EVALUATING ENVIRONMENTAL, HEALTH AND SAFETY PRACTICES IN HOSPITALS: A CASE STUDY IN KARACHI

A. Aziz^{1*}, K. Hassan¹, V. Maystrenko², A.H. Lahori¹, A. M. Pirzada¹

¹Sindh Madressatul Islam University, Karachi, Pakistan

²Public Agency "National Scientific and Research Institute of Industrial Safety and Occupational Safety and Health", Kyiv, Ukraine

*Corresponding email: aaziz@smiu.edu.pk

Received: 5 November 2019; **Accepted:** 10 December 2019

Cite as: Aziz, A., Hassan, K., Maystrenko, V., Lahori, A.H., Pirzada, A. M. (2019). Evaluating environmental, health and safety practices in hospitals: a case study in Karachi. *Labour Protection Problems in Ukraine*, 35(2), 15-21.

Health care systems are working in viable conditions and nowadays hospitals need to have a safe internal working and overall general environment. The aim of this study was to compare the environmental, health and safety measures in public and private hospitals of Karachi. A total of 300 respondents particularly 150 patients and 150 hospital staff were randomly selected from public and private hospitals. Collected data has been statistically verified by t-test and correlation techniques in order to examine the environmental, health and safety practices in said hospitals. It has been found that patient of public hospitals faces and suffered a lot. Overall research findings highlight the inadequate and non-compliance of standards. However, public hospitals need more care and focus on environmental, health and safety measures in current conditions and future policies, planning, and strategies. Hospitals are generally obliged to sustain a safe, health and friendly environment. Public hospitals staff must be made aware of environmentally sound and cost effective measures during their working hours. The first study limitation is that this study was conducted in limited area of Sindh which is Karachi. Further study can be conduct in other regions of Pakistan and then make the difference between the environmental, health and safety measures in public and private sector hospitals. Secondly limitation is that limited hospitals were selected for collection of data because of limited resources and time further detailed studies in different regions of Pakistan able to overcome this factor that cause highly effects on the result.

Keywords: healthcare systems; staff response; environment; health; safety; hospitals.

ОЦІНКА ДІЯЛЬНОСТІ ЩОДО ЗАБЕЗПЕЧЕННЯ СПРИЯТЛИВИГО НАВКОЛИШНЬОГО СЕРЕДОВИЩА, ЗДОРОВ'Я ТА БЕЗПЕКИ В ЛІКАРНЯХ: ТЕМАТИЧНЕ ДОСЛІДЖЕННЯ В КАРАЧІ

A. Азіз^{1*}, К. Нассан¹, В. Майстренко², А. Г. Лагори¹, А. М. Пірзада¹

¹Університет Сінд Мадресатул Айлама, Карачі, Пакистан

²Державна установа «Національний науково-дослідний інститут промислової безпеки та охорони праці», Київ, Україна

*E-mail для листування: aaziz@smiu.edu.pk

Отримано: 5 Листопада 2019; **Прийнято:** 10 Грудня 2019

Цитувати як: Aziz, A., Hassan, K., Maystrenko, V., Lahori, A.H., Pirzada, A.M. (2019). Evaluating environmental, health and safety practices in hospitals: a case study in Karachi. *Labour Protection Problems in Ukraine*, 35(2), 15-21.

На цей час стійке й довготривале функціонування систем охорони здоров'я передбачає наявність надійного і придатного для роботи навколишнього середовища і сприятливої зовнішньої атмосфери. Метою дослідження є порівняння заходів щодо забезпечення сприятливих факторів навколишнього середовища, здоров'я та безпеки в державних і приватних лікарнях Карачі. Для цього випадковим чином було вибрано 300 респондентів, у тому числі 150 пацієнтів і 150 працівників з державних і приватних лікарень. Зібрані дані були статистично оброблені методами t-тестування і кореляції, щоб вивчити практику охорони факторів зовнішнього середовища, здоров'я та безпеки в зазначених лікарнях. Було встановлено, що пацієнт державних лікарень часто відчував великі труднощі й страждання. Загальні результати досліджень підкреслюють неадекватність і невідповідність державних лікарень стандартам. Внаслідок цього державні лікарні потребують більшої турботи і зосередження уваги на заходах, які сприяють сприятливому навколишньому середовищу, здоров'ю та безпеці в сучасних умовах і планованих стратегіях. Лікарні, як правило, повинні підтримувати безпечну, здорову і дружню обстановку. Працівники державних лікарень повинні бути поінформовані про екологічно безпечні та економічно ефективні способи роботи. Перше обмеження дослідження полягає в тому, що воно проводилося в обмеженій зоні провінції Сінд, центром якої є Карачі. Подальше дослідження може бути проведено в інших регіонах Пакистану, а потім можна буде побачити різницю між способами забезпечення сприятливого навколишнього середовища, здоров'я та безпеки в державних і приватних лікарнях. Друге обмеження полягає в тому, що для збору даних було відібрано окремі лікарні в різних регіонах Пакистану внаслідок обмежених ресурсів і часу для подальших детальних досліджень. Можливість подолання цього фактора вплине на результат подальших досліджень.

