population in society. İt is projected that nursing students, as a potential member of the profession in the future, will generally care for older adults in the near future. Zing et al. reported that students who do not have sufficient theoretical knowledge and experience in elderly care will be less willing to care for older adults. In addition, Liu et al. (2013)

determined that being knowledgeable about old age and preferring to work with elderly people are related to a positive attitude towards elderly people.

Although nursing students have a positive attitude while providing care to the elderly and having sufficient knowledge about the old age period is important in this respect, nursing education programs and institutions can play an important role in nursing students' development of positive attitudes towards aging and aging (Kulakçı 2010).

Methodology

Setting and Sample

This is a cross-sectional comparative study with nursing students 18 years and older, studying at grades from 1st to 4th year. It was conducted in a nursing faculty of a public university in Turkey. Cohen's criteria were used to calculate the sample size (Daniel and Cross 2018). The total number of students enrolled in the faculty was 1136. According to this criterion, sample size was calculated to be 287 students (95% confidence interval, $\alpha = 0.05$, $d = 0.05$, $p = 0.50$, and $q = 0.5$) who were randomly selected. The study was terminated after the sample reached 306 participants.

Data Collection

Data were collected from February to March 2020 and were based on self-reported answers. An extended demographic data form and the Attitudes toward Ageing and Elderliness Scale (ATAES) were used to collect data.

Extended Demographic Data Form

This form was developed by researchers and consisted of 11 items, collecting information on individuals' age, gender, year of study, marital status, family characteristics, and general views on older adults.

Attitudes toward Ageing and Elderliness Scale

The scale was developed in Turkey by Otrar in 2016 to assess the attitudes toward ageing and elderliness. The scale consists of 45 items and 4 subscales including difficulty to accept old age, perception of social attrition, difficulty to cope with life, and negative image. In terms of scale grading, a high subscale and total score, indicate more positive attitudes toward ageing and elderliness. The scale was reported as valid and reliable for those 18 years and older. Chronbach's alpha value was 0.97. Test-retest correlations were also significant for the total score, i.e., $r = 0.89$; $p < 0.001$. Item analysis showed that all values were determined significant and discriminant analysis verified the scale to be discriminative. Therefore, the scale is valid and reliable for research in Turkey and hence was chosen for this study's needs (Otrar 2016).

Data Analysis

Data analysis was performed using IBM SPSS version 25.0. The descriptive data in the study are presented as numbers (n) and percentages (%). Prior to data analysis, raw data were examined to determine if there was a normal distribution; this informed the decision regarding whether to use parametric or nonparametric statistics. A Chi-square test for independence was used to test the differences in categorical groups including gender, marital status, years in nursing education, willingness to care for older adults, and to live with older relatives. The Mann–Whitney test was applied to compare attitudes between student groups for non-parametric data and t-test was applied for parametric data. One-Way ANOVA was used for multigroup comparations. Post-hoc effects were examined using the Dunn test. Regression analysis was used to estimate the effects of variables on the ATAES total mean scores.

Ethics and Deontology

Written approval to conduct the study was obtained from relevant University Scientific Research and Publication Ethics Committee (protocol number 02/05), from relevant University Nursing Faculty and from the participants. Participants' anonymity and data confidentiality were also secured. All directives of the Helsinki Declaration have been followed.

Results

The majority of the students were female (90.5%) with a mean age of 21.4 ± 1.2 years; 47.7% of the sample reported that they cared for older adults in their clinical practice and 53.6% confirmed that they had successfully completed the theoretical lessons on elderly care. Of the students, 26.8% were studying in their 4^{th} year, 61.8% were reported they are willing to care for older adults after their graduation, 48.7% were living with one or more older adults in the same house, and 60.5% reported that they want to live with younger family member in the same house when they get old (Table 1).

Statistically significant differences were found with regard to mean scores of perceptions on social attrition ($p = 0.005$), difficulty to cope with life ($p = 0.001$), negative images ($p = 0.002$) subscales, and ATAES total score ($p = 0.004$) between students who care for older people or did not. Statistically significant differences were found with regard to all mean points of subscales and total of ATAES between the students who successfully completed the theoretical lessons on elderly care and those who did not. There were no statistically significant differences with regards to years in nursing education and overall scores (Table 2).

Table 1. *Distribution of Sociodemographic and Education-Related Characteristics of Students*

	n	%
Gender		
Female	277	90.5
Male	29	9.5
Years in Nursing Education		
1st year	67	21.9
2nd year	79	25.8
3rd year	78	25.5
4th year	82	26.8
Family Structure		
Nuclear	239	78.1
Extended	59	19.3
Other	8	2.6
Living with older adults		
Yes	149	48.7
No	157	51.3
Willingness to care for older adults		
Yes	189	61.8
No	117	38.2
Want to live with younger family members when they get old		
Yes	185	60.5
No	121	39.5
Completed the theoretical lessons on elderly care		
Yes	164	53.6
No	142	46.4
	Mean ± SD	
Age	21.4 ± 1.2	

Table 2. *Comparison of ATAES Mean Points with regards to Groups*

		Difficulty to accept old age	Perception of social attrition	Difficulty to cope with life	Negative image	ATAES Total
Cared for older people in clinical practice	Yes	34.92 ± 9.98	43.21 ± 9.27	33.08 ± 7.78	23.37 ± 5.28	134.58 ± 30.25
	No	32.88 ± 8.84	40.23 ± 9.08	29.97 ± 8.51	21.56 ± 4.98	124.65 ± 29.08
	p	0.061	**0.005**	**0.001**	**0.002**	**0.004**
	Hedge's g	0.22	0.32	0.38	0.35	0.34
Completed the theoretical lessons on elderly care	Yes	35.10 ± 9.52	43.03 ± 9.07	32.24 ± 8.06	23.14 ± 5.17	133.51 ± 29.69
	No	32.95 ± 9.41	40.73 ± 9.37	32.09 ± 8.42	21.98 ± 5.21	126.74 ± 30.14
	p	**0.048**	**0.030**	0.223	**0.041**	**0.049**
	Hedge's g	0.23	0.25	0.02	0.22	0.23
Years in Nursing Education	1st year	34.57 ± 9.20	42.30 ± 9.26	32.14 ± 8.36	22.69 ± 5.14	131.70 ± 29.83
	2nd year	35.54 ± 9.82	43.66 ± 8.93	32.33 ± 7.85	23.53 ± 5.59	135.05 ± 29.67
	3rd year	32.44 ± 9.46	39.82 ± 9.00	30.18 ± 7.94	21.58 ± 5.14	124.01 ± 29.03
	4th year	33.44 ± 9.40	41.59 ± 9.69	31.95 ± 8.81	22.35 ± 5.28	129.33 ± 31.12
	p	0.194	0.073	0.343	0.128	0.134
	Cohen's f	0.14	0.46	0.30	0.31	0.74

Regression analysis was used to estimate the effects of variables on the mean of ATAES total scores. Care of older adults in clinical practice and completion of the theoretical lessons on elderly care were negatively affecting the mean of ATAES total score (Table 3).

According to Hedge's g calculation for the independent sample t-test; care for older adults in clinical practice has a small effect on attitudes toward ageing and elderliness (Hedge's g = 0.34). Completion of the theoretical lessons on elderly care has also a small effect on attitudes toward ageing and elderliness (Hedge's g = 0.23).

Table 3. *Regression Estimates on Mean of ATAES Total Scores*

	B (95% CI)	**95% CI for B Lower Bound**	**95% CI for B Upper Bound**	**β**	**t**	**p**
Constant	165.13	148.22	182.05		19.21	<0.001
Cared to older adults in clinical practice	-13.02	-19.94	-6.107	-0.216	-3.71	<0.001
Completed the theoretical lessons on elderly care	-10.57	-17.48	-3.67	-0.176	-3.01	0.003

Model Summary: R = 0.202, R^2 = 0.041, Adjusted R^2 = 0.035, F = 6.477, p = 0.002.

Discussion

Positive attitudes by nursing students towards ageing and elderliness are important to maintain. Nursing education already incorporates modules relating to ageing and elderliness. Yet, there are conflicting results reported in the literature on the effects of nursing education on attitudes toward ageing and elderliness (Holroyd et al. 2009, Gonçalves et al. 2011). This study has explored this relatively poorly researched topic.

In this study, the Attitudes toward Ageing and Elderliness Scale (ATAES) was used to explore and determine the nursing students' attitudes. Results showed that more than half of the sample reported that they were willing to work in health care centers for older adults. Yet, in the relevant literature, the willingness to care for older adults among nursing students was reported to vary widely. Many personal factors are affecting the willingness to care for older adults such as salary and career opportunities (Toygar and Karadakovan 2020, Zhang et al. 2016, Chi et al. 2016, Rathnayake et al. 2016).

One of the attributes affecting attitudes toward ageing and elderliness was the experience of caring for older adults in clinical practice. The students who cared for older adults in clinical practice showed more negative attitudes toward ageing and elderliness. In usual clinical practice, students mostly care for older adults who have at least one disease or symptom (Mauk 2010). So, they are more exposed to the negative changes that can arise from ageing. It is possible that exposure to these negative changes can place nurses more at risk of developing further negative attitudes toward ageing and elderliness.

In the current study, a factor that seemed to promote negative attitudes toward ageing and elderliness was the successful completion of the theoretical modules on elder people's care. Thus, these theoretical lessons on elderly care may seem not to serve their purpose and facilitate positiveness toward ageing and elderliness. Similar to clinical practice, negative changes towards the old can be observed, i.e., the more a student is exposed to first-hand care for the old, the more negative they become towards working for/with this age group (Perez et al. 2016, Deschodt et al. 2010). Therefore, it seems that both theoretical preparation and clinical experience in nurse students in this study, failed in the purpose to produce more positive attitudes towards the aged. This suggests an unfortunate shortcoming in contemporary nursing education in Turkey whereby there is a need for more structuralized forms of older people's care, both theoretical and practical, in the undergraduate nursing courses. There is a need for investigative research into the exact competencies which would promote a shift from ageism to pro-age.

It is noteworthy that a way to tackle ageism via education is to confront elements of ageism such as 'group think' of negative stereotypes toward ageing among nursing students. Such an endeavor, is a Nursing Course on Ageing, as delivered by Sarabia-Cobo and Pfeiffer (2015) who showed that proper training of future professionals markedly contributes in the dispensation of proper care and the diminishing of ageism, which they endorse remains prevalent in healthcare systems.

Along these lines, Meriç et al. (2019) also noticed that positive attitudes toward the elderly should be promoted in Turkey. Thus, they recommend that geriatric nursing and home care nursing lectures be included in the nursing education curricula including awareness of the importance of the concept of old age and elderly care.

Yet, not all research is claiming that there is a widespread ageism in situ among student nurses. Usta et al. (2012) students who completed classes related to elderly health and either lived with or planned to live with at least one elderly parent after starting a family or already experienced having an elderly relative in their home, tended to have positive attitudes toward ageing. Furthermore, Söylemez et al. (2018) in their cross-sectional study on students' attitudes towards old people found slightly positive attitudes on average, but they still recommended that nursing curricula should include more geriatric courses in order to create further awareness and knowledge regarding care of elderly and more positive attitudes toward the elderly.

There was no statistically significant difference with regards to years in nursing education and overall scores in this study. Yet, our results also suggested that negative attitudes increased in the second and fourth years of education but these were not statistically significant. These are the time spans which coincide with the delivery of theoretical education and practice on elderly care in the faculty where this study was conducted.

Although the mean scores of ATAES were lower in the fourth year compared to the first year, theoretical education and clinical practice of nursing students showed only small effects on attitudes toward ageing and elderliness. Demir et al. (2016) also found that elder discrimination was defined by academic class level,

and the willingness to work with old people. They also suggest that more educational elements on getting old and declining/maintaining health should be incorporated in the nursing curricula. More gerontology lessons need to be added into undergraduate programs and practice areas enabling students to spend more time with elderly. Finally, training and consulting programs about discrimination against the old need to be created for the students in all stages of their education.

It is also recommended in the international literature that visiting nursing homes and seeing healthy older adults decreases ageism among nursing students (Deschodt et al. 2010). Smith et al. (2017) also suggest that increased exposure to and interactions with older adults can reduce ageist views among college students. It is therefore postulated that such targeted actions may influence nurse students in adopting more positive approaches to ageing and elderliness.

Limitations

The study was conducted in only one nursing faculty in the country and thus, results cannot be generalized to a national level.

