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Full Length Research Paper

Prevalence and temporal shifts of various diseases in a closed community: A clinical study from a public sector university

Samina Rafique[1]* and Waseem Sarwar[2]

[1]Bahauddin Zakariya University Multan Pakistan.
[2]Department of general surgery Unit 2 Nishtar Medical College and Hospital Multan Pakistan.

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Epidemiological studies are of significant concern in the field of public health. Though an ample account of such studies is available from teaching and non teaching medical institutions (basic health units, rural health centers and hospitals established at district level by local government), no such data is available from any public/private sector university. Therefore, the present study aimed to identify temporal variations in health problems of female students from a public sector university. In this cross sectional study, the data for more than 4000 female students of age 20 to 25 years coming to medical centre of the university during the year 2010 was recorded. The records indicated that the maximum number of patients was encountered during the month of March. Among the females, upper respiratory tract infections were of higher prevalence followed by allergic rhinitis/spasm particularly during winter (December, January and February) and early spring (March). The prevalence of various ailments and temporal variations were found to be highly significant (P< 0.001 for both). The study clearly signified that occurrence of most of the aliments for instance scabies can be attributed to overcrowding and bad personal hygiene. It also became evident that certain ailments were related to mental tensions such as acid peptic disease while others (anemia and gastrointestinal disorders) were due to nutritional imbalance poor hygienic conditions and low quality diet. The findings suggested that living conditions of the community should be improved and awareness among masses regarding personal health and hygiene should be created by involving professionals to conduct lectures and seminars. Moreover, the centre should be well equipped with proper diagnostic facilities for efficient working. Furthermore, an overall increase in health budget is pivotal to raise health care standards of the institution.

Key words: Diseases, prevalence, seasonal variation, female community.

INTRODUCTION

Populations of closed communities are more prone to suffer from seasonal and contagious diseases (Vishniakova et al., 2001), because in such communities a number of factors contribute to the prevalence of diseases. These include lack of safe drinking water, decent living, adequate sanitation, food safety, professional health care, transportation and proper health information. Perceptions regarding health issues and knowledge about root causes can help health professionals and community members to devise effective control and preventive measures.

Halls of residence of colleges and universities constitute a student community which is mostly comprised of youth. Since, they belong to a tender age group, they are less aware of community health issues. One striking example of such community comes from a public sector institution, Bahauddin Zakariya University Multan, Pakistan (30.15° N, 72.25°E) which is situated in the third largest city of the Punjab Province and is the largest Public Sector University of the Region. As most of the population of the area belongs to low socio-economic

*Corresponding author. E-mail: saminawasim@hotmail.co.uk. Fax: 0092-61-9210068. Tel: 0092-03216356506.

class, a large number of people seek admission in public sector organization owing to affordability. As a result about 13000 students get enrolled every year out of which 65% are females (Career Development Centre Report, 2010).

Although, university offers a limited numbers of accommodations, most of the students prefer to live at the campus for several reasons. As a result, 4 to 5 or even more female students have to share a room in the halls of residence. This overcrowding may result in spread of contagious diseases especially respiratory tract infections. Furthermore, there are common toilets and washing areas and as most of the students come from rural background, they have a little awareness about personal hygiene. Consequently, the overall sanitary conditions become poor. Moreover, there are no standards for food quality and safety. Hence the served meals are at times prepared from sub standard ingredients which can also be contaminated owing to poor hygienic conditions of the premises as well as of the workers. In addition, nutritional status of the population is generally low, resulting in low immunity which may certainly affect the prevalence of different diseases occasionally culminating into seasonal epidemics. Despite limited financial grants available to the university, a medical center was established at the campus in order to treat the students who suffer from different ailments.

Unlike many government hospitals and clinics no database exists regarding the number of patients and various ailments which they suffer from, since the establishment of this medical centre. In the absence of such data, no effective planning and management strategy could be initiated. Due to this, shortage of the required medicines occurs very often and medical treatment becomes difficult.

Several studies which were carried out in the past (Kenneth,1995; Rehman et al., 2004) regarding the prevalence of different diseases in communities during changing seasons of a year have helped in identifying the determinants of various ailments as well as they facilitated the development of effective strategies to combat different out breaks.