Ключові слова: системи охорони здоров'я; реакція персоналу; навколишнє середовище; здоров'я; безпека; лікарні.

1. Problem statement and analysis of the recent researches and publications.

Healthcare systems plays a unique role for preventing and controlling diseases, it also promotes health and offers rehabilitation facilities. Good health is an essential requirement to perform life activities for an individually or society. Generally, patients visit hospitals and care unit in chronic or acute disease or in case of emergency in private or public hospital. A public hospital works like a profit company and funded through payment from patients whereas, public or government hospitals receive funding from

government and should provide free services [1]. It is estimated by WHO that 10 millions of patients undergo with injuries or loss life each year due to deteriorated environmental conditions and unsafe medical practice in healthcare systems [2]. Nowadays environment, health and safety (EHS) is most important department in all industries and much progress in developed countries but developing countries like Pakistan still lag behind in this area. Effective EHS management results environmental and resource protection, performance and quality evaluation and minimize risks. Basically, environment, health and safety are the measurement, assessment and control

of issues that have adverse consequences on the health of the people inside the working area. Environment is direct interaction of human with surrounding and Health and safety between the workers and workplaces. Evaluation of EHS is an important tool to find gaps, weakness and suggest mitigation measures accordingly [3]. Issues related to EHS starts at various points in hospitals including patient hygiene, waiting areas, testing labs, safety protocols, environmental measures like generation and collection of waste [4]. Good governance and dynamic leadership is the key element to promote EHS practices, promotion and policies at workplace. Patients perception and employee satisfaction are two major indicators to evaluate the quality of services in a healthcare system [5]. EHS guidelines for healthcare include information about environment parameters, solid and hazardous waste management.

In Pakistan, a large population lives in rural areas with limited health facilities and in case of serious health issue move towards urban centre and almost all the lower and lower-middle class communities depend on the public sector for health services. However, corruptions in health department, monitoring errors and low budget allocations have disturbed the staff and patient safety at the health care settings [6].

Environmental, Health and Safety Policy, Legislation and Guidelines. The depiction of comprehensive legislation on environment, Health and safety, covering multiple areas of concern, is a relatively new whereas, a basic policy and legislative framework for the protection of environment, health improvement and development of safety culture detailed rules, regulations and guidelines required for the implementation of the policies and enforcement of legislation. Sindh Environmental Protection Act 2014. National Environmental Quality Standards. Sindh Hospital Waste Management Rules, 2014. Sindh Hazardous Substance Rules, 2014. Sindh Healthcare Commission Act, 2013. Sindh Service Delivery Standards for Hospitals 2017. World Health Organization (Safe Hospitals Initiatives) 2015. Some international standards have been implemented including ISO-9000 for quality management, OHSAS18000 for occupational safety, HSE guidelines for successful health and safety management.

2. Statement of the problem and its solution.

Hospitals are complex, large and critical organizations connecting a number of people to each other's and same time these hospitals are potentially hazardous place including physical, chemical and biological hazards. Therefore, existence and implementation of EHS Environmental, Health and Safety protocols is highly needed in hospitals. In the light of above issue facing by hospitals workers, visitors and patient's researcher is curious to know the EHS conditions in public and private hospitals of Karachi to investigate the quality of over all conditions in hospitals.

2.1 Materials and Methods.

Research Hypothesis.

H1: There is no significant difference between patient perception towards EHS Practices in public and private hospitals.

H2: There is no significant difference between the hospitals staff perceptions towards EHS Practices in public and private hospitals.