Conclusion

As a result, nursing education does not seem to affect the attitudes toward ageing and elderliness at least to a degree that it was planned to achieve. Unfortunately, as this sample indicates that, theoretical education and clinical practice as conducted currently in a university in Turkey, failed to improve attitudes toward ageing and elderliness. We propose that nursing students should be exposed to healthy older adults more frequently and that in the theoretical training, targeted educational techniques and content are employed in order to strive towards positive changes on ageing. The need for further investigative studies into the exact nature of the competencies which would promote a shift from reported ageism to pro-age is of paramount nursing importance.

Overall, adopting positive attitudes towards the elderly would translate into providing higher quality nursing care for the elderly, and raising the standards of the nursing profession as a whole.

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Health System in Zimbabwe and Delay in Seeking Health Care of Breast Cancer Among Women

By Elsie Gotora[*]

Breast cancer, the most prevailing and only cancer considered universal among women worldwide. The rate of breast cancer per 100,000 women is higher in high income countries than in low income countries. However, mortality rates are high in low income countries due to the delay in seeking health care. A systematic literature review was carried out to document the health system implemented in Zimbabwe and its challenges that could be contributing to the delay in seeking health care of breast cancer among women in Zimbabwe. A content analysis was used to analyze articles, searching was done using the Boolean search strategy, articles from 2005 to 2021, which met the inclusion criteria were considered. Factors such as centralized services due to shortage of cancer specialists, lack of financial allocations on breast cancer health programs, shortage of screening and surgical equipment, lack of accurate data due to weak registration system and health management information system as well as poor governance and leadership have also been found to be challenges in the health system of Zimbabwe that may contribute to delay in seeking health care of breast cancer among women in Zimbabwe.

Keywords: *breast cancer, health system, health care, Zimbabwe*

Introduction

Background

Breast cancer, a cancerous tumor which originates from tissues of the breast, starts when cells in the breast begin to grow out of control to form a tumor which then results in breast cancer (Irvin and Carey 2008). Breast cancer is the most prevailing cancer among women and it is the only cancer that is considered universal among women worldwide, though it also affects men to a lesser extent. It is now the leading cause of cancer-related deaths among women globally. The rate of breast cancer per 100,000 women is higher in high income countries than in low income countries. However, mortality rates are high in low income countries as opposed to high income counties due to delay in seeking health care of breast cancer with poor treatment outcomes due to determinants such as disparities to access to high quality treatment, lack of facilities for breast cancer screening and poor awareness and knowledge of the disease in low income countries (WHO 2017).

According to WHO (2017), it is estimated that more than 450,000 breast cancer deaths occurred worldwide and over 1.1 million new cases were recorded. However medical advances have shown that one third of cancer of the breast is preventable and a further one third of the cases can be cured if diagnosed on time.

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Breast cancer in low to middle-income countries peaks 10-15 years earlier than in high income countries, presenting between the ages of 35-45 years as compared to 55-65 years in high income countries. Moreover, breast cancer in high-income countries such as USA and Canada and other regions have been impressive with an approximate survival rate of 70%-89% because of early detection by screening and timely effective treatment which is lacking in low income countries especially in the African continent. Breast cancer survival rates in most African countries ranged from 10%-25% (Nkala 2014).

Breast Cancer Causes

Literature pointed out that, the underlying causes of breast cancer are not yet known but there are a number of factors that increase risk of getting it. Risk increases if you: are a woman, above the age 40, have someone who had breast cancer in the family, are a smoker and take alcohol more than two normal size (350mL) bottle a day, take a diet which has high animal fat and low fiber content, started having children over the age of 30 or have no children at all, started menstruating before reaching the age of 12 and experience menopause later than what is considered normal, that is, after 55years (CAZ 2016). Being aware of the cause of breast cancer will help people to take preventive measures where possible and seek medical care as soon as a suspicious tumor appears in the breast.

Breast Cancer Screening

There are a number of ways for screening tumors and lumps in the breast, these are: clinical and self-breast exams, mammography, genetic screening, ultrasound, and magnetic resonance imaging (MRI) (Muchirevesi 2016). Breast self-examination (BSE) is a screening method for early detection of breast cancer. It is used as a checkup with women to find or detect any changes in the breast and it helps women to seek early treatment when a tumor is still small. Mammography can detect the tumor before it is capable of being touched or felt but it has some limitations such as false negative; sometimes it cannot find the cancer in the breast when in fact the cancer is there. Clinical breast examination (CBE) is another method that is done by well-trained nurses and other qualified health care providers. It is recommended that CBE be part of a periodic health assessment, at least every 3 years for women in their 20s and 30s and every year for women at least 40 years of age (Shao et al. 2018). Breast cancer screening is an important topic concerning delay in seeking health care of breast cancer because the screening method used to determine early or late detection of breast cancer.

Preventing Breast Cancer

The most common way to prevent breast cancer is by living a healthy life. Almost one third of most common cancers, including cancer of the breast can be prevented by eating a healthy diet, keeping a healthy weight and physical activity like exercises. The diet containing whole foods that are high in fiber and naturally

grown is encouraged. The other important fact is to avoid food that is highly processed, refined, high in fats, sugars and salts. It is the best to completely avoid alcohol, tobacco smoking and tobacco sniffing or chewing. Managing stress effectively is another important aspect in the prevention of breast cancer as well as other cancers. Breast feeding for a long time, up to 2years also a protective factor-this is a common practice in Zimbabwe and must be encouraged (Lei 2021).

Delay in Seeking Health Care of Breast Cancer

Delay in seeking health care is the time lag from which women notice signs and symptoms of tumor(s) in their breast and the time they seek health care depending on the breast cancer stages. At stage 1, cancer is relatively small and contained within the organ it started in, stage 2 means the cancer has not started to spread into surrounding tissue but the tumor is larger than in stage 1. From stage 3 that is when it is considered as delay when one seek health care at that stage or later because stage 3 usually means the cancer is larger and it may have started to spread into surrounding tissues and there will be cancer cells in the lymph nodes in the area, whereas, stage 4, the cancer has spread from where it started to another body organ (Moran et al. 2014). Moreover, seeking health care at stage 3 or above is considered as the delay because nothing much can be done since 90% of treatment will not work at stage 3 and 4 (American Cancer Society 2017).

Determinants of Delay in Seeking Health Care of Breast Cancer

According to a study done in Tanzania on Clinical and Epidemiologic profile of breast cancer lower income, lower educational level, experienced prejudice in care delivery, perceived lack of access to health care, fatalism about breast cancer, poor health care utilization habits, self-care behavior, spouse/partner and employer perceived constraints, problem-solving style, and a lack of knowledge of breast cancer's presenting symptoms were associated with likelihood to delay in seeking health care of breast cancer (Burson et al. 2010).

The results from a study in India to identify the determinants affecting the delay in seeking health care of breast cancer, with variables such as age, educational level, place of residence, and marital status, revealed that rural background and education status were strongly associated with the delay in seeking health care of breast cancer than their respective counterparts (Stewart and Wild 2017). Income earned by the family and smoking status, breast symptoms which were experienced previously, self-treatment and time taken to travel to the hospital were found to be key determinants of the delay in seeking health care of breast cancer from a Thailand study (Poum et al. 2014).

A study done in Nigeria pointed to socio -demographic determinants such as age, gender, place of residence and educational level were strongly associated with delay to seek health care. late presentation to treatment (Eze 2014). Another research which included South Africa, Egypt, Ghana, Kenya and Libya revealed that negative symptom interpretation, fear, belief in alternative medicine, social relations and networks, lack of trust and confidence in orthodox medicine, disparities to access to high quality treatment, lack of facilities for breast cancer

screening and poor awareness and knowledge of the disease are major determinants to delay in seeking health care (Maree and Wright 2010).

Breast Cancer in Zimbabwe

Statistics from Zimbabwe National Cancer Registry reveal that cancer of the breast accounts 12.4% of the cases among Zimbabwean black women. It is in the second position among the most common cancers in Zimbabwean women, the highest being cancer of the cervix (30.2%). Breast cancer is a top cause of morbidity and mortality in Zimbabwe with over 6,500 deaths per year. Cancer cases are expected to rise due to increasing ageing population and HIV and AIDS since Zimbabwe is in the top 22 of the countries in the world that have the highest burden of HIV. Most breast cancer cases in the Zimbabwe are related to HIV infection, therefore, the country is faced by a massive breast cancer challenge (Chokunonga 2016).

The majority of cancer patients (70%) in Zimbabwe delay to seek health care, they present for treatment at a late stage usually stage 3 and 4, which is the main cause of the increase in premature deaths from breast cancer (Nkala 2014).

One study done in Zimbabwe point out that lack of knowledge of breast cancer is a major contribution to delay in seeking health care of breast cancer. Results show that 52% have heard about breast cancer and the other 48% have never heard about it (Muchirevesi 2016). Most women in Zimbabwe are afraid of what people's reactions will be when people hear that they have breast cancer and the fear of being rejected by the community and also fear of the loss of a breast were other determinants that were found in another study. A study done by Nyakabau in 2014 pointed economic factors, Zimbabwe is going through economic hardships since 2008 and many people do not afford health care services (Nyakabau 2014). The economic hardships are also affecting the health care systems in Zimbabwe in terms of service delivery, health cost and health information. Concisely, according to literature, socio- economic determinants have a major contribution in the delay of seeking health care of breast cancer in Zimbabwe.

There are many kinds of health promotion materials and awareness on breast cancer risk factors and breast self-examination have been developed in the form of posters, fliers, pamphlets, as well as books. However, despite all these efforts that have been put in place, breast cancer remains a major public health problem among Zimbabwean women. The major concern contributing to this being that most patients present to the health service provider when the cancer is very advanced that is stage 3 and 4 and it will be too late for curative treatment to be offered.

Health Systems in Zimbabwe

According to WHO, a good health system is the one that delivers quality services to everyone in the population whenever they need them. The exact configuration of services varies from country to country, but in all cases requires a

robust financing mechanism; a well-trained, motivated and adequately paid workforce as well as reliable information on which to base decisions and policies and well-maintained facilities and logistics to deliver quality medicines and technologies (WHO 2016).

The economic hardships in Zimbabwe are causing the majority of people to not afford health care costs (Nyakabau 2014). Treatment for cancer including doctors' fees, surgery costs and treatment cycle costs range from US$4,000 and US$5,000 in private hospitals, yet most civil servants earn a minimum salary of US$300 a month. In government hospitals treatment may cost half of what it costs in private hospitals, however drugs are always out of stock and they are quickly depleted due to high demand and low supply (Muchirevesi 2016). Economic hardships are also causing doctors and nurses and other health professional to leave the country and go to other countries for greener pastures which is creating shortages of human resource in the health system which also lead to poor service delivery (Muchirevesi 2016). As mentioned in the WHO definition of the health system that a good health system should be able to deliver quality services to people but in Zimbabwe it is quite challenging for the health system to deliver what people want especially because of economic hardships. Therefore, the economic hardships in Zimbabwe are affecting the health system in a negative way as mentioned above, thereby contributing to the delay to seek health care services.

Problem Statement

Prevalence and incidence of breast cancer are high in high-income countries compared to low income countries. Africa has a low breast cancer incidence rate but high mortality rates compared to other continents due to poverty which is the main cause of delay in seeking health care. The incidence rate of breast cancer is 27 cases per 100 000 women in Middle Africa and 92 cases per 100,000 women in North America (WHO 2017). Survival rates were 70-89% in high income countries and 10-25% in low income countries including Zimbabwe. The delay in seeking health care being the major determinant of breast cancer survival in Africa (Nkala 2014).

In Zimbabwe, breast cancer cases are increasing by almost 30% yearly. The reported cases are probably an underestimate as many breast cancer cases are not captured because most patients do not seek health care (CAZ 2015). Breast cancer is a major cause of morbidity and mortality as well as premature deaths among Zimbabwean women with over 3 000 new diagnoses and over 6 500 deaths per year. Only 31% are diagnosed at an early stage when chances are high to cure the cancer and the other 69% delay to seek health care which is a major determinant of breast cancer survival (Chokunonga 2016).

Studies done in Zimbabwe revealed poor socio-economic status as being the major determinant of the delay in seeking health care (Muchirevesi 2016) even though some of the studies point to economic access barrier as the major source of the delay (Nyakabau 2014), some have generated evidence of non- economic access barriers to women participation in breast health care programs as major

contribution to the delay of seeking health care (Nkala 2014). This suggested that health system framework implemented in Zimbabwe, a considerable non-economic barrier, may contribute to the delay in seeking health care of breast cancer among women in Zimbabwe. Presently, the evidence on this issue in Zimbabwe is unclear. Lack of such information may hinder progress in addressing issues that influence breast cancer.