Keeping in view the aforementioned situation, the present study was carried out to assess the temporal variation in health problems of female students at Bahauddin Zakariya University, Multan, Pakistan. A compilation of data records regarding prevalence of different diseases among female students of the university during different seasons of the year 2010 was done. The foremost objective of the study was to provide directions that could serve as a ready reference for the officials while developing health policy and allocating fiscal budget for more efficient working of the medical centre. Moreover, this study would also be helpful in controlling various diseases effectively as well as to combat any epidemic or sudden outbreak. The outcome would also facilitate the selection of appropriate medicines for female medical centre of the university. Although, health institutions regularly contribute towards the maintenance of records regarding community health but to the best of our knowledge no such data exists for any public /private sector university. Therefore, the present study is the debut of such information from a public sector university of the country.

Clinical study

The study has encompassed the following aspects.

MATERIALS AND METHODS

Volunteer selection and methodological description

The study was carried out during the year 2010 and data records were made during the whole year. A total of 4251 volunteers (female students) contributed for the study and no resistance was posed by the students thus every female patient rendered herself as a volunteer. For the purpose of study, 12 most commonly reported ailments were selected.

These include; upper respiratory tract infections (infections of nose, mouth and respiratory passages including tonsillitis, pharyngitis, common cold and sinusitis), allergic rhinitis and bronchospasm (nasal allergy and constriction of respiratory passages resulting in difficulty in expiration), anemia (low hemoglobin level in blood), dysmenorrhea (painful menstruation), gastrointestinal disorders (disorders of stomach and intestine resulting in nausea, vomiting ,diarrhea), urinary tract infections (bacterial infections of urethra, bladder and kidneys resulting in painful micturition and pus cells in urine), vaginal candidasis (fungal infection of vagina), scabies (skin infestation with a mite resulting in severe itching), malaria (parasitic infection caused by bite of *Anopheles* mosquito), acid peptic disease (Increased acid production in stomach resulting in regurgitation of acid in esophagus and/or ulceration in stomach or duodenum), mental tension, wounds and burns. Diagnosis was made on the basis of presenting complaints, history of the patient and clinical features observed.

Laboratory help was sought where and when needed. Patients were properly followed to evaluate the effectiveness of the treatment given. The detail description is appended in Table 1.

Data collection and presentation

Data records were compiled on monthly basis and cumulative results are presented diagrammatically for each quarter of the year.

Table 1. Methodological and diagnostic approaches used for various diseases observed in female students of a public sector university during 2010.

	Disease	Symptoms	Signs	Laboratory investigation
1	Acid peptic disease	Heart burn, pain epigastrium		
2	Allergic rhinitis/ bronchospasm	Sneezing, irritation in nose and throat/ difficulty in breathing	Red eyes, rhinorrhea / rhonci on auscultation	CBC in some cases to rule out bacterial infection. IgE level.
3	Anemia	Easily fatigued, breathlessness on exertion	Pallor, pale lower conjunctivae and nails. Koilonychias in a few cases	Hb level. Peripheral blood picture in a few cases.
4	Dysmenorrhea	Painful menses	Confirmed by the history of patient.	
5	Gastro intestinal disorders	Nausea, vomiting, diarrhea, abdominal cramps with or without history of intake of foods from canteens or venders.	Sunken eyes, dry mucous membranes, weak pulse etc.	
6	Scabies	Itching over whole body more pronounced at night.	Scratch marks, papules over different parts of body	Scraping from lesions examined under microscope in laboratory
7	URTI	Fever, cough, pain in throat radiating to ears, headache.	Congested throat , inflamed tonsils and pharyngeal wall.	Complete blood count. X-ray PNS where applicable.
8	UTI	Painful or burning micturition, pain hypogastrium or lumber region, fever with chills.	Tenderness in lumber region in some cases	Urine examination, USG abdomen and pelvis in a few cases.
9	Vaginal candidiasis	Thick whitish vaginal discharge with or without pruritis at vulva	Examination not allowed.	
10	Malaria	Fever with rigors and chills often on alternative days, history of mosquito bite.	Signs of mosquito bite in many cases	MP slide
11	Mental tension	Vague symptoms, pain abdomen or chest radiating to head or arms, migrating body pains.		ECG in some cases to rule out ischemia.
12	Wounds/cuts/ burns	History of the patient	Examination of wound	

Statistical analysis

A two way analysis of variance (ANOVA) was carried out using MS Excel, 2007 in order to elucidate significant differences between various ailments during different months of the year.