Research Methodology. This study based on qualitative survey technique. The study was conducted to analyze the "Evaluating Environmental, Health and Safety Practices between Public and Private Hospitals: A case study in Karachi" to evaluate patients and hospital staff perception towards Environmental, Health and Safety practices in

hospitals. Two different self-constructed and close ended questionnaires were used for data collection from targeted respondent and five hundred questionnaires were equally filled up in total from 10 hospitals 250 each. Equal participation of patients and hospital's staff was made for filling up the questionnaires. Questionnaire which was used for patient based on 13 questions and make availability of questionnaire into local language as well for patient convenience to get their true opinion whereas, staff questionnaire contains 20 questions with two factors. Factor I Management Leadership in EHS measures and Factor II Employee participation in EHS measures. Four hospitals were selected for the data collection in order to conduct pilot study for checking reliability and credibility of questionnaire through SPSS (statistical package for social sciences) software. The reliability is up to the mark and result was mentioned in Table 1.

Table 1 – Reliability Statistics

Reliability Statistics	N of Items	Cronbach's Alpha
	10	0.838
	20	0.696

A walk through survey was carried out in randomly selected hospitals. Normally, OPD timing in most of the hospitals is 9:00AM to 2:00PM and these hours are the rush hours and many of the hospital staff are busy in treatments of the patients but data collection from patients were done in this duration and admitted ones whereas, hospital staff were contacted after their duties time including doctors, MS, Nurses and others administrators. Each questionnaire completed within 8 to 10 minutes. Collection was started in March and completed in month of August, 2019. To identify the environmental, health and safety practices between two different groups of hospitals in Karachi, descriptive analyses was done and representing the statistical graph, mean, standard deviation in order to increase understanding and improvement in quality for patient and hospital workers. Secondly, independent sample t-test was performed to estimate the values of Levene's test for equality of variances, t-value, df and Pearson Point Biserial Correlation to test the significance level of the environmental, health and safety practices in public and private hospitals.

2.2. Results and Discussion.

The study tested the perception of patients and staff of the public and private hospitals regarding their environmental, health and safety of the respective hospitals (Figure 1, 2). We tested the difference between perceptions with independent sample t-test, which is used if we have one continuous variable and one categorical variable.

Reliability Statistics. Cronbach's alpha describes internal consistency of the instrument. Reliability statistics of patient perception questionnaire was shows 0.838 and hospital staff was 0.696.

2.2.1. Patient Testing Results.

Independent t-test. Table 2 shows that from the total sample size of 300 patients, 150 were patients of private and 150 were of public hospitals. The mean value of private is 50.89, whereas mean value of public is 28.31. The deviation from the mean for private is 5.31 and for public, its 5.529.

Table 3 displays that significant value of equal variance assumed is 0.428, which is larger than 0.05, which means, the sample has successfully assumed the equal variance, and the data is fit for independent t test. It was found that the two tailed value is 0.00 that is less than 0.05, which means that there is significant difference between the perception of patients of private hospitals and the perception of patients of public hospitals.

Patient responses

Patient responses

Figure 1 – Patient perception towards EHS: a – in Public Hospitals; b – in Private Hospitals

Staff responses

Staff responses

Staff responses

Staff responses

Figure 2 – Survey results: a – Factor I in Public Hospitals; b – Factor II in Public Hospitals; c – Factor I in Private Hospitals; d – Factor II in Private Hospitals
(Factor I – Management Leadership in EHS measures; Factor II – Employee participation in EHS measures)

Table 2 – Difference between the perception of patients regarding environmental, health and safety practices of public and private hospital

Hospital	Sample	Mean	Standard Deviation	Standard Error Mean
Private	150	50.89	5.311	0.434
Public	150	28.31	5.529	0.451

Table 3 – Leven's Test for Equality of Means

Variance	Leven's Test for Equality of Means		t-test for Equality of Means				
	F	Sig.	t	df	Sig (2-tailed)	Mean Diff.	Standard Error
Equal Variance Assumed	0.631	0.428	36.06	298	0.000	22.57	0.626
Equal Variance not Assumed	–	–	36.06	297.5	0.000	22.57	0.626

The mean difference between the two is found to be 22.57. The effect size of this difference was calculated with the standard formula, $(t^2/(t^2 + (N1+N2-2)))$, the effect size was found to be 81.35 percent, which is very high effect, according to the criterion given by [7]. This tells us that there the magnitude of difference between the perception of patients of private and public hospitals is very high, and thus our hypothesis is accepted.