Purpose of Study

Understanding the health system framework implemented in Zimbabwe and its potential influence on the delay in seeking health care of breast cancer could be an effective step to reduce breast cancer prevalence and mortality. Moreover, the information might be used to upgrade health care systems and improve access to health service delivery to ensure that breast cancer is detected and treated at an early stage.

Study Question

- To what extend does the health system of Zimbabwe (Ouagadougou Declaration 2008 Framework) adopt the WHO health system in the prevention and control of breast cancer among in the country?
- What are the challenges in the health system of Zimbabwe that may contribute to delay in seeking health care of breast cancer among Zimbabwean women?

Study Objectives

- To describe the extent to which health system in Zimbabwe adopts the WHO health system framework in provision of health services to prevent and control breast cancer among women in Zimbabwe.
- To identify challenges in health system contributing to delay in seeking health care among women in Zimbabwe.

Operational Definition

Health System

Defined as a system consisting of all organizations, people and actions whose primary interest is to promote, restore or maintain health so as to deliver quality services to everyone in the population whenever they need them (WHO 2018).

Health Care

Health care is defined as a way of taking preventive and medical procedures to improve the health of a person especially when they are not physically and mentally fit. This may be done with surgery, the administering of medicine, or other alterations in a person's lifestyle. These services are offered through a health care system made up of hospitals and physicians (Porter 2010).

Delay in Seeking Health Care

The time lag from which women notice signs and symptoms of tumor(s) in their breast and the time they seek health care at stage 3 or 4 of breast cancer (Maree and Wright 2010).

Research Methodology

Study Design

A systematic literature review is used to analyze published articles to identify the determinants of delay in seeking health care of breast cancer among Zimbabwean women. The review strategy is authentic, date of publishing and publishing organization and or journal was ascertained before articles were included for reviewing. Only articles, reports and researches published between 2005 and 2021 were taken into consideration. Credibility is also taken into consideration, articles written based on personal opinions are not included for review. Articles are also reviewed to ascertain their reliability and whether the documents were representative of a collection of articles. Documents are also checked if their contents are logical and understandable. In order to have a clear understanding of evidence and information, only articles written and published in English were considered (Budgen and Brereton 2006).

Search Methods

The search methods are used by search tools such as search engines, and links from trusted websites to increase the effectiveness and efficiency of internet searches. Search engines are used in such a manner that terms are relevant to the study topics. When they are entered the engines responsible for searching and providing the list of web pages that had terms entered somewhere in them, whereas trusted links are found in the bibliography at the end of the paper or book and the bibliography help to find other sources that are related to the study.

Searching of articles was done across a wide range of databases which include: PubMed, Cochrane, Science Direct among others.

A Boolean search was used for identification of relevant articles using the keywords (breast cancer "OR" delay in seeking health care "OR" health care "OR" health system "OR" health information "OR" health financing "OR" health workforce "OR" health governance "OR" service delivery) "AND" (Zimbabwe "OR" name of any country). Some articles were identified through snowballing from articles which provided relevant information.

Inclusion and Exclusion Criteria

Published documents, journals articles, reports and web pages with key words relevant to health system and delay to seeking health care of breast cancer were included. The research focused on documents from only the 2005-2018

period and articles which were written in English. Non-English documents and abstract only documents were excluded.

Management of References

All published articles that are relevant and related to this study, and accessed from different search engines using different search methods were developed and managed using Endnote. In order to manage the information, all the information was summarized into a literature review matrix tabulated into author(s), year of publication and findings to identify patterns across the included studies to reach conclusions.

Data Analysis

Data were translated using content analysis by collecting and collating data from both qualitative and quantitative sources relevant to the study question to identify interventions common between studies. Content analysis is a family of systematic, rule-guided techniques used to analyze the informational contents of textual data and systematically categorizing textual data in order to make sense of it and answer the study questions (Strijbos et al. 2006). Deductive content analysis was used because the structure of analysis is based on previous knowledge with the aim to test a previous theory in a different situation (Elo and Kyngas 2008).

Results and Discussion

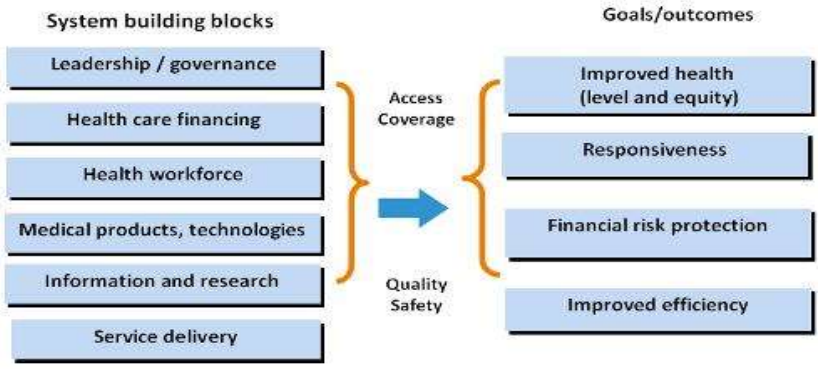
Document Identification

The Boolean search strategy yielded 147 articles. The articles were first screened using titles and abstracts and only 71 articles met the criteria whereby the other 76 were excluded. The articles were further screened using the full text review where 39 articles were excluded. Therefore, a total of 32 full text articles met all the inclusion criteria.

WHO Health System Framework and the Zimbabwean Health System Framework

The WHO health system framework is defined as a system consisting of all organizations, people and actions whose primary interest is to promote, restore or maintain health so as to deliver quality services to everyone in the population whenever they need them (WHO 2018). This can be described by using the six building blocks shown in Figure 1.

Figure 1. *The WHO Health System Framework*



Source: WHO 2018.

1) Leadership and governance involves ensuring strategic policy frameworks exist and are combined with effective oversight, coalition-building, the provision of appropriate regulations and incentives, attention to system-design, and accountability (WHO 2018).
2) Health care financing raises adequate funds for health, in ways that ensure people can use needed services, and are protected from financial catastrophe or impoverishment associated with having to pay for them (WHO 2018).
3) Health workforce works in ways that are responsive, fair and efficient to achieve the best health outcomes possible, given available resources and circumstances (WHO 2018).
4) Medical Products and technologies ensures equitable access to quality, safety, efficacy and cost-effectiveness, and their scientifically sound and cost-effective use (WHO 2018).
5) Health information system ensures the production, analysis, dissemination and use of reliable and timely information on health determinants, health systems performance and health status (WHO 2018).
6) Health services delivery are those which deliver effective, safe, quality personal and non-personal health interventions to those who need them, when and where needed, with minimum waste of resources (WHO 2018).

Health System Framework and Challenges in Zimbabwe

In 1980, the Government of Zimbabwe adopted the Primary Health Care Approach as a strategy to deliver health services. The health delivery platforms include primary, secondary and tertiary, however most of the health facilities in Zimbabwe are at primary care level which refer complicated patients to the upper levels. Moreover, mission and private sector facilities provide considerable services in both rural and urban areas. The primary health care aimed at ensuring the provision of quality and safe health services through a network of health facilities organized on the basis of increasing levels of sophistication (MoHCW 2016).

Zimbabwe adopted the Ouagadougou Declaration 2008 on Primary Health Care and Health Systems in Africa which focuses on nine major priority areas. The WHO health system framework and Ouagadougou Declaration 2008 are the same except that the Ouagadougou Declaration emphasizes on 3 more areas including: ensuring effective community ownership and participation in health development by creating an enabling policy framework for community participation, building community capacity, as well as using health promotion strategies to empower communities to adopt healthier lifestyles. Table 1 shows the summary of this comparison.

Table 1. *Comparison of WHO Health System Framework and Ouagadougou Declaration 2008 Framework*

WHO Health System Framework	Ouagadougou Declaration 2008 (Zimbabwe Health System Framework)
Leadership and Governance	
- ensure strategic policy frameworks exist and are combined with effective oversight, coalition-building, the provision of appropriate regulations and incentives, attention to system-design, and accountability (WHO 2018).	- aims at improving health determinants and updating and improving the national health strategic plan and policy (WHO 2010).
Health Care Financing	
- raises adequate funds for health, in ways that ensure people can use needed services, and are protected from financial catastrophe or impoverishment associated with having to pay for them (WHO 2018).	- aims at developing comprehensive health financing policies and plans and strengthen financial management skills at all levels (WHO 2010).
Heath Workforce	
-a well-performing health workforce one which works in ways that are responsive, fair and efficient to achieve the best health outcomes possible, given available resources and circumstances (WHO 2018).	- the main goal of building health training institutions capacity for scaling up the training of relevant cadres of health-care providers and to promote strategies for motivation and retention of health workers (WHO 2010).
Medical Products and Technology	
-ensures equitable access to quality, safety, efficacy and cost-effectiveness, and their scientifically sound and cost-effective use (WHO 2018).	-which is about increasing access to quality and safe health technologies and developing national policies and plans on health technologies as well management of appropriate health technologies (WHO 2010).
Health Information	
-ensures the production, analysis, dissemination and use of reliable and timely information on health determinants, health systems performance and health status (WHO 2018).	- which emphasize on the need to strengthen health information and surveillance systems for evidence based decisions given the weaknesses in data collection, collation, analysis, interpretation and use (WHO 2010).
Health Service Delivery	
- are those which deliver effective, safe, quality personal and non-personal health interventions to those who need them, when and where needed, with minimum waste of resources (WHO 2018).	- which aims ensure service organization and stakeholder coordination to promote and improve efficiency and equity (WHO 2010).
Community Ownership and Participation	
	-which is about ensuring effective community ownership and participation in health development by creating an enabling policy framework for community participation and building community capacity as well as using health promotion strategies to empower communities to adopt healthier lifestyles (WHO 2010).

Partnerships for Health Development	
	- which promote and strengthen partnerships for health development and adopting inter-sectoral collaboration, public-private partnerships and civil society participation in health policy formulation and service delivery (WHO 2010).
Research for Health	
	- which ensure the need of enough research on health so as to improve health outcomes.

Adoption of WHO Health System Framework in Zimbabwe

Leadership and Governance for Health

According to WHO (2018), leadership and governance ensures wide range of functions carried out by governments to improve population health while ensuring equity in access to services, quality of services, and patients' rights through the implementation of strategic health policies and coalition building. However, Zimbabwe's health systems reflect an explicit poor governance in allocation of resources, expansion of health infrastructure, deployment of health workers, particularly in rural areas. The breast cancer services are centralized and cannot reach rural and marginalized areas, where the delay in seeking health care of breast cancer is high (Marjolein et al. 2012). Additionally, lack of collaboration and synergies across different sectors, has also affected allocation of resources to address breast cancer inequities. Competing health and development priorities in the face of scarce resources subordinates the health sector to other sectors such as agriculture, finance and security. Hence, the health sector does not have much influence when compared to other sectors. This leads to lack of coherence in implementing policies that address determinants of delay in seeking health care of breast cancer (MoHCW 2014).

Zimbabwe has a draft Cancer Prevention and Control Strategy, which outlines priorities for cancer prevention and control though it is not yet implemented. The aim of the strategy includes reducing cancer incidence, mortality and morbidity. Finalization and launch of the National Cancer Prevention and Control Strategy needs to be given priority. Zimbabweans are expected to exercise breast cancer prevention behaviors and have access to early cancer detection (MoHCW 2014).