RESULTS

Various ailments in the year 2010

The data for total number of patients with various ailments examined during the year 2010 is presented in Figure 1. It is evident from the figure that the maximum number (1449) of patients was suffering from upper respiratory tract infection (URTI) out of a total 4251 that is, 34%. Similarly, complaints regarding allergic rhinitis/bronchospasm were also higher as 1131 patients were reported with this ailment (26%). Anemia and Dysmenorrhea were also common but the number of patients with anemia was greater as compared to dysmenorrhea (Figure 1). The occurrence of acid peptic disease, gastrointestinal (GI) disorders, and wounds and burns was almost similar as 214, 248 and 265 patients were recorded, respectively. Urinary tract infection (UTI) was also of low occurrence as the number of patients with this ailment was only 157. The data also depicted 105 female students with mental tension. Although malaria was also prevalent but only 96 patients were reported with this ailment during the whole year. The number of patients for scabies was lower (65) followed by vaginal infection as only 34 cases were recorded for it.

Variations in number of patients during different months of the year 2010

The data presented in Figure 2 showed variation

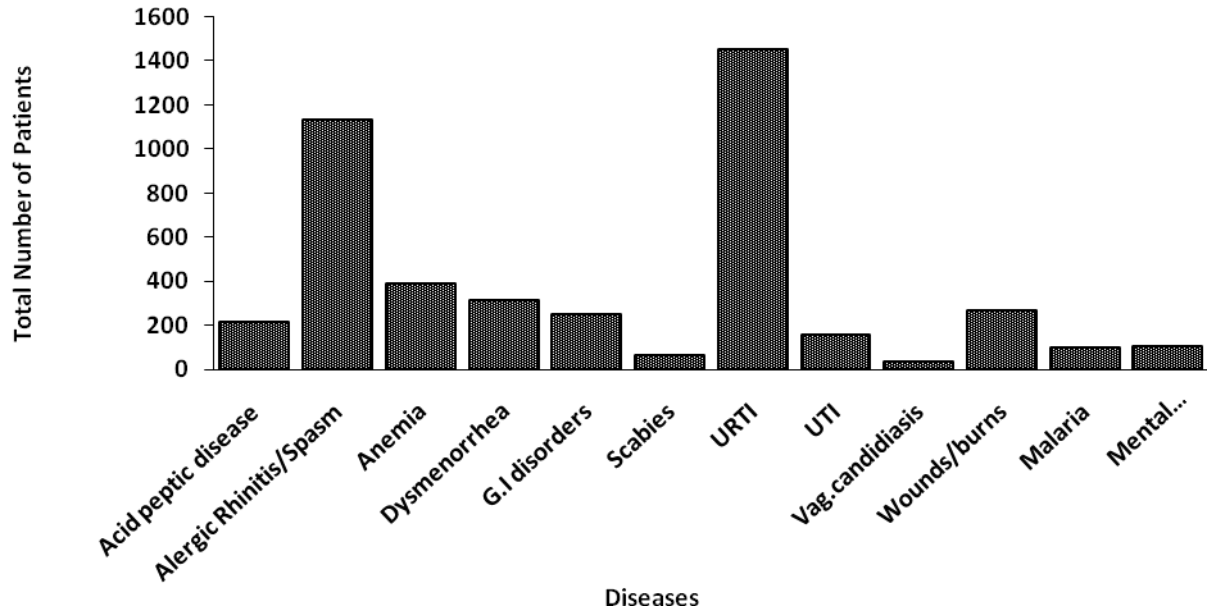

Figure 1. Total number of patients recorded with various diseases at female medical centre of a public sector university of Pakistan during 2010 (N=4251).