Pearson Point Biserial Correlation. Pearson correlation also tested between the type of hospital and patient's perception regarding environmental, health and safety practices in hospitals. We specifically tested Pearson Point Biserial correlation which is a tested when, in hypothesis; we have two variables, one continuous and another categorical. In our hypothesis, the "type of hospital" is categorical variable and "patient's perception" is continuous variable.

Table 4 – Pearson Point Biserial Correlations

Criteria	Hospital	TPSQ
Hospital	Pearson Correlation	1
	Sig (2-tailed)	0.000
	N	300
TPSQ	Pearson Correlation	-0.902**
	Sig (2-tailed)	0.000
	N	300

**Correlation is significant at the 0.01 level (2-tailed)

Pearson Point Biserial correlation shows, that type of hospital which has been assigned greater number is negatively correlated with patient's perception of safety, health and environmental condition. In our data, greater number was assigned to public hospital. Therefore, the results show that there is negative 0.902 correlation coefficient with significance value of 0.00 between public hospital and patients' perception. This can also be said as, patients of public hospital are very much dissatisfied with the environmental, health and safety practices of the hospitals. For better understanding scatter plot of above-mentioned correlation test was mentioned in Figure 3.

The role of hospital management leadership is very important when it comes to augment the health, safety and

environment of the hospitals; therefore we collected the data of management leadership from the staff of public and private hospitals. We tested their difference with independent t-test.

Figure 3 – Scatter plot of Pearson Point Biserial correlation about patient perception towards EHS practices

2.2.2. Administration Test Results.

Independent t-test. Table 5 shows that from 300 sample size, 150 staff members were from private and 150 were from public hospitals. The mean value for public staff is 22.86, and private staff 37.79. The deviation from the mean for former is 5.88 and for later is 5.33.

As the prerequisite of independent t test is equal variance, so table 8 displays that the value of significance is 0.267, that is greater than 0.05, which means the criterion of equal variance is fulfilled and equal variance is assumed. The value of significance two tailed is 0.00, that is greater than 0.05, this shows that there is significant difference between management leadership of private and public hospitals (Table 6). Thus, the hypothesis is accepted.

Table 5 – Difference in the management leadership in environmental, health and safety of public and private hospitals

Hospital	Sample	Mean	Standard Deviation	Standard Error Mean
Private	150	22.86	5.889	0.481
Public	150	37.79	5.334	0.436

Table 6 – Leven's Test for Equality of Means

Variance	Leven's Test for Equality of Means		t-test for Equality of Means				
	F	Sig.	t	df	Sig (2-tailed)	Mean Diff.	Standard Error
Equal Variance Assumed	1.237	0.267	23.008	298	0.000	14.92	0.649
Equal Variance not Assumed	–	–	23.008	295.1	0.000	14.92	0.649

After we found that there is significant difference management leadership of private and public hospitals, we then calculated the effect size with same formula, $(t^2/(t^2 + (N1+N2-2)))$. Thus, the effect size was found to be 63.9 percent, which according to [7], is high effect. This shows that management leadership of private hospitals play important role in providing health safety and environment facilities then in the management leadership of public hospitals.

Pearson Point Biserial Correlation. Here we have also two variables, one is categorical variable which is type of hospital and another continuous variable which is the role of management leadership in environmental, health and safety condition of hospitals. Therefore, we tested Pearson Point Biserial correlation (Table 7).

Table 7 – Correlations of Hospital and Role of Management

Criteria	Hospital	TML
Hospital	Pearson Correlation	1
	Sig (2-tailed)	0.000
	N	300
TML	Pearson Correlation	0.800**
	Sig (2-tailed)	0.000
	N	300

**Correlation is significant at the 0.01 level (2-tailed)

Table 7 depicts that hospital with higher number assigned, that is “private hospital” is positively correlated with the role of management leadership in it. The correlation coefficient is 0.800 with 0.00 significance level. That is to say that, there is significant role of management leadership in environment, health and safety condition of private hospital. To show that graphical representation, a scatter plot of above results is also presented in Figure 4.

Table 7 shows that the other type of hospital which is public hospital, have negative correlation with management leadership role.

2.2.3. Staff Test Results.

Independent t-test. Since this study is multi-dimensional research, so apart from testing the perception of patients and

management leadership, we also tested the employee participation in health, safety and environment facilities.

Figure 4 – Scatter plot of Pearson Point Biserial correlation of hospital and role of management towards EHS practices

With the help of independent t test, we tested the difference between employee participation in private and public hospitals. Basic statistics are shown in Table 8 the sample size is same 300 and distribution is 150 for public and 150 for private. The mean value of public staff is 22.86 and of private staff is 37.79. The deviance from the mean for former is 6.06 and later is 5.13.