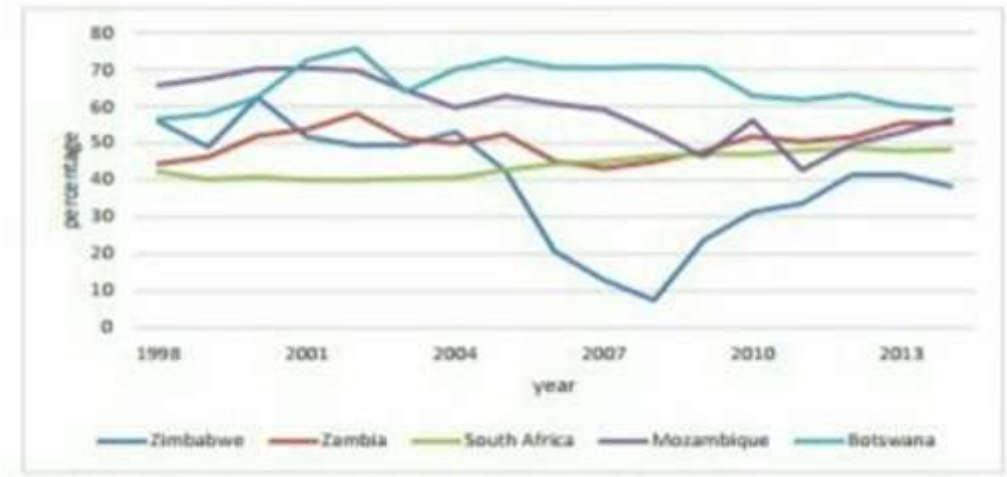
Health Financing

A good health financing system raises adequate funds for health, allocates resources, and purchases good and services in ways that improve quality, equity, and efficiency (WHO 2018). In Zimbabwe, evidence revealed a significant lack of financial allocations especially for cancer services. The National Health Accounts 2015 revealed that the health system is currently underfunded, with its US$7 per capita per annum for health significantly lower than US$34 recommended by the WHO. The underfunding is also affecting the availability of drugs and medical equipment (MoHCW 2017). Poor health financing began in the 1990s when the country adopted the structural adjustment programs (Lee et al. 2007). Structural Adjustment Programs (SAPs) were implemented as a conditionality for accessing bail out loans from the World Bank and International Monetary Fund. Structural

Adjustment Program (SAPs) entailed restructuring the domestic economy in order to support cost effective health interventions (Labonté 2010). This led to a reduction in health financial allocation as well as reduction in financial allocation for cancer interventions and the subsequent rise in breast cancer mortality.

Figure 2 shows that of all the Southern African countries, Zimbabwe's general government expenditure on health has gone down significantly between 1998 and 2013. Low expenditure on health in Zimbabwe is associated with high breast cancer mortality due to shortage of drugs and medical equipment (Nyakabau 2014).

Figure 2. *General Government Expenditure on Health in Southern African Countries 2013*



Source: Southern African Countries, NHA 2014.

Health Workforce

A well- performing health human resource one which works in ways that are responsive, fair and efficient to achieve the best health outcomes possible, given available resources and circumstances, that is, here are sufficient numbers and mix of staff, fairly distributed; they are competent, responsive and productive (WHO 2018). However, the health parameters for Zimbabwe are poor. The deteriorating economic conditions of the last decade resulted in the most senior health care workers migrating to neighboring countries and abroad leading to a shortage of human resource. Physicians density: 0.07 physicians/1,000 population. The WHO, 2016 concluded that less than 2.3 health care providers (doctors, nurses, and midwives) per 1,000 will not be enough to have convenient coverage of proper health care (WHO 2016). Hospital bed density: 1.7 beds/1,000 population which are also regarded as insufficient for the health care system. Shortage of pathologists, radiologists and surgical oncologists as well as shortage of drugs have left thousands of breast cancer patients without an option other than relying on traditional medicine which worsens the issue of the delay in seeking health care of breast cancer (Chokunonga 2016).

Table 2 summarizes the national shortage of health staff per cadre in 2009. There was a shortage of 6,940 staff members, meaning Zimbabwe's health system is just 57% staffed to capacity in 2009 and the projection is that the situation is even worse in 2018 because of continued economic hardships from 2009 up to date. In the public and private sectors, health workers are moved more rapidly than training institutions are able to replace.

Table 2. *Shortfall of Health Staff per Selected Cadre, 2010*

Cadre	# of Staff for Full Health System Operations	# of Staff in Place as of January 2009	Shortfall	% of Cadre Staffed
Doctor	1505	508	997	34%
Nurses (RGN)	7688	5087	2601	66%
Primary care nurse	2500	1778	722	71%
Pharmacists	132	37	95	28%
Pharmacy technician	185	90	95	49%
Laboratory scientists	385	245	140	64%
State-certified medical laboratory technician	120	31	89	26%
Environmental health officers	277	64	213	23%
Health services administrator	62	28	34	45%
Total for all cadres nationally*	16049	9109	6940	

Source: MoHCW 2010.

Medical Products and Technology

According to WHO (2018), a well-functioning health system ensures equitable access to essential medical products vaccines and technologies which must be available and affordable, of assured quality and properly used both by providers and patients. They should be available at all times, in adequate amounts, in the appropriate dosages (WHO 2018). However, in Zimbabwe, due to the underfunded health system, there is limited access to medical products such as, screening equipment, laboratory services, surgery, radiotherapy and chemotherapy equipment, and drug supplies. Health facilities do not have enough funding to secure adequate stocks of drugs, and cancer equipment (WHO 2010). Due to reduced government capacity to acquire medical products, NGOs contribute significantly in the procurement of these products though shortages still exist (CAZ 2016).

Health Information

A well performing system ensures the production, analysis, dissemination and use of timely and reliable information which is used by policy-makers, planners, health care providers, development partners and the general public to track health-system performance, to support better health policies and make effective health-related decisions (WHO 2018). In Zimbabwe, evidence established a lack of strong breast cancer registration system for tracking breast cancer mortality and the causes of the increase of breast cancer mortality in Zimbabwe. A weak health information system is demonstrated by the lack of data quality, timeliness and accurate information on breast cancer (MoHCW 2016). A strong and reliable Health Management Information System is crucial to ensure availability of timely and accurate information on key breast cancer health indicators (CAZ 2016).

Service Delivery

Good health services deliver effective, safe and quality health interventions to those who need them, when and where needed, with minimum waste of resources and include all services dealing with the diagnosis and treatment of disease, or the promotion, maintenance and restoration of health. They include personal and non-personal health services (WHO 2018). Zimbabwe health care services for breast cancer are centralized and not spread out to other remote areas of the country, there are transport and accommodation challenges which lead to the delay to seek health care treatment of breast cancer. Moreover, the way the existing centers operate is sub-optimal because of lack of enough radiotherapy equipment, limited chemotherapy drugs, shortage of medication to control pain and shortage of skilled staff. Inadequate supplies of chemotherapy drugs in state pharmacies drive patients to go to private pharmacies which are expensive and very few people can afford. On the other hand, wealthy patients go out of the country to seek medical services compromising national income (CAZ 2015).

Additionally, as mentioned earlier that Zimbabwe adopted the 2008 Ouagadougou Declaration on primary health care which include three more building blocks above those that are used by WHO. The three blocks are community ownership and participation, partnerships for health development and research for health (WHO 2008). The health system of Zimbabwe is underfunded which makes it difficult for the implementation of the community capacity building since there is need for health promotion strategies which need to be funded to empower communities to adopt healthier lifestyles so as to prevent breast cancer (Chokunonga 2016).

Evidence show that there is lack of collaboration across health sector and other different sectors, also the health sector does not have much influence when compared to other sectors (MoHCW 2014), concluding that the Partnership for Health Development is not well functioning in Zimbabwe. Furthermore, there is lack of research on health issues in Zimbabwe; there are gaps in most health issues which are awaiting research. For example there are few breast cancer researches that have been done in Zimbabwe the reason why I decided to do this study.

Challenges in the Zimbabwe Health System

In Zimbabwe the health system faces a number of challenges which hinder it to create and support breast cancer health care programs that can reduce the delay in seeking health care of breast cancer and improve breast cancer outcomes through early detection of breast cancer. In addition to the financial and organizational problems inherent in any health care systems, the main challenges faced by the Zimbabwean health system are:

Centralized services which are not spread out to other remote areas of the country where delay in seeking health care of breast cancer is high. Majority of the population live in rural areas and do not have access to cancer services due to transportation and accommodation challenges which lead to the delay in seeking health care of breast cancer (CAZ 2015).

Lack of coherence in implementing policies that address the delay to seeking health care of breast cancer because the health sector does not have influence compared to other sectors(MoHCW 2014).

Underfunded health system which leads to shortage of drugs and medical equipment of breast as s a result people need to purchase drugs privately which most people cannot afford considering the economic hardships in the country hence the delay in seeking health care of breast cancer. Improving breast cancer treatment outcomes in Zimbabwe requires a significant increase in social spending and macroeconomic policies that prioritize breast cancer in financial allocations (MoHCW 2013). Due to the underfunded health system, there is no money to train pathologists, radiologists, and surgical oncologists (MoHCW 2017).

There is a shortage of cancer specialists in the country. Due to underfunded health system, there is no money to train more workers health workers including cancer specialists whereas the few that are available are not equally distributed, they are based in major hospitals which are located in urban areas and they are burdened with heavy workloads. Therefore, eradicating the delay to seeking health care of breast cancer becomes difficult (Chokunonga 2016).

Limited access to medical products leading to shortage of screening and surgical equipment such as: laboratory services, surgery, radiotherapy and chemotherapy equipment, and drug supplies due to the underfunded health system (CAZ 2016).

Lack of accurate data due to weak registration system and health management information system that yield misleading breast cancer health indicators hence measuring the performance of health system on reducing breast cancer burden as well as reducing the delay in seeking health care of breast cancer becomes difficult (CAZ 2015).

Poor governance and leadership, resulting in the lack of political will to channel resources such as cancer drugs, medical equipment and health workers to reach rural and marginalized areas where delay in seeking health care of breast cancer is high as well as poor governance in resource allocation (MoHCW 2014).

Poor health service delivery due to centralized services which are as a result of underfunded health system. People have to wait in long queues before they receive the services and in cases of breast cancer, most patients are referred to provincial hospital which is accompanied by challenges such as transport and accommodation problem hence worsening the delay to seeking health care of breast cancer.

Discussion

Prevalence and incidence of breast cancer are high in high-income countries compared to low income countries. Africa has a low breast cancer incidence rate but high mortality rates compared to other continents. In Zimbabwe, breast cancer cases are increasing by almost 30% yearly, which according to this study, the increase is due to the challenges which exist in the health system that are leading to the delay in seeking health care of breast cancer. The reported cases are probably

an underestimate as many breast cancer cases are not captured because most patients do not seek health care (CAZ 2015). However, based on inevitable economic and practical constraints, all health care systems are compelled to make trade-offs among four main factors: access to care, scope of service, quality of care, and cost containment and these factors are directly linked to the delay in seeking healthcare of breast cancer. No perfect health care system exists, even in the wealthiest countries (Talpur et al. 2011).

According to the evidence gathered from a number of government reports and studies concerning the Zimbabwe health system and the delay to seeking health care of breast cancer among Zimbabwean women, Zimbabwe Health System is still struggling to adopt the WHO health system framework due to challenges that are faced by the health system. Evidence has shown that there are challenges in the Zimbabwean health system that are leading to the delay in seeking health care of breast cancer hence the rise in mortality and morbidity of breast cancer. The main challenge is the underfunded health system which is leading to centralized services of breast cancer, shortage of drugs and medical equipment, shortage of cancer specialists as well as shortage of cancer drugs, screening and surgical equipment. Lack of reliable information, lack of coherence in implementing policies that address the delay to seeking health care of breast as well as poor governance and leadership in the country are also challenges in the health system causing the delay of seeking breast cancer heath care (CAZ 2016).

As mentioned earlier that there is no perfect health care that exist even in wealthy countries. For example, there is breast cancer increase of between 30-40% annually in Latin America (Justo et al. 2013) compared to 30% annual increase in Zimbabwe. Among the problems that contribute to the existing breast cancer burden in Latin America is the health care system: limited access to treatment, insufficient physical and human resources for clinical care, and poor quality control of health services. Cancer data in Latin America are scarce specifically in Mexico because there is no national cancer registry, and time intervals for medical attention among patients with breast cancer are unavailable, therefore the delay in seeking health care of breast being the main contribution to the breast cancer burden (Villarreal-Garza et al. 2013).

As mentioned earlier that the main challenge in the Zimbabwean health system leading to the delay of seeking health care of breast cancer is underfunding. Figure 2 shows that out of five Sothern African countries which are South Africa, Zambia, Mozambique and Botswana, Zimbabwe has the most underfunded health system from 2004-2014 (NHA 2014). On the other hand, other African countries like Malawi, Rwanda and Zambia are doing well to improve their health systems, they are some of the few countries that met the Abuja declaration target to allocate at least 15% of their annual budget to health care by 2015 (WHO 2016). Due to the underfunded health system, the health service delivery is poor and Zimbabwe cannot meet the WHO recommendations because there is shortage of health care providers especially cancer specialists as well as shortage of medical equipment and drugs. The Ministry of Health cannot afford to train more health workers and to pay well those who are already in the system as well as providing enough drugs and medical equipment to the health care centers leading to centralized services

which makes it difficult for marginalized population to access the services (CAZ 2015). Tanzania is also facing a similar situation of shortage of health care providers because 30% of the country's healthcare professionals leave the health sector after receiving medical training because of poor incentives which is also affecting the well-functioning of its health system which is also causing the rise in breast cancer death which are projected to increase by 80% by 2030 (Burson et al. 2010).

