Short Communication

MORBIDITY PATTERNS AMONG KING FAISAL UNIVERSITY STUDENTS, AL HASSA, KINGDOM OF SAUDI ARABIA

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Objectives: To explore the prevalent morbidity problems among students at King Faisal University. To identify the nature of referred cases and assess the efficiency of the referral system.

Subjects and Methods: This was a retrospective, records-based descriptive study, involving the examination of the health records of students at King Faisal University, who attended the Medical Center for Primary Health Care services in a five-year period. A pre-tested compilation sheet was used for data collection.

Results: Out of 2472 consultations, about 58% of the diagnosed morbidity conditions were of infectious nature, mostly affecting the respiratory (62%), dental (14%), gastrointestinal (7%), and skin infections (5%), with more prevalence among males. The non-infectious morbidity conditions were recorded more among females and included muscle and joints problems (16%), allergic conditions (15%), gastrointestinal (8%), and trauma (5%). Some of the encountered morbidity demonstrated seasonal variation. Case referrals were about 6% more in the non-infectious conditions, with a deficient feedback system.

Conclusion: Quality improvement of the medical records and the establishment of a proper referral system are necessary. Health education on preventable morbidity conditions should be organized and implemented.

Key Words: Morbidity, Medical Records, University students.

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INTRODUCTION
The incidence and patterns of morbidity vary within each community. Delineation of these patterns needs meticulous research design and careful interpretation so that suitable preventive strategies could be implemented.1 The morbid conditions varied from the trivial such as common respiratory tract infections to devastating chronic diseases. Therefore, proper management protocols, lifestyle modification, and effective referral system are essential for the achievement of favorable outcomes.2 There is virtually no information on the pattern of morbidity in the Northern and Western regions of the Kingdom of Saudi Arabia.3

University students to some extent reflect their communities with regard to health and health-related problems. This age group is vulnerable to multiple factors that induce morbidity, variations in lifestyle patterns, inadequate knowledge, all of which encourage certain disease conditions. Definition of the patterns and variations of these problems as well as the profiling of the socio-cultural and seasonality of the conditions will inevitably help in the provision of comprehensive health care and subsequent health promotion of this important age group.4

SPECIFIC OBJECTIVES
1. To explore the prevalent health problems among students at King Faisal University-Al Hassa.
2. To identify the nature of referred cases and assess the efficiency of the referral system.
3. To establish the basis of information for suitable health education to promote the health of this age group.

SUBJECTS AND METHODS
Study design: A retrospective, records-based descriptive study.
Subjects and Sampling: The study examined the five years of medical records of students at King Faisal University. All files for both male and female students located at the University's Medical Center at the University Campus were examined. The Medical center provides all the Primary Health Care services to students, faculty staff, and university employees. The total number of served students was approximately 18,000. Revision of the files as well as validation of the contents were carried out before data collection. A total 1221 records were reviewed to fulfill the study objectives and 1030 of these were found to be valid. The presence of the minimal data required for identification were, consistency of the contents, and readability.

Data collection
A pre-tested compilation sheet was designed for the recording of the following data:
- Socio-demographic data in each health record.
- Date of consultation, and the recorded symptoms and signs. Laboratory and imaging procedures done. Recorded final diagnosis including the specific nature of the condition and outcome of the case.
- Referral of cases, nature, level of referral, reason for referral, and the outcome if any. Follow-up visits, as well as those seeking promotive health services were excluded during the data collection phase.

Data processing and analysis
A pre-designed SPSS (Statistical Package for Social Science version 11.01) file was used for data entry. Data processing involved the application of the appropriate statistical tests with confidence limits of 95% and cut-off p-value of <0.05.

Ethical considerations
The data confidentiality was preserved according to the Helsinki declaration of bioethics and proper information management system.