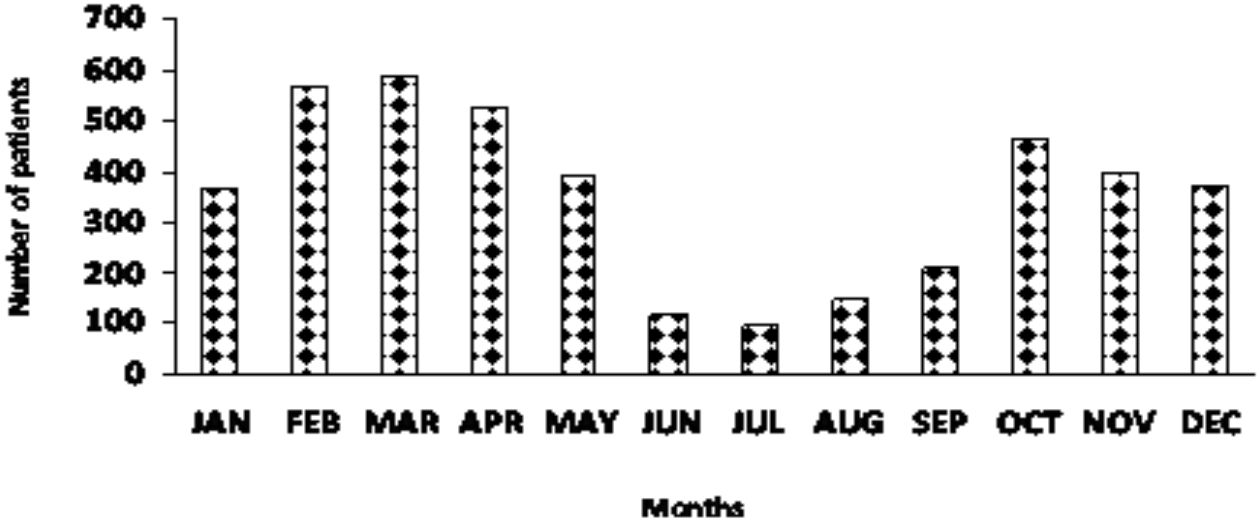

Figure 2. Total number of patients (N=4251) recorded at female medical centre of a public sector university during different months of the year 2010.

in the number of patients during different months of the year. However, a higher number was recorded during the months of February, March and April (566, 589 and 526, respectively). Similarly, no significant contrast was observed for number of patients reported during October to December which remained 465,397 and 375, respectively. The number of patients declined markedly during summer months and the least number that is, 97 were recorded during July.

Prevalence of different diseases during different quarters of the year 2010

The temporal prevalence of various diseases during four quarters of the year 2010 is presented in Figure 3. It is evident from the figure that the number of patients with URTI during first quarter was considerably higher (35% of the total) but 41% reduction was observed in the 2nd quarter. A further decline was noticed during the last two