Another challenge in the Zimbabwean health system leading to the delay in seeking health care of breast cancer is the shortage of medical equipment and drugs for breast cancer. There is need for collaboration between the National Pharmaceutical company and NGOs to ensure a coordinated response and maintain adequate stocks for breast cancer treatment. This will ensure equitable distribution of resources and effective management in controlling breast cancer prevalence and mortality and also avoiding the delay in seeking health care of breast cancer (MoHCW 2016). There is also need to collaborate with more NGOs and INGOs to acquire more funding in order train more cancer specialists and other health care workers as well as hiring some from other countries since they are the most important link in making sure that people are in a position to access cancer screening and treatment in order to reduce their risk of breast cancer development. Improvement on the services for early detection of breast cancer at all levels followed by a good referral system, that is, referral centers need to have the capacity to take up the referred cases as needed. Furthermore, cost-effective breast cancer screening services are not available and there is need to be made available for easy access to cancer screening services (Nyakabau 2014).

Furthermore, the lack of reliable breast cancer health information, hence measuring and monitoring the performance of the health system in the achievement of national and global targets for breast cancer becomes difficult. There is crucial need for improvement in the health management information system in order to come up with reliable breast cancer indicators. Accurate information is critical for measuring performance, equity, effectiveness and efficiency of policies and intervention. Moreover, quality Health Management Information System is integral for implementing evidence-based policies and equitable resource allocation (Chokunonga 2016).

Good governance plays a major role in improving the responsiveness of health system, however in Zimbabwe most of the challenges faced by the health system in prevention and treatment of breast cancer such as the lack of funding of breast cancer programs, shortage of breast cancer drugs and medical equipment, lack of coherence in implementing policies, as well as poor health registration system are all as a result of poor governance. In Zimbabwe, there is need to recognize that health is a political issue and it extends beyond the health sector. Political actions of different sectors such as infrastructure development, legislation, finance and NGOs are influential on how resources are distributed thus governance influences inequities and disparities of cancer health care through actions taken by policy makers (Reich et al. 2016).

Conclusion

In conclusion, the findings indicated the Zimbabwean health system is struggling to adopt the WHO health system framework in provision of health services to prevent and control breast cancer, mainly because of the underfunded health system. The underfunding of the health system is a serious matter since it is characterized by a number of challenges that lead to the delay to seeking health care of breast cancer which then result in the increase of breast cancer prevalence and mortality among Zimbabwean women. The challenges associated by the underfunded health system are centralized services of breast cancer, shortage of drugs and medical equipment, shortage of cancer specialists as well as shortage of cancer drugs, screening and surgical equipment. Lack of reliable information, lack of coherence in implementing policies that address the delay to seeking health care of breast as well as poor governance and leadership in the country.

Though there has been significant improvement in raising awareness on cancer prevention and early detection in Zimbabwe by the Cancer Association of Zimbabwe. Although the Ministry of Health and other partners in cancer control are prioritizing the policies of breast cancer and implementation of convenient way forward on breast cancer prevention and treatment, it has not been sufficient to reduce the delay of seeking health care of breast cancer in Zimbabwean women. The evidence provided by this study suggested that the challenges embedded in the Zimbabwe health system could potentially contribute to the delay in seeking health care of breast cancer.

Recommendations

Multi sectorial approach - The Health sector should collaborate with different sectors of the economy and stakeholders to address the key challenges leading to breast cancer mortality and to explore the common interests and establish coordinated response to promote seeking health care of breast cancer at its early stages. Additionally, this ensures shared goals for delay in seeking health care of breast cancer across all sectors thus strengthening breast cancer interventions.

Improving Health Information system - There is need for the Ministry of Health to strengthen the breast cancer registration system in order to track breast cancer mortality and the causes of the increase of breast cancer mortality. A strong and reliable Health Information System is crucial to ensure availability of timely and accurate information on key breast cancer health indicators.

Leveraging available resources - Leadership should aim to provide accountability, efficiency and harmonization of scarce resources between urban and rural areas to ensure they are distributed equitably depending on contextual needs.

Available private or non-profit services for the cancer community should attempt to fill in the gaps left by government health services and address the issue of delay to seek health care of breast cancer.

Acronyms

AIDS	Acquired Immune Deficiency Syndrome
BSE	Breast Self-Examination
CAZ	Cancer Association of Zimbabwe
CBE	Clinical Breast Examination
HIV	Human Immuno-Deficiency Virus
MRI	Magnetic Resonance Imaging
NHA	National Health Accounts
USA	United States of America
UHC	Universal Health Care
WHO	World Health Organization
MoHCW	Ministry of Health and Child Welfare
SAP	Structural Adjustment Program

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Prevalence and Severity of Asthma, Rhinitis and Eczema in Pre-School Children in the United Arab Emirates

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Very few studies have been carried out on asthma and allergies in pre-schoolchildren. This is the first study of pre-school children with asthma and allergies in the United Arab Emirates. We studied 4,000 pre-schoolchildren from the United Arab Emirates: Dubai, Sharjah, Abu Dhabi, and Al-Ain. The ages of the study group were between 1-5 years, and were 2,000 boys and 2,000 girls; they were randomly selected from kindergartens and nurseries. We used the standardised International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire. The mean (SD) age, height, weight and BMI were 3.3 (1.4) years, 92.0 (1.3) cm, 17.3 (5.2) kg, and 23.4 (9.3). The prevalence rates of "wheeze ever", "current wheeze", "speech limitation", "asthma" , "dry night cough", and "exercise-induced asthma" were 40.4%, 43.8%, 37.6%, 26.5%, 36.1, and 37.6%, respectively. Boys had a significantly higher prevalence of wheeze ever and current wheeze than girls. Girls had a significantly higher prevalence of speech limitation than boys. The prevalence rates of "rhinitis ever", "current rhinitis", "itchy watery eyes" and "hay fever" were 42%, 40.5%, 39.1% and 46.9%, respectively. Boys had significantly higher prevalence rates of "rhinitis ever", "current rhinitis", and "itchy watery eyes" than girls. The prevalence rates of "rash ever", "current rash" and "eczema ever" were 38.9%, 33.7% and 58.0%, respectively. Boys had significantly higher prevalence rates of rash ever, current rash, and eczema ever than girls. Children who were exposed to parental smoking have significantly higher prevalence rates of asthma, wheezing, and cough than those whom were not exposed. Children who breastfed more than 10 months had a significantly lower prevalence rates of "wheeze ever", "current wheeze", "speech limitation", and "asthma", than those whom breastfed less than 10 months. The prevalence rates of asthma, rhinitis and eczema were very high. Breastfeeding was found to be protective for asthma. The study can be used as a baseline intervention project to reduce incidents of asthma and allergies in these children and to establish atopic march in order to implement strategies to improve the respiratory health and allergies in these children.

Keywords: *asthma, wheeze, night cough, rhinitis, eczema, pre-school children, paediatric asthma*

Introduction

The prevalence of asthma and other allergic diseases (e.g., rhinitis and eczema) has increased over the last twenty years worldwide (Barreto et al. 2006, Forno et al. 2015, Weinmayr et al. 2008, Nutten 2015). Atopy is an important risk factor for asthma, rhinitis, and eczema, related to the allergic component of these diseases

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(Cohen et al. 2003, Mallol et al. 2013, Aït Khaled et al. 2009). The International Study of Asthma and Allergies in Childhood (ISAAC) documented high prevalence rates of allergic diseases and atopy in some countries like Europe, Australia, New Zealand, Brazil, Paraguay, Uruguay, Ecuador, and Peru (Forno et al. 2015, Weinmayr et al. 2008, Beasley 1998, Rosser et al. 2014). Allergic diseases are considered to arise through complex interactions between genetic susceptibility and environmental exposures (Strina et al. 2014), so that temporal trends in prevalence are most likely to be explained by changes in environmental exposure, lifestyle, and living conditions (Barreto et al. 2006).

In developed countries, over one-quarter of the population is affected by allergic diseases which are considered one of the most common problems seen by primary care physicians and pediatricians. Morbidity and school absenteeism correlates with the raised prevalence of asthma, allergic rhinitis, and atopic dermatitis in children. In children and adults, asthma is considered as one of the most widespread chronic diseases. Over the last three decades, the prevalence of asthma has grown in developed and developing countries (Al Ghobain et al. 2012).

The International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire for children, and the European Community Respiratory Heath Survey (ECRHS) for adults, are standardized research instruments that add better insight into the worldwide prevalence of asthma and other allergic diseases (Asher et al. 1995, Asher et al. 2006, Al Ghobain et al. 2012).

The prevalence of asthma was decreased in children who grew up in rural settings because of the presence of endotoxin (Bateman et al. 2008). In developed countries, asthma is considered the most common respiratory disease affecting children, with 10-30% of all school age children diagnosed. Lau et al. (2002), Stewart et al. (2001), and Weiland et al. (1999) found that a maternal history of asthma is known to induce a great risk for childhood asthma, and result from environmental factors like the utero-immunologic environment which can confer additional susceptibility.

The ISAAC study indicated that there are differences in the prevalence and incidences of asthma, allergic rhino-conjunctivitis and eczema which can be considered as a result of environmental factors including economic development (Weiland et al. 2004), dietary factors (Von Mutius et al. 2000), climate (Burr et al. 2003), infections (Cauwenberge 2003), and pollens (Sibbald 1993). Godfrey (1996) showed that the U.K had the 5th highest incidence of asthma (30-35%) compared to Russia, China and Greece where they had the lowest incidence of asthma (2-5%).

Allergic Rhinitis (AR) is an autoimmune disease that presents clinically with rhinorrhea, nasal obstruction, nasal itching, and sneezing which are reversible, spontaneously or with treatment. AR in children is clinically explained as a symptomatic disorder of the nose induced by an IgE-mediated inflammation after allergen exposure of the membranes lining the nose. The subdivision of rhinitis disease includes “intermittent” and “persistent”. Regarding the severity of allergic rhinitis, it has been classified into three types based on the duration and the effect of allergic rhinitis on daily activities (mild, moderate and severe) (Ciprandi et al. 1996).

AR is considered a global health problem and it is one of the most common diseases worldwide, affecting 10 to 25% of the population. Many patients do not recognize rhinitis as a disease and therefore do not consult a physician; therefore, the figures probably underestimate the prevalence of the disease (Gregory et al. 1999).

Over the last decades, an increasing prevalence of AR has been recognized (Simons 1996). According to Gregory et al. (1999), AR is one of the top ten reasons for visiting primary care clinics. AR significantly impacts the social life of patients, affects school performance (Malone et al. 1997), as well as work productivity (Renzoni et al. 1999). The cost of rhinitis is substantial (Krol and Krafchik 2006). A large variation in the prevalence of asthma and rhinitis symptoms in children throughout the world has been demonstrated by the ISAAC. In the 6- to 7-year-old age group, the prevalence of rhinitis with itchy-watery eyes "rhino-conjunctivitis" varied from 0.8% to 14.9% and in the age group of 13- to 14-year-olds, it varied from 1.4% to 39.7% (Teng et al. 2006). In school children, the overall correlation between the prevalence of asthma and rhinitis was significant.

Bosnic-Anticevich et al. (2020) have concluded that the parent-perceived burden of AR in Australian children is high and it impacts many areas of day-to-day living. Inadequate symptom control is a key driver of the extent of this impact. Opportunities to optimise the management of AR in children include the adoption of self-assessment tools to gauge and monitor the adequacy of symptom control.

Bousquet et al. (2020) have recently indicated the following facts about AR: AR is caused by immunoglobulin E (IgE)-mediated reactions to inhaled allergens and is one of the most common chronic conditions globally. AR often co-occurs with asthma and conjunctivitis, and is a global health problem causing major burdens and disability worldwide. Risk factors include inhalant and occupational allergens, as well as genetic factors. AR impairs quality of life, affects social life, school and work, and is associated with substantial economic costs. The AR and its Impact on Asthma (ARIA) initiative classified AR into intermittent or persistent and mild or moderate/severe.