RESULTS
A total of 1030 medical records were included. The male to female ratio was 1.5:1 with an overall male predominance (60 %, P 0.0001). The age of the subjects included, ranged from 18 to 35 years, with a mean of 23.7 ± 2.3 years and median of 23 years (Table 1). The females were older than the males (p 0.0001). The current residence of the subjects was reported in 919 records (90 %). Thirty-eight percent had urban residence, with more females in urban residence than males (34 % vs. 43.7 % in females). The difference was the same with regard to rural residence (27 % vs. 30 % in females). There were more men residing in hostels than women (26 % vs. 19% in females) (P 0.001). Only 13 males (2%) were married compared to 37 % (148) females and the overall ages of those married were significantly higher.
Table 1: Some socio-demographic characteristics of the included medical records reviewed at the Medical Center of King Faisal University; age in years (mean ± standard deviation – SD), current residence and marital status

| Socio-demographic characteristics | Gender of the subjects | Total No. (%) | p-value |
|-----------------------------------|------------------------|---------------|---------|
|                                   | Males No. (%)          | Females No. (%)|         |
| Age in years:                     | 608 (60.8)             | 391 (44.6)    | 999 (100)* |
| Mean ± SD                         | 23.2 ± 2.2             | 24.1 ± 2.5    | 23.7 ± 2.3 | t-test=6.18 |
| Median                            | 23.0                   | 24.0          | 23.0      | 0.0001     |
| Current Residence:                |                        |               |          |
| Urban                             | 212 (34.0)             | 178 (43.7)    | 390 (37.9) | X² = 24.1  |
| Rural                             | 169 (27.1)             | 123 (30.2)    | 292 (28.3) | 0.0001     |
| Hostels†                          | 163 (26.2)             | 74 (18.2)     | 237 (23.0) |           |
| Non-recorded                      | 79 (12.7)              | 32 (7.9)      | 111 (10.8) |           |
| Total                             | 623 (60.5)             | 407 (39.5)    | 1030 (100.0) |
| Marital status:                   |                        |               |          |
| Married                           | 13 (2.1)               | 148 (36.7)    | 161 (16.1) | X² = 175.7 |
| Age (mean ± SD)                   | 25.9 ± 2.0             | 24.4 ± 2.6    | 24.5 ± 2.6 | 0.001      |
| Single                            | 588 (97.9)             | 255 (62.6)    | 843 (83.9) | t-test=4.93 |
| Age (mean ± SD)                   | 23.1 ± 2.1             | 23.9 ± 2.4    | 23.5 ± 2.6 | 0.001      |
| Total‡                           | 601 (59.8)             | 403 (46.5)    | 1004 (100.0) |

*Age of 31 subjects was not recorded (15 males and 16 females)
†Included 12 subjects of non-Saudi nationalities (6 males and 6 females)
‡The marital status was not specified in 26 records

Table 2: Gender distribution of the encountered morbidity diagnoses of infectious nature and their pattern of referral among students attended the medical center of King Faisal University, Al-Hassa