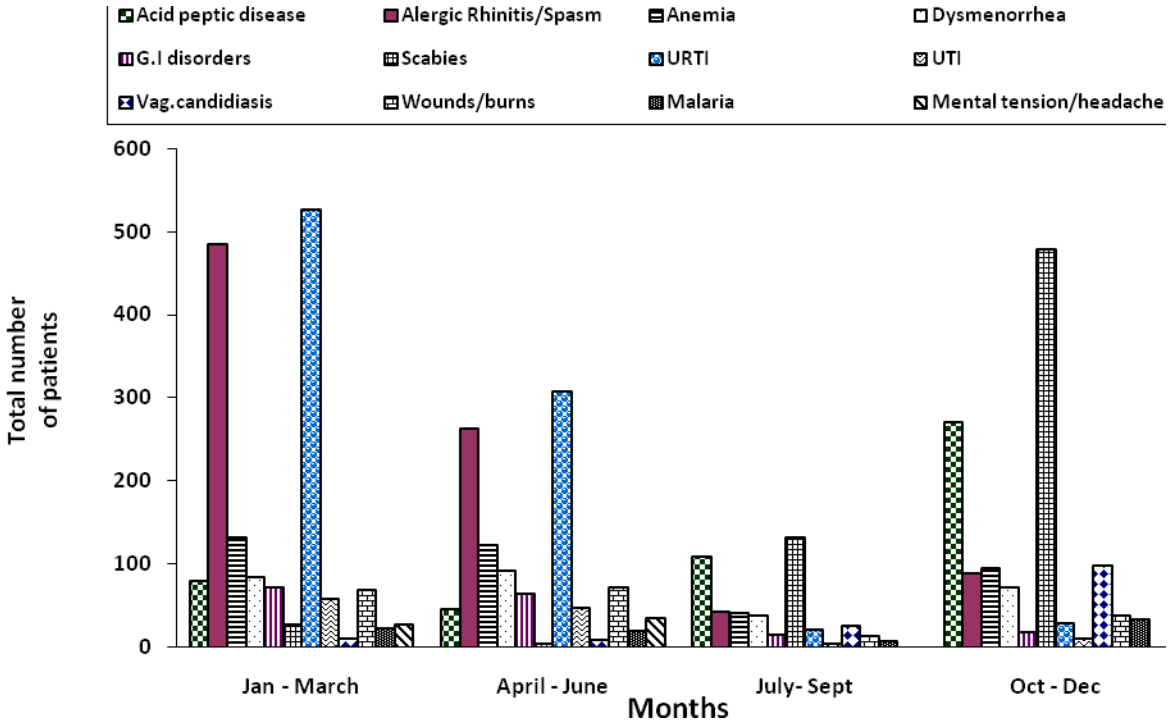

Figure 3. Prevalence of different diseases in female patients of a public sector university of Pakistan during different quarters of the year, 2010 (N=4251).

Table 2. Analysis of variance for temporal variation of various diseases in female students of a public sector university of Pakistan during 2010.

Source of variation	SS	df	MS	F
Diseases	182797.6	11	16617.96	31.09***
Months	29903.91	11	2718.537	5.08***
Error	64667.51	121	534.4422	
Total	277369	143		

***= significant at 0.001% level of probability.

quarters and the reduction was more pronounced (94%) as compared to the first two quarters. The figure also clearly depicted that in addition to URTI the complaints of allergic rhinitis/spasm were about 32% of the total during the first quarter but declined during the other quarters. The extent of decline was 57, 97 and 81%, respectively, for the last three quarters.

The data presented in Figure 3 indicated that the number of patients with scabies was significantly lower during 1st and 2nd quarter. Though, prevalence of scabies was also higher during the 3rd quarter but a pronounced increase was encountered during last quarter of the year.

Regarding the prevalence of anemia it is important to note that no considerable variation was noticed during different times of the year. Likewise, the occurrence of dysmenorrhea also exhibited a similar trend. The incidence of acid peptic diseases was at the maximum during the last quarter of the year. No significant disparity was observed regarding the occurrence of GI disorders, UTI, mental tension and malaria during different quarters of the year. The complaints of wounds and burns were reported during the first two quarters however, the reverse was true for vaginal candidiasis which was of great occurrence during the last two quarters of the year.

Analysis of variance of different ailments during different months of the year 2010

The analysis of variance presented in Table 2 clearly depicted that the prevalence of different ailments varied significantly (P≤ 0.001) among female students of the university residing at the campus. Similarly, a significant ((P≥0.001) contrast was observed for the occurrence of diseases during different months of year.

DISCUSSION

The present study has considered the prevalence of various diseases during different times of the year. The data presented clearly indicated differentially variable occurrence of aliments temporally. Therefore, in the

following account the possible explanation is given to understand the reasons behind these variations. In addition, those ailments which are not related to weather change were also discussed to help improve the overall health status of the female community.

The data indicated that in the 1st quarter of the year, the disease of highest prevalence was URTI followed by allergic rhinitis/ spasm.