Table 9 displays that significance level of equal variance is 0.010, that is not greater than the standard level of 0.05, which means that equal variance is not assumed, so we followed the scores of second line of the table, in which equal variance is not assumed. The significance level 2 tailed score was found to be 0.00 which is less than the required value, and this proves that there is significant difference between the employee participation of public and private hospitals.

Table 8 – The difference between employee participation in health, safety and environment facilities of private and public hospitals

Hospital	Sample	Mean	Standard Deviation	Standard Error Mean
Private	150	22.86	5.889	0.481
Public	150	37.79	5.334	0.436

Table 9 – Leven's Test for Equality of Means

Variance	Leven's Test for Equality of Means		t-test for Equality of Means				
	F	Sig.	t	df	Sig (2-tailed)	Mean Diff.	Standard Error
Equal Variance Assumed	6.722	0.010	22.577	298	0.000	14.64	0.649
Equal Variance not Assumed	–	–	22.577	290.2	0.000	14.64	0.649

Pearson Point Biserial Correlation. In this hypothesis, we have two variables, first, 'type of hospital' which is categorical and second, 'employee participation' which is continuous variable. Therefore, we tested Pearson point biserial correlation (Table 10).

Table 10 shows that the higher number was assigned to 'private hospital' and result shows that there is 0.794 correlation coefficient between private hospital and employee participation. It can be said that in private hospitals the participation of employees in maintaining environment, health and safety condition than the employee of public hospitals. Above rest are presented in Figure 5.

Table 10 – Pearson Point Biserial Correlation

Criteria	Hospital	TEP
Hospital	Pearson Correlation	1
	Sig (2-tailed)	0.794**
	N	300
TEP	Pearson Correlation	0.794**
	Sig (2-tailed)	0.000
	N	300

**Correlation is significant at the 0.01 level (2-tailed)

Figure 5 – Scatter plot of Pearson Point Biserial correlation of hospital and employee participation towards EHS practices

Conclusion and recommendations.

The paper investigates the key EHS practices to investigate whether there are differences in the EHS practices in public and private hospitals. The result showed low level of compliance to EHS measures in public hospitals mainly due to lack of systematic EHS department to give information to patient as well as hospital staffs. From the above results

and discussions, it concluded that the empirical findings are evident that private hospitals are planned to provide better EHS culture for patient and their hospital staff members as compare to public sector hospitals by adopting best practicing like proper sterilization of equipment's, proper management of hazardous waste and advanced health care techniques used for the treatment of their patient. In private hospitals staff including nurses, administrative staff, and doctors aimed to provide better EHS standards to promote the hospital. Some Private hospitals manage EHS practices including staff training and award appreciation to staff. According to the study conducted by [8] some services like food, ward, staff and welfare services have significant impact on patient satisfaction but physical, pharmacy, laboratory, OPD, emergency and housekeeping services have no significant impact on patient satisfaction. But in Public sector over loaded staff are present but unable to follow EHS practices due to nonfunctional EHS department. It was observed during field survey that public hospitals were having some Personal protective equipment's, fire extinguisher, color coded dustbin for hazardous waste but they were failed to adopt the proper utilization of all these.

Research limitation and supplementary research implications. There are few limitations also present in this research. The first one is a fact that this study was conducted in limited area of Sindh which is Karachi. Further study can be conduct in other regions of Pakistan and then make the difference between the EHS measures in public and private sector hospitals. Secondly limited hospitals were selected for collection of data because of limited resources and time further detailed studies in different regions of Pakistan able to overcome this factor that cause highly effects on the result. Patient and Employee satisfaction are two strong factors which enhance organization reputation so, there is need therefore, adaptation of EHS practices and measures that protect and promote healthcare system.

Recommendations. It is recommended to proposed EHS department in public sector hospitals and strengthen the EHS department in private sector by following practices: Strictly following EHS guidelines and standards, allocation of budget for EHS practices, Permanent based EHS department, Proper availability and utilization of PPE, Timely EHS training of staff, proper audit of EHS practices and promotion of EHS practices inside and outside the hospital premises.

Acknowledgements.

The authors are thankful to Sindh Madressatul Islam University and Public Agency "National Scientific and Research Institute of Industrial Safety and Occupational Safety and Health" for their support.