| Morbidity diagnoses of Infectious Nature | Frequency No. (%) | Males No. (%) | Females No. (%) | Referred cases No. (%) |
|-----------------------------------------|-------------------|---------------|-----------------|------------------------|
| Common cold/nasopharyngitis             | 547 (38.2)        | 328 (38.2)    | 219 (38.2)      | 2 (0.4)                |
| Dental infection / gingivitis           | 210 (14.7)        | 127 (14.8)    | 83 (14.4)       | 22 (10.5)              |
| Tonsillopharyngitis                    | 131 (9.1)         | 89 (10.4)     | 42 (7.3)        | 4 (3.0)                |
| Bronchitis                             | 130 (9.0)         | 104 (12.1)    | 26 (4.5)        | -                      |
| Gastroenteritis                        | 53 (3.7)          | 24 (2.8)      | 29 (5.0)        | -                      |
| Infective diarrhea / dysentery         | 46 (3.2)          | 30 (3.5)      | 16 (2.8)        | -                      |
| Vulvo-vaginitis                        | 40 (2.8)          | -             | 40 (7.0)        | 1 (2.5)                |
| Sinusitis / bronchitis                 | 34 (2.4)          | 12 (1.4)      | 22 (3.8)        | 1 (2.9)                |
| Conjunctivitis / eye infections        | 31 (2.1)          | 21 (2.4)      | 10 (1.7)        | 2 (6.2)                |
| Skin boils / abscesses / cellulites    | 28 (1.9)          | 24 (2.8)      | 4 (0.7)         | 13 (46.4)              |
| Tracheobronchitis                      | 26 (1.8)          | 11 (1.2)      | 15 (2.6)        | -                      |
| Teamial skin infections                | 18 (1.3)          | 13 (1.5)      | 5 (0.8)         | -                      |
| Viral skin infections                  | 18 (1.3)          | 10 (1.2)      | 8 (1.3)         | -                      |
| Bronchitis / pharyngitis               | 17 (1.2)          | 4 (0.5)       | 13 (2.6)        | -                      |
| Urinary / uro-genital infections       | 16 (1.1)          | 4 (0.5)       | 12 (2.1)        | -                      |
| Otitis media                           | 16 (1.1)          | 12 (1.4)      | 4 (0.7)         | 2 (12.5)               |
| External otitis infections             | 15 (1.0)          | 5 (0.6)       | 10 (1.7)        | -                      |
| Hepatitis                              | 5 (0.3)           | 5 (0.6)       | 0               | 2 (40.0)               |
| Pilomidal sinuses / abscesses          | 4 (0.3)           | 4 (0.5)       | 0               | 3 (75.0)               |
| Infected wounds                        | 4 (0.3)           | 4 (0.5)       | 0               | -                      |
| Corneal ulcers                         | 4 (0.3)           | 4 (0.5)       | 0               | -                      |
| Non-diagnosed                          | 27 (1.9)          | 14 (1.6)      | 13 (2.2)        | 1 (3.7)                |
| More than one diagnosis                | 12 (0.8)          | 9 (1.0)       | 3 (0.5)         | -                      |
| Total                                  | 1432 (100)        | 858 (59.9)    | 574 (40.1)      | 53 (3.7)               |

than the unmarried students (p 0.001). On the utilization of health services, the females more frequently sought medical help than males; with a median of 2.5 consultations per year compared to 0.8 for the males. About 13 % of the females had a total frequency of more than ten visits within the period of five years compared to 1.2 % males (p 0.0001).

Out of 2472 consultations, the infective morbidity conditions were recorded in 1432 (58%) which affected more males (60%) than females. Upper and lower respiratory tract infections ranked first, 36% of the total of the 901 cases recorded, 560 of which cases were males (p 0.001). Tonsillopharyngitis and acute bronchitis were disproportionately more among males, while the
### Table 3: Gender distribution of the encountered morbidity diagnoses of non-infectious nature and their pattern of referral among students attended the Medical Center at King Faisal University

| Morbidity diagnoses of non-Infectious Nature | Frequency Males No. (%) | Females No. (%) | Referred cases No. (%) |
|---------------------------------------------|-------------------------|----------------|----------------------|
| Sprains and myalgia                         | 132 (12.7)              | 40 (6.7)       | -                    |
| Antenatal care                              | 127 (12.2)              | 421 (18.9)     | -                    |
| Anemia                                      | 64 (8.0)                | 20 (4.5)       | -                    |
| Allergic dermatitis/eczema                  | 76 (7.3)                | 20 (4.5)       | -                    |
| Acne lesions                                | 72 (6.9)                | 19 (4.3)       | -                    |
| Bronchial asthma                            | 60 (5.8)                | 36 (8.1)       | -                    |
| Refractive error / conjunctivitis           | 49 (4.7)                | 22 (4.9)       | -                    |
| Traumatic lesions / injuries                | 46 (4.4)                | 35 (7.9)       | -                    |
| Allergic conjunctivitis                     | 45 (4.3)                | 29 (6.5)       | -                    |
| Gastritis and peptic ulcer                  | 39 (3.8)                | 25 (5.6)       | -                    |
| Dysmenorrhea                                | 38 (3.6)                | 0              | -                    |
| Allergic rhinitis                          | 34 (3.2)                | 31 (6.9)       | 3 (0.5)              |
| Chronic conditions                         | 30 (2.9)                | 23 (5.1)       | 7 (1.1)              |
| Obstetric/gynecological                     | 30 (2.9)                | 0              | 30 (5.0)             |
| Surgical problems                          | 24 (2.3)                | 12 (2.7)       | 12 (2.0)             |
| Dental lesions                              | 20 (1.9)                | 9 (2.0)        | 11 (1.8)             |
| Joints and tendons affections               | 19 (1.8)                | 6 (1.3)        | 13 (2.1)             |
| Lumbo-sacral / disc lesions                 | 19 (1.8)                | 16 (3.6)       | 3 (0.5)              |
| Urinary colic/stones                        | 17 (1.6)                | 5 (1.1)        | 12 (2.0)             |
| Psychological problems                      | 8 (0.8)                 | 5 (1.1)        | 3 (0.5)              |
| Skin lesions                                | 4 (0.3)                 | 4 (0.9)        | 0                    |
| No diagnosis                                | 20 (1.9)                | 16 (3.6)       | 4 (0.7)              |
| More than one diagnosis                     | 2 (0.2)                 | 2 (0.4)        | 0                    |
| **Total**                                   | **1040 (100)**          | **444 (42.7)** | **596 (57.3)**       | **90 (8.7)** |