The great occurrence of allergic rhinitis/spasm in the 1st quarter of the year is mainly due to environmental factors such as pollens, dust, cold wind, dust mites and molds' spores (Sibbald et al., 1991). As university is situated in the outskirts of the city and has a dense plantation which is a potential source of pollens of different plant species and consequently daily pollen count (DPC) remains high particularly during late winter and early spring (Annesi-Maesano et al., 2012). Moreover, an incredible increase in the number of vehicles coming to the university and a fleet of 50 buses which remains mobile in the campus for 24 h to facilitate students contributes towards particulate pollution, further augmenting the situation. Like allergic rhinitis, upper respiratory tract infections (URTI) are very high during 1st quarter of the year presumably due to cold weather (Mossad, 2010). Furthermore, 4 to 5 girls have to share a room in the hostels due to high number of students (already mentioned) resulting in the spread of infection among roommates due to highly contagious nature of the disease. This ultimately culminates in high incidence of the disease (Barker et al., 2001).

The records showed that the maximum number of the patients for acid peptic disease was reported during last quarter of the year. Since, semester finishes during December and final term examinations are held in this month therefore the students are under tension. Moreover, new admissions take place in the month of October and the freshly admitted students have to cope up with an entirely different system of education which puts them under stress mentally. The challenges posed by co-education and hostel life aggravate the situation. A greater incidence of peptic ulcer during these months can be attributed to mental stress resulting in increased secretion of HCL in the stomach. These reasons have also been well reported in medical literature (Guyton et al., 2005, Jones, 2006). When considering anemia, it seems to be prevalent throughout the year except during the months of July, August and September due to overall decrease in the number of patients on account of summer vacation in the university. Anemia clearly is not a seasonal disease but it depends on the nutritional status of the person who is otherwise healthy and not suffering from any chronic illness. One of the significant reasons to include it in the study was that it was discovered in many patients during general physical examination while they presented with some other complaint. The occurrence of anemia can be attributed to several other reasons but lack of a balanced and iron rich diet is the main cause (Craig et al., 2010). Similarly, dysmenorrhea has no temporal associations but it was also incorporated because it has shown an increased occurrence and severity in young girls due to the reasons still to be investigated.

Gastrointestinal disorders are less likely to happen during cold months of the year but our study depicted that they occurred mostly in the 1st quarter of the year and continued to prevail in other quarters also. The greater incidence of such disorders may have an affirmative relation with poor hygienic conditions and food contamination as pointed out earlier. These reasons are also well reported elsewhere (Chambers, 2001). Similarly, scabies showed a low frequency in summer months but became pronounced in winter because cold weather results in sharing of beds and less frequent washing of winter clothing leading to the spread of the disease (Timothy, 2001; McCarthy et al., 2004).

Malaria, though endemic in Pakistan, appeared to be of little occurrence as recorded for the present study. It might either be due to prophylaxis advised to patients coming to medical centre of the University as well as health advisories issued to hostels and control measures taken by the hostels administration from time to time.

The prevalence of other diseases such as vaginal candidiasis and UTI was less but this is most probably due to social stigmas associated with these conditions which prevent a person especially a female from seeking medical advice. Grouped under the heading mental tension/headache were those students who were trying to grab the attention and presented with vague complaints like migrating type of headache or pain in chest or abdomen radiating to head. They had social /psychological reasons behind the condition and were referred to psychologist of the university.

It is evident that diseases associated with the seasons were more common. Certain ailments have no temporal connection and are related to living conditions, sanitation, health and nutritional status of the population. Still there are others which need to be addressed by creating awareness and removing social stigmas. If the girls are encouraged to discuss every health problem with the doctor, this may result in many diseases unrevealed and properly treated.

Based on the results of the study it can be suggested that burden of disease in the community mentioned in the present study can be decreased by restricting sharing of rooms in hostels, improving sanitary conditions and providing advice regarding nutrition. It can be achieved by educating the students regarding personal hygiene. Lectures and seminars should be arranged which will highlight the value of a well balanced and nutritious diet not only for attaining optimum level of health but also for the prevention of certain infectious diseases. Food safety standards should be observed and hygienic conditions of the workers are to be improved by screening for carrier state of certain intestinal infections and infestations.

Besides for more efficient and competent working, medical centre should be facilitated fiscally by setting up a pathology laboratory and provision of advanced diagnostic equipments. In addition, the budget for purchase of medicines should also be enhanced.

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