Conflicts of Interest.

The authors declare no conflicts of interest in this research.

REFERENCES

1. Naz, A., Khan, W., Daraz, U., Hussain, M., Khan, T. (2012). An analytical study of patients' health problems in public hospitals of Khyber Pakhtunkhwa Pakistan. *International Journal of Business and Social Science*, 3(5).
2. Bodur, S., Filiz, E. (2010). Validity and reliability of Turkish version of "Hospital Survey on Patient Safety Culture" and perception of patient safety in public hospitals in Turkey. *BMC health services research*, 10(1), 28.
3. Li, W., Liang, W., Zhang, L., Tang, Q. (2015). Performance assessment system of health, safety and environment based on experts' weights and fuzzy comprehensive evaluation. *Journal of Loss Prevention in the Process Industries*, 35, 95–103.
4. Ahmed, R., Ahmad, N., Nasir, F., Khoso, I. (2014). Patients' satisfaction and quality health services: an investigation from private hospitals of Karachi, Pakistan. *Research Journal of Recent Sciences*, 3(7), 34–38. ISSN 2277-2502.
5. Hernandez, P.M.R., Quizon, R.R., Lacsamana, G.C., Remanese, J.I. Occupational Health Systems across Selected Public Healthcare Facilities in the Philippines. *Acta medica Philippina*, 48(3), 43–51.
6. Jafree, S.R., Zakar, R., Zakar, M.Z., Fischer, F. (2017). Assessing the patient safety culture and ward error reporting in public sector hospitals of Pakistan. *Safety in Health*, 3(1), 10.
7. Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*—Second Edition. 12 Lawrence Erlbaum Associates Inc. Hillsdale, New Jersey, 13.
8. Raheem, R.A., Nawaz, A., Fouzia, N., Imamuddin, K. (2014). Patients' Satisfaction and Quality Health Services: An Investigation from Private Hospitals of Karachi, Pakistan. *Research Journal of Recent Sciences*, 3(7), 34–38.

А. Азиз, К. Нассан, В. Майстренко, А. Г. Лагори, А. М. Пирзада

ОЦЕНКА ДЕЯТЕЛЬНОСТИ ПО ОБЕСПЕЧЕНИЮ БЛАГОПРИЯТНОЙ ОКРУЖАЮЩЕЙ СРЕДЫ, ЗДОРОВЬЯ И БЕЗОПАСНОСТИ В БОЛЬНИЦАХ: ТЕМАТИЧЕСКОЕ ИССЛЕДОВАНИЕ В КАРАЧИ

В настоящее время устойчивое и долговременное функционирование систем здравоохранения предполагает наличие надежной и пригодной для работы окружающей среды и благоприятной внешней атмосферы. Целью исследования является сравнение мероприятий по обеспечению благоприятных факторов окружающей среды, здоровья и безопасности в государственных и частных больницах Карачи. Для этого случайным образом было выбрано 300 респондентов, в том числе 150 пациентов и 150 работников из государственных и частных больниц. Собранные данные были статистически обработаны методами t-тестирования и корреляции, чтобы изучить практику охраны факторов внешней среды, здоровья и безопасности в указанных больницах. Было установлено, что пациент государственных больниц часто испытывал большие тяготы и мучения. Общие результаты исследований подчеркивают неадекватность и несоответствие государственных больниц стандартам. Вследствие этого государственные больницы нуждаются в большей заботе и сосредоточении внимания на мероприятиях, способствующих благоприятной окружающей среде, здоровью и безопасности в современных условиях и планируемых стратегиях. Больницы, как правило, должны поддерживать безопасную, здоровую и дружелюбную обстановку. Работники государственных больниц должны быть осведомлены об экологически безопасных и экономически эффективных способах работы. Первое ограничение исследования состоит в том, что оно проводилось в ограниченной зоне провинции Синд, центром которой является Кара чи. Дальнейшее исследование может быть проведено в других регионах Пакистана, а затем можно будет увидеть разницу между способами обеспечения благоприятной окружающей среды, здоровья и безопасности в государственных и частных больницах. Второе ограничение заключается в том, что для сбора данных были отобраны отдельные больницы в различных регионах Пакистана вследствие ограниченных ресурсов и времени для дальнейших детальных исследований. Возможность преодоления этого фактора окажет значительное влияние на результат дальнейших исследований.

Ключевые слова: системы здравоохранения; реакция персонала; среда; здоровье; безопасность; больницы.