Examination of the included records revealed that 1040 cases had a morbidity of non-infectious nature (40% of the total); females were affected in 57% of cases (Table 3). Muscle sprains, rheumatic myalgia and joint affection were diagnosed in about 14% of both genders.

Females had more upper and lower respiratory tract infections (Table 2). Dental problems recorded in 8.5% (210 cases) in the form of gingivitis, dental caries, tooth infections and dental abscesses affected about 14% of both genders.

Gastroenteritis and infective diarrhea were diagnosed in about 7% without gender predilection. Eye infections were more common in males (2.1% vs. 1.7% in females). Skin abscesses, boils and cellulitis were diagnosed in about 28 cases, 85% of which were males. Viral skin infections were diagnosed in 18 cases; herpes simplex-Zoster in 14 cases (all were males) and chickenpox in four females. Hepatitis was diagnosed in five cases, three of which were hepatitis B and two of type A; all were males. Urinary tract infections were found in females only, while combined urogenital infections were exclusively found in males. There were no definite diagnoses for 27 cases (infective oral ulcers, other viral skin infections, and non-specified infections). More than one diagnosis each was recorded in cases with multiple infectious lesions; nasopharyngitis/infected acne, nasopharyngitis/gingivitis, combined dental and eye infections.
Figure 1: Seasonal variation of respiratory, oro-dental, and musculoskeletal morbidity recorded among King Faisal University students.

Figure 2: Seasonal variation of the encountered eye, skin and gastrointestinal morbidity recorded among King Faisal University Students.
peptic ulcer was diagnosed in seven cases; (6 were females). Besides hemolytic anemia, bronchial asthma, gastritis/peptic ulcer disease, skin and dental lesions there were other chronic conditions: hypertension - nine cases, diabetes mellitus Type II - two cases, migraine - eight cases, intractable tachycardia, persistent hypotension, irritable bowel syndrome (two cases each), systemic lupus erythematosus, thyrotoxicosis, multiple vitamin deficiency, obesity, mitral valve lesion and elephantiasis, one case each. The total of those affected by chronic diseases and conditions was 190 cases (8% of the total). Obstetric and gynecological morbidity conditions included three cases of threatened abortion, nine cases of post-natal complications of non-specified nature, problems with intrauterine devices, miscarriage and uterine prolapse (one case each), three cases of menstrual irregularities, sickle cell disease coupled with pregnancy, emesis graviderum (two each), and six cases of ovarian cyst.