Wheeze is an adventitious, high-pitched whistling sound made while breathing and is associated with difficulty breathing. Recurrent wheezing is common in young infants and toddlers, with 27% of all children having at least one wheezing episode by the age of 9 years. The initial wheezing episodes in young children are often linked to respiratory infections due to viral pathogens such as respiratory syncytial virus, rhinovirus, human metapneumovirus, and influenza virus. Bacterial colonization of the neonatal airway also may be significant in the late development of recurrent wheeze and asthma. Some 60% of children who wheeze in the first 3 years of life will have resolution of wheezing by age 6 years ("transient early wheezers") (Robinson and Singh 2012).

The characteristic of atopic dermititis (AD), a pruritic dermatitis which is localized in different areas, depends on the age of the child. The face and lower leg extensors are affected in infancy, whereas the flexural areas are commonly involved in childhood. In adulthood, however, the eruption has a more diffused distribution. Xerosis of the skin, early age of onset, and a chronic, relapsing course

are important clues to the diagnoses of eczema (Tootoonchi 2004). Exposures to oxidant air pollutants (O3 and NO2), but not PM2.5, were associated with an increased risk of incident asthma and eczema in children. This suggests that improving air quality may contribute to the prevention of asthma and other allergic diseases in childhood and adolescence.

In early life, wheeze may be attributed to a variety of causes such as respiratory infections, but data on asthma in younger pre-school children remains inadequate. However there are a few studies on the epidemiology of asthma and related symptoms in pre-school children.

Von Kobyletzki et al. (2012), conducted a cross sectional prevalence study of wheeze, rhinitis and eczema in 7,549 randomly selected Singaporean pre-school children between the ages of 4 to 6. Cumulative and past 12 months (current) prevalence of wheeze was 27.5% and 16.0%, respectively. Asthma was reported by 11.7% of the group. Current rhinitis prevalence was 25.3% and rhino-conjunctivitis was 7.6%, current chronic rash affected 13.5% of subjects, while 9.9% reported chronic rash with flexural distribution. After multivariate analysis, the main risk factor for "current wheeze" and self-reported asthma was a family history of allergy. The study showed that a considerable portion of pre-school children were affected by these allergy-associated symptoms, which supports the need for allergy education and intervention programs in this age group towards avoiding certain triggers of asthma, etc.

A study was performed by Grize et al. (2006) to analyze the prevalence of asthma and related symptoms in children younger than 5 years. A survey was conducted by interviewing the mothers of 617 children using the ISAAC questionnaire. The overall cumulative and 12 month prevalence of wheezing were 21.9% and 19.4%, respectively. The prevalence of exercise-induced wheezing, dry cough without respiratory infections or physician-diagnosed asthma were 18.9%, 11.8% and 3.9%, respectively. There was a high prevalence of history of wheezing or exercise-induced wheezing in the male sex, and in children with positive history of atopy, constant cough unrelated to respiratory infections was strongly associated. Moreover, a physician-diagnosed asthma was strongly associated with a positive history of atopy in children.

Another study was performed by Barnes, Godfrey and Martin (1998) to assess the association between eczema in early childhood, and the onset of asthma and rhinitis later in life in children. Of 3,124 children aged 1-2 years, the prevalence of eczema was 17.6% at baseline. Children with eczema had a 3-4 fold risk of developing asthma, and nearly 3-fold risk of developing rhinitis at follow-up, compared with children without eczema. Further independent risk factors increasing the odds of developing asthma were a parental history of allergic disease and a period of breast feeding shorter than 6 months. The incidence of rhinitis was increased in parental history of allergic disease. Thus, during the following 5 year period in infancy, eczema was associated with the development of asthma and rhinitis.

A cross-sectional study was carried out by Myers (2012) to evaluate the prevalence of current wheezing in pre-school children, and to examine the association between current wheezing and current rhinitis, considering its severity

and persistency. The sample was represented by 5,003 Portuguese children aged 3-5 years. Current wheezing prevalence was 24.5%, and in the previous year, 9.4% of the participants had ≥ 4 wheezing episodes. It was found that almost 25% of pre-school children had current wheezing which was strongly associated with rhinitis.

Gaga et al. (2007) studied the prevalence of atopic dermatitis in a sample of pre-school children aged 3-5 years. Children with atopic dermatitis presented with 32.2% affected by rhinitis and 24.2% affected by wheezing; a high prevalence of atopic dermatitis and a close relationship with rhinitis symptoms.

Another study conducted by Moss (1989) investigates whether the infants with atopic eczema were at greater risk of developing asthma and allergic rhinitis than those with non-atopic eczema. The presence of eczema was documented in children up to 2 years of age in a birth cohort study of 620 infants with a family history of atopic disease. Skin prick tests (SPTs) at 6, 12, and 24 months using six common allergens, were used to determine the sensitization status. So, in order to determine the presence of asthma and allergic rhinitis, interviews were conducted at 6 and 7 years. The study showed that within the first 2 years of life for children with eczema, SPT can provide a very important data on the risk of childhood asthma and allergic rhinitis.

Four cross-sectional surveys in 5- to 7-year-old children were conducted in seven different communities in Switzerland between 1992 and 2001 by Barnes (2012). The results showed that the increase in prevalence of asthma and hay fever in 5- to 7-year-old children living in Switzerland may have ceased, but atopic dermatitis symptoms may still have increased, especially among girls.

More and more, new-fashioned personal products, household appliances, building materials and furnishing materials have been used in residences (Al Ghobain et al. 2012, Bateman et al. 2008, Moss 1989, Gwaltney 1996), changing indoor environmental exposures in residences over the past 20 years (Bateman et al. 2008, Lau et al. 2002, Gwaltney 1996, Gwaltney et al. 1992). During the same time period in developed countries: Germany (Schiffman 1992), Italy (Girgis et al. 2007), Australia (Bateman et al. 2008, Weiland et al. 2004), and Switzerland (Bauer et al. 1973), similar exposures to modern chemicals began many years ago and have plateaued. In developing countries where home environments have recently and rapidly changed, prevalence rates of these diseases and symptoms among children appear to have been increasing (Lau et al. 2002, Stewart et al. 2001, Weiland et al. 1999, Weiland et al. 2004, Von Mutius et al. 2000).

Since 1990, several studies have been conducted on childhood asthma and related diseases or symptoms (Cauwenberge 2003, Sibbald 1993, Ciprandi et al. 1996, Proud et al. 1990, Kaufman 1986, Graf 1997, Ellegard and Karlsson 1994), and their associations with ambient environmental exposure (Ellegard and Karlsson 1999, Mallol et al. 2013, Zollner et al. 2005, Duggan et al. 2012, Poulos et al. 2005), but between 2000 and 2010, there has not been a large-scale study simultaneously conducted in urban and suburban districts. Thus, it is of interest to investigate to what extent childhood asthma prevalence has increased.

Attendance at daycare facilities is associated with a greater contact among young children, and much greater exposure to infections during childhood, in

comparison with children who stay at home (Barreto et al. 2010, Okomoto et al. 2004, Wahn and Von Mutius 2001, Swartz et al. 2019).

Few published studies have explored risk factors and prevalence of asthma and allergic diseases in pre-school children, and none has been done in the UAE. The aim of the present study was to describe the prevalence of asthma, rhinitis, and eczema among a representative sample of pre-school children living in this expanding country and identify associated risk factors, and to what extent pre-school childhood asthma and allergy has increased. It aims to report the current prevalence and severity of childhood asthma, allergies and other respiratory symptoms in pre-school children which can be used in asthma prevention programmes.

Materials and Methods

We used a validated Arabic and English version of the ISAAC questionnaire which has been used in related published papers. We added relevant questions on breastfeeding. All participants' parents verbally consented for themselves and for the pre-school children for whom they responded to questionnaires. Parents of all participants voluntarily responded to the survey. Kindergartens and nurseries have approved this procedure for obtaining consent.

We preliminarily contacted the administrations of the kindergartens/nurseries in the Emirates of Dubai, Sharjah, Abu Dhabi and Al-Ain to include all pre-school children. We visited and recommended that the child's parent fill out the questionnaire.

Study Design

The study involved a cluster random sample of pre-school children aged 1-5 years of age to study the prevalence and severity of asthma, rhinitis, and eczema, with a response rate of 95%.

Inclusion and Exclusion Criteria

Inclusion Criteria

1. Participants were enrolled pre-school children in Dubai, Sharjah, Abu Dhabi and Al Ain, UAE (nurseries and kindergartens).
2. Target age group was under 6 years old
3. Willing to participate in the study

Exclusion Criteria:

1. Children over 6 years
2. Not willing to participate in the study

Study Participants

We studied 4,000 children from nurseries and kindergartens from both genders (2,000 males and 2,000 females) from different nationalities.

Sampling Method

We studied all children from each kindergarten/nursery in order to complete the required sample size.

An ISAAC questionnaire (Arabic and English versions) was used. After the questionnaires were collected, they were carefully checked and coded. Pearson's chi-squared ($\chi 2$) test was used to test for significance of difference in prevalence between different groups of children. A p-value <0.05 indicated statistical significance. Asthma was defined as parental-reported wheezing in the last 12 months, plus at least one of the following: i) asthma diagnosis ever, ii) wheezing during/after physical exercise in the last 12 months, and iii) sleep interruption due to wheezing in the last 12 months (Pires et al. 2018). Eczema was defined as the presence of an itchy rash at any point during the last 12 months involving the folds of the elbows, behind the knees, in front of the ankles, buttocks, or around the neck, ears or eyes (Singh et al. 2018).

The additional questions part consisted of 21 questions to measure other risk factors that can affect the prevalence and severity of asthma, rhinitis, and eczema symptoms in pre-school children. Parents were asked about having a household smoker, history of asthma or atopy in the first-degree relatives of the child, whether the child was breastfed and some other questions.

Data Collection

A list of all government nurseries was obtained from the Education Council. Approval was granted from the Education Council to distribute the questionnaires to be filled in by parents or guardians of the students. Moreover, the questionnaires were also distributed among kindergartens.

Data Analysis

Data was entered and analysed using SPSS version 20. All questions were coded and then transferred to SPSS for analysis. Descriptive statistical analysis included frequencies for categorical data. We used t-test and chi-square test to compare continuous and categorical variables.

Ethical Issues

An ethics permission letter to conduct the study was obtained from Ajman University to get the approval of distributing the questionnaires among nurseries and kindergartens. Another ethics permission letter was obtained from the Education Council for distributing the questionnaire among governmental

nurseries. Prior to data collection, a written and signed consent form was obtained from parents or legal guardians, and confidentiality of participants was maintained at all times. Participants were informed that they have the right to withdraw from the study at any time, and they were also informed that their participation is voluntary.

Results

There was a significant difference in weight and height between boys and girls; boys were significantly taller and lighter than girls (Table 1). Boys had a very high, significant prevalence of wheeze ever than girls. They also had high significant current wheezing and diagnosed asthma than girls, but had significantly lower speech limitation than girls (Table 2).

There was a significant difference in the prevalence of rhinitis symptoms between boys and girls; boys had higher prevalence rates than girls (Table 3). Boys had significantly higher prevalence rates of rashes ever, current rashes, rash locations and eczema ever than girls (Table 4).

Table 1. *Physical Measurements of All Children*

Variable	Boys (2000)		Girls (2000)		All (4000)	
	Mean	S.D	Mean	S.D	Mean	S.D
Age	3.3	1.4	3.4	1.4	3.3	1.4
Height	91.6	10.9	92.3***	11.8	92.0	11.3
Weight	17.7	5.3	16.9***	4.9	17.3	5.2
BMI	23.5	8.2	23.3	9.2	23.4	9.3

*: P ≤ 0.05; **: P ≤ 0.01; ***: P ≤ 0.001

Table 2. *Prevalence and Severity of Asthma Symptoms*

Symptoms	Boys (2000)		Girls (2000)		All (4000)	
	N	%	N	%	N	%
Wheeze Ever	944	47.2***	654	32.7	1616	40.4
Current Wheezing	906	45.3**	840	42.0	1752	43.8
Wheezing Attacks:						
None	704	35.2	750	37.5	1448	36.2
1-3	786	39.3	666	33.3	1464	36.6
4-12	52	2.6	48	2.4	100	2.5
≥12	36	1.8	14	0.7	12	1.3
Sleep Disturbance:						
None	680	34	560	28	1172	29.3
1-3	880	44.1	820	40.6	1700	42.5
4-12	48	2.4	52	2.6	100	2.5
Once a Week	24	1.2	28	1.4	52	1.3
Speech limitation	720	36.0**	762	38.1	1504	37.6
Diagnosed Asthma	564	28.2**	488	24.4	1060	26.5
Dry Cough	722	36.1	722	36.1	1444	36.1
Exercises- induced Asthma	748	37.4	758	37.9	1504	37.6

*: P ≤ 0.05; **: P ≤ 0.01; ***: P ≤ 0.001

Table 3. *Prevalence and Severity of Rhinitis Symptoms*

Symptoms	Boys (2000)		Girls (2000)		All (400)	
	N	%	N	%	N	%
Rhinitis Ever	864	44.4***	682	39.8	1546	42.2
Current Rhinitis	775	41.1**	663	39.8	1438	40.5
Itchy watery eye	757	40.2**	631	37.9	1388	39.1
Season:						
Summer	333	19.2	261	17.4	594	18.4
Winter	856	49.2	679	45.3	1535	47.5
Spring	140	7.2	151	1.10	291	9.0
Autumn	20	1.2	18	1.2	38	1.2
Effect of Rhinitis on Daily Activity						
None	700	40.4	593	39.5	1293	40.0
Little	543	31.3	397	26.5	940	29.1
Moderate	77	4.4	86	5.7	163	5.0
A lot	29	1.7	34	2.3	63	1.9
Hay fever	814	47.0	702	46.8	1516	46.9

*: P ≤ 0.05; **: P ≤ 0.01; ***: P ≤ 0.001

Table 4. *Prevalence and Severity of Eczema Symptoms*

Symptoms	Boys (2000)		Girls (2000)		All (4000)	
	N	%	N	%	N	%
Rashes Ever	794	40.7***	632	36.8	1426	38.9
Current Rashes	675	34.6*	501	32.7	1236	33.7
Rashes Locations	570	31.1*	451	28.2	1021	29.8
Age first occurred						
≤ 2	723	39.5	641	40.1	1364	39.8
2-4	559	28.7	435	27.2	994	29.0
≥ 5	110	6.0	78	4.9	188	5.5
Cleared rash past 12 month	1028	56.3	830	52.0	1858	54.3
Wake at night						
Never	1351	73.8	1265	79.2	2616	76.3
≤ 1 night per week	415	22.7	284	17.8	699	20.4
1 or more night per week	26.2	1.3	16	1.0	42	1.2
Eczema Ever	1136	60.0**	940	56.3	2076	58.0

*: P ≤ 0.05; **: P ≤ 0.01; ***: P ≤ 0.001

There was a trend showing higher prevalence of current wheezing, current asthma, incense affecting breathing, perfume affecting breathing among girls compared with boys. Twenty one percent of boys and 27% of girls were exposed to parental smoking (Table 5).

Mean age of onset of asthma for boys and girls was 1.6 years, and mean age for recovery from asthma for boys and girls were 1.8 and 1.7 years, respectively. Both boys and girls had the same mean age of onset for rhinitis which was 1.8

years and the mean age of recovery for boys and girls were the same (1.8, 1.7 years) (Table 6).

The prevalence rates of asthma and asthma symptoms (wheeze ever, current wheezing, number of wheezing attacks, number of sleep disturbances per week, speech limitation, asthma, dry cough and exercise-induced asthma) were significantly higher in children who breastfed less than 10 months compared to those who breastfed more than 10 months (Table 7).

The prevalence rates of rhinitis symptoms (rhinitis ever, current rhinitis, itchy watery eyes, and hay fever) were significantly higher in children who breastfed less than 10 months, compared to those who breastfed more than 10 months (Table 7).

The prevalence rates of eczema symptoms (rash ever, current rash, and eczema) were significantly higher in children who breastfed less than 10 months compared to those who breastfed more than 10 months (Table 7).

Children who were exposed to parental smoking had significantly higher prevalence rates of asthma and respiratory symptoms than unexposed children (Table 8). Children whose parents had history of asthma had more prevalence, and severity of symptoms of asthma compared to those parents who never had asthma. In general, for all symptoms of asthma, the difference was highly significant ($P \leq 0.001$) (Table 9).

There was a very high significant difference in prevalence of rhinitis symptoms in children who had asthma, compared to children who never had asthma. Children without asthma had a significantly lower prevalence of rhinitis symptoms (Table 10).

There was significant difference in prevalence of eczema symptoms in asthmatic children compared with children without asthma. Children without asthma had significantly less prevalence of eczema symptoms (Table 10).

There was a very high significant difference in prevalence of asthma symptoms in children who had rhinitis compared to children without rhinitis. Children without rhinitis had significantly less prevalence of asthma symptoms. Children with rhinitis had significantly higher prevalence of eczema and rashes than children without rhinitis (Table 11).

Children with eczema had significantly higher prevalence rates of asthma and respiratory symptoms than children without eczema. There was a higher significant difference in prevalence of rhinitis between children with eczema and children without eczema ($P \leq 0.001$). Children, who never had eczema, have significantly lower prevalence rates of rhinitis symptoms (Table 12).

Table 5. *Additional Questions*

Questions	**Boys (2000)**		**Girls (2000)**		**All (4000)**	
	N	**%**	**N**	**%**	**N**	**%**
Wheezing now	21	4.7	28	6.0	49	5.3
Asthma now	14	3.1	16	3.4	30	3.3
Treatment for Asthma now	15	3.3	20	4.3	35	3.8
Smoker at home	95	21.1	128	27.2	223	24.2
Incense affect breathing	56	12.4	64	13.6	120	13.0
Perfume affect breathing	30	6.7	39	8.3	69	7.5
Father suffer from asthma	22	4.9	35	7.4	57	6.2
Father suffer from eczema	33	7.3	37	7.9	70	7.6
Mother suffer from asthma	22	4.9	32	6.8	54	5.9
Mother suffer from eczema	33	7.3	45	9.6	78	8.5
Child breast feed	379	84.2	399	84.9	778	84.6
Animal at house	83	18.4	89	18.9	172	18.7
Brothers or Sisters has asthma	47	10.4	49	10.4	96	10.4
Brothers or Sisters has rhinitis	87	19.3	76	16.2	163	17.7
Brothers or Sisters has eczema	82	18.2	102	21.7	184	20.0
Change house recently	65	14.4	70	14.9	135	14.7
Type of housing						
Villa	330	73.3	342	72.8	672	73.0
Apartment	120	26.7	128	27.2	248	27.0
Diet Changed recently	46	10.2	52	11.1	98	10.7
Meals of fruit in week						
Daily	246	54.7	262	55.7	508	55.2
Twice a week	126	28.0	134	28.5	260	28.3
Rarely	68	15.1	71	15.1	139	15.1

Table 6. *Age of Onset and Recovery of Asthma, Wheezing, Rhinitis, and Eczema (years)*

Variable	**Boys (2000)**		**Girls (2000)**		**All (4000)**	
	Means	**S.D**	**Means**	**S.D**	**Means**	**S.D**
Age of Asthma Onset	1.56	1.2	1.58	1.4	1.8	1.3
Age of Wheezing Onset	1.54	1.3	1.7	1.3	1.6	1.3
Age of Asthma Recovery	2.13	1.8	1.8	1.7	2.0	1.7
Age of Rhinitis Onset	1.67	1.38	1.75	1.4	1.7	1.4
Age of Rhinitis Recovery	1.56	1.82	2.1	1.79	1.9	1.8
Age of Eczema Onset	1.2	1.2	1.26	1.22	1.2	1.2
Age of Eczema Recovery	1.2	1.4	1.15	1.32	1.2	1.4

Table 7. *Prevalence and Severity of Asthma, Rhinitis and Eczema in Children who Breastfed Less than and More than 10 Months*

Symptom	Children Breastfeed ≤ 10 Months (n=3249) %	Children Breastfeed > 10 Months (n=751) %
Wheeze Ever	44.0 ***	12.8
Current Wheeze	48.2 ***	9.4
No. of Wheeze Attacks	40.6 ***	7.7
No. of Sleeping Disturbances per week	47.7 ***	6.6
Speech Limitation	41.7 ***	1.5
Asthma Ever	29.5 ***	6.3
Dr Cough	39.2 ***	11.4
Exercise-induced Asthma	42.1 ***	1.7
Rhinitis Ever	45.5 ***	16.6
Current Rhinitis	43.9 ***	14.5
Itchy Watery Eyes	43.3 ***	6.5
Hay Fever	45.3 ***	4.4
Rash Ever	42.8 ***	7.3
Current Rash	37.1 ***	6.8
Eczema Ever	63.6 ***	17.1

*: P ≤ 0.05; **: P ≤ 0.01; ***: P ≤ 0.001

Table 8. *The Effect of Parental Smoking on Prevalence and Severity of Asthma Symptoms*

Symptoms	Exposed Children (n=2066)		Not Exposed Children (n=1599)	
	N	%	N	%
Wheezing Ever	1015	50.9***	426	26.7
Current Wheezing	1092	52.9***	507	31.8
Wheezing Attacks:				
None	774	43.3***	441	28.0
1-3	771	43.1***	455	29.1
4-12	40	2.2	45	2.9
≥12	35	2.0***	9	0.6
Sleep Disturbance:				
None	576	33.8***	262	24.0
1-3	896	52.6***	471	31.2
4-12	45	2.6***	35	2.3
Once a Week	17	1.0***	25	1.7
Speech limitation	924	46.1***	384	24.9
Diagnosed Asthma	533	31.4***	311	20.7
Dry Cough	908	43.9***	413	25.9
Exercises induced Asthma	963	46.6***	414	26.0

*: P ≤ 0.05; **: P ≤ 0.01; ***: P ≤ 0.001

Table 9. *Effect of Parental History of Asthma on Symptoms of Asthma*

Symptoms	Father with Asthma		Father without Asthma		Mother with Asthma		Mother without Asthma	
	N	%	N	%	N	%	N	%
Wheezing Ever	1162	50.5***	318	23.4	888	54.6***	593	29.2
Current Wheezing	1246	54.2***	353	26.0	967	59.5***	633	31.1
Wheezing Attacks:								
None	957	47.4***	256	19.3	636	47.4***	579	28.8
1-3	932	40.5***	296	22.2	602	44.8***	623	31.0
4-12	49	2.4***	34	2.6	50	3.7***	35	1.7
≥12	28	1.2***	14	1.1	26	1.9***	1	0.1
Sleep Disturbance:								
None	675	35.7***	267	20.2	493	4.7***	447	22.4
1-3	1103	58.4***	262	20.0	613	50.6	756	37.6
4-12	36	1.9***	39	19.9	52	4.3***	28	1.4
Once a Week	22	1.2***	20	1.5	24	2.0***	2	0.9
Speech limitation	1085	49.4***	226	16.8	887	58.6***	425	20.9
Diagnosed Asthma	605	32.2***	241	18.3	622	51.7***	224	11.2
Dry Cough	1019	44.3***	303	22.3	787	48.4***	533	26.2
Exercises induced Asthma	1136	49.3***	242	17.8	861	52.9***	515	25.3

*: P ≤ 0.05; **: P ≤ 0.01; ***: P ≤ 0.001

Table 10. *Comparing Rhinitis and Eczema Symptoms between Children with Asthma and Children without Asthma*

Symptoms	Children with Asthma		Children without Asthma	
	N	%	N	%
Rhinitis Ever	371	44.0***	806	34.2
Current Rhinitis-	415	49.3***	722	31.0
Itchy watery eye	389	46.4***	698	30.0
Rhinitis Season:				
Summer	200	23.8***	394	17.1
Winter	506	60.2***	1016	44.2
Spring	68	8.1***	151	6.6
Autumn	7	0.8***	23	1.0
Rhinitis Affect Daily Activity				
None	390	46.4***	860	37.4
Little	320	38.0***	585	25.4
Moderate	53	6.3***	96	4.2
A lot	18	2.1***	44	1.9
Hay fever	509	60.5***	1001	43.6
Rashes Ever	366	43.2***	739	31.3
Current Rashes	331	39.0***	682	28.9
Rashes Locations	342	40.3***	675	29.3

Eczema Age First Occurred				
≤ 2 years				
2-4 years	389	45.9*	853	37.0
≥ 4 years	316	37.3*	593	25.7
Cleared rash past 12 mo Rash	53	6.3*	69	3.0
Wake at night	586	69.4***	1183	51.3
Never				
≤ 1 night per week	570	67.2**	1837	79.6
1 or more night per week	233	27.5**	402	17.4
Eczema Ever	1	1.1**	2	0.2
	603	71.4***	1347	57.1