Surgical problems included six cases of piles, three cases of lymphadenopathy, goiterous lesion, multiple nasal polyps, tumor mass (one testicular, two breast and one bone), one case each of anal fissure, paraumbilical hernia, varicos leg ulcer, splenomegaly and facial lesion requiring cosmetic surgery. Dental lesions included six cases of impacted tooth, one case of jaw problems and 13 cases of cavity dental lesions. Three cases each had presented with psychological problems of ill-defined nature such as insomnia, anxiety disorders, and two cases of intractable anorexia. Traumatic lesions and injuries were disproportionately more common in males (76% of total traumatic lesions). Lumbo-sacral sprains of traumatic nature had been diagnosed in 17 cases. Psoriasis had been diagnosed in one male and seborreic dermatitis in another three. Waxy ear, epistaxis, non-specified central nervous lesion, were the main categories encountered among the no-diagnosis group.

The referral process was dependent upon the nature of the condition. Out of 2472 consultations, 134 (6%) cases were referred to tertiary level of care (Tables 2 and 3). Conditions of infectious nature were less referred compared to non-infectious conditions (3.7 % vs. 8.7%). Despite the high prevalence of respiratory tract infections, they were the least referred (<1%). The referral rate for dental problems which was almost 11%, required further interventions not available at this level of care. Some of these were dental abscesses, gingival polyps, impacted tooth, and jaw lesions. There was a higher rate of referrals for skin lesions especially abscesses (46%). The rate of referrals for pilonidal sinus and abscesses was 75%, while hepatitis was 40%. Women presenting for the first antenatal care visit were 127 of the 184 (89%) married women who represented about 31% of the total number of females in the study. About 19% (24 cases) of attendees for antenatal care were referred to other primary care facilities or tertiary level of care. Threatened abortion (two cases), ovarian cysts (three cases), pregnancy with sickle cell anemia and uterine prolapse (one case each) were the main reasons for referral in obstetric and gynecological cases. Referred to tertiary level for proper management and further investigation were 8% of the anemic cases as well as sickle crisis (four cases), two cases of sickle cell disease and one case with sickle cell and thalassemia.

There was a high rate of referral for traumatic lesions and injuries (28%); as was rate of those presenting with traumatic lumbo-sacral sprains. There was a high rate of referrals for surgical conditions (50%); and 27% for chronic conditions. There was no documentation on the final diagnosis attained at the level of referral, type of procedures conducted, or patient outcome in any of the included records. There was no proper feedback of the referral system.

The relationship between the diagnosed morbidity and residence revealed that respiratory problems less frequently occurred in rural residents compared to urban and hostel residents (36.4% vs. 41.6 and 47.8 respectively, P 0.000), while skin affection was significantly more among rural residents (10.5% vs. 6.7 and 8.4 % in urban and hostels residents, p 0.001). Residents of the hostels were more affected with gastrointestinal and conditions requiring surgical intervention. Figures 1 and 2 illustrate the seasonal variation shown in the Hijri calendar months of some morbidity problems. Respiratory tract problems showed two peaks, the first in Muharram, and the second in Shaban when the peak was higher. Similarly, the oro-dental problems first peaked in Safar. Muscle and joint problems exhibited the same pattern as oro-dental but was less pronounced in Safar. Skin lesions showed variations in Muharram with a main peak in Rajab rather then Shaban. Gastrointestinal problems were high in Rabi I as well as in Shaban and Ramadan.
DISCUSSION

The results of this study are consistent with others conducted in different parts of the world regarding the pattern of morbidity encountered at the primary level of care. The study of the utilization of primary health care, revealed that in Saudi Arabia, acute respiratory infections were the commonest form of morbidity followed by gastrointestinal problems. A similar record-based study conducted in Pakistan using the International Classification of Diseases coding system (ICD) showed that diseases of the respiratory tract were the most commonly encountered in all age groups followed by other infections, parasitic infestations, diseases of the skin and those affecting the nervous system.

The above study showed that females were the clients of the primary care services in a ratio of 2:1 males, which is also consistent with what was obtained in our study with regard to the pattern of primary health care utilization at King Faisal University's Medical Center. In this age group, the women presenting for the first antenatal care visit constituted 85% of the total married women, which was far more than other studies at the level of primary health care including the whole spectrum of the population. It was also found that about 20% women of this reproductive age group utilized PHC services for antenatal care. This difference could be explained by the fact that our study included women within the peak period of their fertility.