Table 11. *Comparing Asthma and Eczema Symptoms between Children with Rhinitis and Children without Rhinitis*

Symptoms	**Children With Rhinitis**		**Children Without Rhinitis**	
	N	**%**	**N**	**%**
Wheezing Ever	818	52.9***	658	31.1
Current Wheezing	902	58.3***	698	33.0
Wheezing Attacks:				
None	555	43.5***	657	31.7
1-3	547	42.9***	679	32.7
4-12	44	3.4***	41	2.0
≥12	36	2.8***	8	0.4
Sleep Disturbance:				
None	410	34.8***	528	26
1-3	609	51.7***	758	37.3
4-12	49	4.2***	31	1.5
Once a Week	16	1.4***	26	1.3
Speech limitation	741	50.4***	568	27.4
Diagnosed Asthma	371	31.5***	473	23.4
Dry Cough	751	48.6***	568	26.9
Exercises induced Asthma	771	49.9***	604	28.6
Rashes Ever	849	54.9***	577	27.3
Current Rashes	691	44.7***	545	25.8
Rashes Locations	508	37.4***	511	24.7
Age first occurred				
≤ 2	575	42.3***	789	38.2
2-4	524	33.9***	466	22.6
≥ 5	111	7.2***	77	3.7
Cleared rash past 12 month	1040	76.5***	818	39.6
Wake at night				
Never	891	65.6*	1723	83.4
≤ 1 night per week	397	29.2*	302	14.6
1 or more night per week	2	1.4*	6	0.8
Eczema Ever	1143	77.2***	933	44.8

*: P ≤ 0.05; **: P ≤ 0.01; ***: P ≤ 0.001

Table 12. *Comparing Asthma and Rhinitis Symptoms between Children with Eczema and Children without Eczema*

Symptoms	**Children With Eczema**		**Children Without Eczema**	
	N	**%**	**N**	**%**
Wheezing Ever	895	43.1*	484	32.5
Current Wheezing	959	46.2**	544	36.6
Wheezing Attacks:				
None	853	43.1***	262	20.6
1-3	929	46.9***	297	23.3
4-12	44	2.2	41	2.8
≥12	35	1.8	9	0.6
Sleep Disturbance:				
None	677	34.7	251	20.0
1-3	1089	55.8	278	22.2
4-12	49	2.5	31	2.5
Once a Week	16	0.8	26	2.1
Speech limitation	872	42.4***	427	28.9
Diagnosed Asthma	603	30.9***	241	19.2
Dry Cough	779	37.5***	443	29.8
Exercises induced Asthma	846	40.8***	432	29.1
Rhinitis Ever	1143	55.1***	337	22.7
Current Rhinitis	883	43.5***	543	36.6
Itchy watery eye	884	43.5***	494	33.3
Season:				
Summer	409	21.3***	183	14.3
Winter	1192	62.0***	340	26.6
Spring	186	9.7***	80	6.3
Autumn	22	1.1***	11	0.9
Affect Daily Activity				
None	991	51.6***	283	22.2
Little	691	36.0***	236	18.5
Moderate	92	4.8***	68	5.3
A lot	35	1.8***	28	2.2
Hay fever	1153	60.0***	363	28.5

*: $P \leq 0.05$; **: $P \leq 0.01$; ***: $P \leq 0.001$

Boys had higher prevalence rates of asthma, eczema, rhinitis, asthma and eczema, asthma and rhinitis, eczema and rhinitis and asthma, rhinitis and eczema than girls (Table 13). The prevalence rates of asthma, rhinitis and eczema was higher in children who breastfed less than 10 months compared with those who breastfed more than 10 months (Table 14).

Table 13. *Prevalence of Asthma, Rhinitis, Eczema Symptoms in Boys (2,000), Girls (2,000) and All (4,000)*

Boys (1950)	**Asthma Only**	**Eczema Only**	**Rhinitis Only**	**Asthma & Eczema Only**	**Asthma & Rhinitis Only**	**Eczema & Rhinitis Only**	**Asthma & Rhinitis & Eczema**
	24.9%	58.2%	44.3%	17.8%	12.0%	34.0%	11.2%
Girls (1718)	**Asthma Only**	**Eczema Only**	**Rhinitis Only**	**Asthma & Eczema Only**	**Asthma & Rhinitis Only**	**Eczema & Rhinitis Only**	**Asthma & Rhinitis & Eczema**
	21.1%	54.7%	39.7%	14.9%	8.0%	27.9%	7.5%
All Children (3668)	**Asthma Only**	**Eczema Only**	**Rhinitis Only**	**Asthma & Eczema Only**	**Asthma & Rhinitis Only**	**Eczema & Rhinitis Only**	**Asthma & Rhinitis & Eczema**
	23.1%	56.6%	42.1%	16.4%	10.1%	31.2%	9.5%

Table 14. *Prevalence and Severity of Asthma, Rhinitis, and Eczema Symptoms in Children who Breastfeed ≤ 10 Months and >10 Months*

Breastfeed ≤ 10 Months (n=3249)	**Asthma Only**	**Eczema Only**	**Rhinitis Only**	**Asthma & Eczema Only**	**Asthma & Rhinitis Only**	**Eczema & Rhinitis Only**	**Asthma & Rhinitis & Eczema**
	6.3%	18.7%	2.4	7.9%	0.5%	20.6%	10.5%
Breastfeed > 10 Months	**Asthma Only**	**Eczema Only**	**Rhinitis Only**	**Asthma & Eczema Only**	**Asthma & Rhinitis Only**	**Eczema & Rhinitis Only**	**Asthma & Rhinitis & Eczema**
	3.1	12.6	1.0%	0%	1.7%	3.4%	14.8%

Discussion

Previous studies have identified genetic, environmental, behavioral, and socioeconomic factors associated with the development of allergic diseases in childhood, likely to reflect complex interactions between genes and environmental exposures (Lambercht and Hammad 2017).

In the present study, current prevalence and severity of asthma, rhinitis and eczema among pre-school children in Dubai, Sharjah, Al-Ain and Abu Dhabi (UAE) were reported and analysed. The global prevalence of asthma among 6- to 7-year-old and 13- to 14-year-old children were estimated at 14.1% and 11.7%, respectively in 2002 (Grize et al. 2006). We can speculate that asthma prevalence among different age groups that are presently growing linearly will level at a plateau level, as has happened in other countries (Qu et al. 2013, Yangzong et al. 2012, Dong et al. 2012, Hong et al. 2012), or will be in the region of steep increase in a sigmoid curve as in Beijing (Pearce et al. 2007).

The present study, with a relatively large sample size, shows significantly high prevalence of asthma, asthmatic symptoms, rhinitis and eczema. The strength of the upward asthma prevalence trend over the past years is real in spite of the methodological differences amongst various studies. The present study reports more actual prevalence rates, whereas earlier reports may have underestimated prevalence rates.

Studies in Chinese pre-school children found significantly higher asthma in urban areas than in suburban areas, consistent with other studies (Zhao et al. 2010, Bjerg et al. 2010, Choi et al. 2014). Also, other Chinese studies have found significantly higher asthma prevalence rates in boys than girls, consistent with many Chinese (Zhao et al. 2010, Choi et al. 2014, Postma 2007) and international (Yangzong et al. 2012, Dong et al. 2012, Hong et al. 2012, Almqvist et al. 2008, Zhang et al. 2013) studies. Young boys had a higher asthma prevalence than girls at least until age 13-14 (Weschler 2009), or adolescence (Guarnieri and Balmes 2014, Mi et al. 2006). The time-trend of childhood asthma among 3- to 7-year-old children is most likely well-characterised. The present study represents a comprehensive description of asthma, allergy, and airway symptoms or diseases in pre-school children in the UAE. It also provides a good reference for national or international studies, and comparisons of childhood health issues which will be useful for future similar studies in rapidly developing cities, countries, or regions.

Furthermore, given the parallel exponential uptrends of prevalence rates of childhood asthma in different age groups and of various indicators of rapid modernization in the UAE, we can ask whether the disease increase is associated with changes in environmental exposures (indoor and outdoor) and family lifestyles that have occurred with rapid modernization. Many studies have found significant associations between air pollution and childhood asthma and other respiratory diseases and/or symptoms (Asher et al. 1995). However, the annual average concentrations of typical outdoor air pollutants in the Gulf region have trended down. Thus, it is possible that environmental exposures whose sources are indoors rather than outdoors may have stronger associations with childhood asthma than outdoor air pollution (Li et al. 2011, Asher et al. 1995, Qian et al. 2011, Bornehag et al. 2004, Dong et al. 2008, Liu et al. 2014, Hu et al. 2014).

It has been previously reported that some environmental factors, including pet-keeping, indoor tobacco smoking, using wood as cooking fuel, living within 200m of a highway or busy road, and home dampness-related indicators, have positive and significant associations with childhood asthma and other diseases or symptoms.

Attention should be given to the health effects of changing environmental exposures with indoor sources due to newly-fashioned lifestyles that have developed as the economy in many countries has grown.

1. Prevalence and severity of symptoms of asthma, allergic rhinitis, and eczema: first of all, as for the prevalence and severity of asthma symptoms in all children, we found that the prevalence rates of symptoms of wheezing ever, current wheezing, dry cough, speech limitation, and exercise-induced asthma were high. There was significant difference in asthma, rhinitis and eczema symptoms between boys and girls.
2. Effect of breast-feeding, passive smoking and parental history on prevalence and severity of symptoms of asthma, allergic rhinitis, and eczema.

Breastfeeding

Although prolonged breastfeeding was shown to reduce the risk of allergic and respiratory disease, still the fact that breastfeeding can prevent allergic disease remains controversial, as there are no reports from developing countries that support this issue. In this study, we tried to assess the relationship between breastfeeding and the development of childhood asthma and allergic diseases. We found that there was significant difference in the prevalence of asthma for children who breastfeed more than 10 months compared to children who breastfeed less than 10 months ($P \leq 0.001$). Breastfeeding may be confounded by other factors such as income.

Passive Smoking

Worldwide, smoking rates are increasing despite all of the campaigns to eliminate smoking and hinder the detrimental effects of passive smoking. Children who were exposed to passive smoking, either in utero or during their adulthood, may have an increased prevalence of allergies and asthma. In the present study, it has been found that children who are exposed to parental smoking have significantly higher prevalence rates of asthma symptoms ($P \leq 0.001$). Smoking may be confounded by other factors such as income.

Boys had higher prevalence rates of asthma, eczema, rhinitis, asthma and eczema, asthma and rhinitis, eczema and rhinitis and asthma, rhinitis and eczema than girls (Table 13). The prevalence rates of asthma, rhinitis and eczema was higher in children who breastfed less than 10 months compared with those who breastfed more than 10 months (Table 14).

Parental History

Although hereditary factors have an important role in asthma and in other allergic diseases, the mechanisms underlying the inheritance of these disorders are still poorly understood. We investigated the effect of parental history on the prevalence and severity of asthma and we found that children, whose parents had

history of asthma, had more prevalence and severity of symptoms of asthma compared to those children whose parents never had asthma. The difference was very highly significant ($P \leq 0.001$).

As breastfeeding has a protective effect in relation to early asthma, it should be encouraged. As passive smoking has significant effect on prevalence and severity of asthma, it should be discouraged. We need to provide effective awareness programmes for parents about asthmatic patients, all allergic diseases, and towards avoiding certain triggers of asthma.

Conclusion

The present study has provided an up-to-date description of the prevalence and severity of asthma, rhinitis and eczema in pre-school children in the UAE. In this study, data has illustrated that there is a significant difference of the prevalence and severity of symptoms of asthma and allergic rhinitis between boys and girls. However, girls showed lower prevalence of asthma, wheezing, rhinitis and eczema compared to boys.

In addition, results have demonstrated that factors such as beast-feeding, passive smoking and parental history have an important effect on the prevalence and severity of symptoms of asthma, allergic rhinitis and eczema. The data are based on self-reported data. The healthcare organization in UAE has to encourage campaigns that are encouraging breast-feeding and discouraging smoking. Additionally, there is a need for asthma education programmes towards avoiding certain triggers of asthma and allergic diseases. The present study can be used as a baseline study to implement asthma and allergy intervention programmes in children.

Limitations

In the present study, we have used the ISAAC questionnaire which has been designed for 6- to 7-year-old and 13- to 14-year-old children because we do not have a specific questionnaire for pre-school children.

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