Results obtained from the current study in this particular age group also agrees with those obtained from other cross-sectional studies to determine the pattern of morbidity among adolescents in Riyadh City, in which out of the sample of 1473, upper respiratory infections constituted 43% of the complaints. In another study to determine the workload of the primary health care services in the summer, it was revealed that respiratory problems represented 60% followed by 20% in digestive problems in those who used the curative services, most of whom were young, adolescent Saudis. A case-control study conducted in Finland to portray the socio-demographic characteristics and the psychosocial profile of the frequent attendees at the primary health care revealed that females more significantly utilized the available services. This is consistent with our findings. In this study, using the ICD-9, the most commonly encountered problems in the over 15 years age group were musculoskeletal disorders, respiratory, and digestive problems. The reason for this is that frequent users had more mental problems than controls.

In 4% of the cases, no specific diagnosis was recorded, which is far less than the results obtained in a similar study which claimed that the records of 46% of all visits to primary health care did not include any kind of diagnosis. In addition, this study revealed that non-communicable diseases namely hypertension, diabetes, bronchial asthma, eye, ear, cardiologic and dermatologic problems were the main problems encountered among the adult subjects. The previous conclusions conflict with those obtained in our study as the included subjects were younger.

Several studies revealed that dental problems were peculiar to the pediatric age group, while in this study it represented 9% of all morbidity of the age group 18 to 35 years. This may reveal the reason for the persistence of these problems in the transition to adulthood and the reasons for encountering them in the primary health care services.

The problems of chronic morbidity among the age group in our study was bronchial asthma (6%) as the most commonly diagnosed disorder. This finding is in accord with that revealed by another survey conducted among 1473 Saudi adolescents attending primary health care. In that study, about 10% of those between the ages 15-24 years had a chronic morbidity condition, the most frequently diagnosed being bronchial asthma. This study revealed a nearly constant trend of the rate of referral to the higher level of care (6% of cases) as was found in a study to ascertain the morbidity pattern and evaluate the referral system in primary health centers in Jeddah, Kingdom of Saudi Arabia. In that study, 5% of the patients were referred to secondary and tertiary health care levels. The feedback was only in 22.7%, and the majority of referral letters lacked the necessary information on the patient. In our study, there was no documentation of the feedback and the validity of the referral letters was questionable.

Our results on the seasonal variation of the morbidity problems included, particularly on respiratory, gastrointestinal and skin problems, match those obtained from other studies, where the peak incidence of respiratory and gastrointestinal problems was in late winter and mid-summer. For skin lesions, the highest peak was early in the summer. This study raised the important issue of recording morbidity encountered in PHC settings. Proper morbidity
recording is vital in PHC practices since they reflects the changing needs of the served population and would therefore aid the preparation of the centre and health team to deal with the dynamically changeable health problems.\textsuperscript{15} Finally, the included medical records demonstrated a great deal of inconsistency, lack of agreement, identification, and retrieval difficulties. One of the basic practices of community-oriented primary care (COPC) is to record morbidity in a standardized easily retrievable fashion that allowed the user to monitor the health of the community by means of simple analytic procedures. A proper recording system may aid the processes of the prediction of disease, evaluation of the health needs, and the determination of the logistic, technical and training requirements of the health team at the primary care level.\textsuperscript{16}

CONCLUSIONS AND RECOMMENDATIONS

- Standardization of problem-oriented medical records would be helpful in providing information about different patterns of morbidity encountered at the level of primary health care.

- The patterns emerging may provide a strong foundation for health promotive activities especially in the field of health education, particularly on how to avoid exposure to risk factors of conditions such as dental problems, allergic disorders, and respiratory and other infections. They would also assist in the tracking of chronic diseases, the promotion of lifestyle modification and the proper utilization of the available health services.

- A standardized referral system is required to improve the link between health providers and the selection of the best evidence-based management protocol to bring about the necessary favorable outcome for the patient.

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