

Smart Dialysis Chaise Longue For Better Health for human beings

Dr. Aya Lotfy Zakarya Habbak

Lecturer, Interior Design and Furniture Department, Faculty of Applied Arts, Damietta University, Damietta, Egypt, aya_habbak@du.edu.eg.

Abstract:

The number of “dialysis” patients in Egypt is about 60 thousand, each of them needs at least 13 sessions per month, with 3 sessions per week, the duration of one session is four continuous hours, the majority of patients are under the age of fifty, according to the Egyptian Society of Nephrology and Transplantation – ESNT (Magdi, A. 2021). Also, according to the same previous source, Egypt has approximately 460 private and governmental dialysis centers, distributed all over Egypt Othman, A. & Hisham, M. & Hosni, M. (2018). Since the man is the main engine for countries progress and development, the state provides specialized dialysis centers furnished well to ensure best care for users. Here appears the role of applied arts in providing products that serve humankind and advance society, as one of the main objectives of establishing colleges of applied arts is community service, through continuous communication with all community organizations to influence and be affected by them and to serve as scientific, research and reference leadership (du.edu.eg 2021.) To perform a dialysis session, the patient needs a dialysis machine and a bed or chair while receiving treatment. Due to the high cost of imported dialysis chaise longue, some hospitals use residence beds as an alternative solution. And due to the patient’s need to repeat dialysis sessions at least 3 sessions per week, and some of them need daily sessions according to the patient’s health condition. A study of a dialysis chair design that can be manufactured locally to avoid the high cost and achieve physical comfort for the patient, as well as provide the patient with solutions that help in killing the sense of time is needed, which may contribute in improving the patient psychological condition, which may help raise the rate of recovery.

Keywords:

Dialysis, Smart Chaise Longue, Smart furniture, Smart Dialysis Chair, multipurpose chair, Human Health

Paper received 17th October 2021, Accepted 10th December 2021, Published 1st of January 2022

Introduction:

The World Health Organization has described kidney failure as a chronic disease most neglected, especially since the kidneys are frequently and violently attacked from chronic diseases -that exist in a large number of Egyptians -such as diabetes and pressure, neglecting them drain the kidneys very slowly, but in complete silence, the patient does not notice it except in the last stage, which is “kidney failure.” (Magdi, A. 2021)

The number of deaths caused by kidney disease in Egypt annually is approximately 20,433 cases, which is equivalent to 32.88 cases among every 100,000 Egyptians, which placed Egypt in the 20th place in terms of the number of deaths resulting from kidney diseases worldwide. (Othman, A. & Hisham, M. & Hosni, M. 2018).

According to the importance of the human health condition, dialysis centers are allocated throughout the Republic. To conduct a dialysis session, the patient needs a dialysis device and chair, and here appears the role of applied arts in providing products that serve the human.

The dialysis chair should have several characteristics that achieve psychological and physical comfort for the patient. Hence, the researcher, after a number of field visits to the dialysis centers, as well as the questionnaire, developed a design for a smart dialysis chair that could achieve physical and psychological comfort

for the user.

Problem:

The research problem is limited to the following question:

- 1- How appropriate is the dialysis chair available in hospitals in Egypt for the physical and psychological aspects of the patient?
- 2- Does the use of a smart dialysis chair achieve better physical and psychological comfort for the patient?
- 3- Does using a smart dialysis chair contribute to kill time for dialysis patients?
- 4- Does the use of the smart dialysis chair achieve greater patient comfort than the traditional chair?

Hypotheses:

From the previous question, the researcher assumes the following:

- 1- The use of a smart dialysis Chaise Lon equipped with a phone charger may contribute to reduce the dialysis patient’s sense of time due to the number of long hours that the patient needs for treatment in one session, which reaches four hours each time.
- 2- The use of a smart dialysis chair that helps the patient change his position from sitting to resting may achieve better patient comfort.
- 3- If the dialysis chair achieves physical comfort



for the patient through all the elements of the chair such as the footrest, armrest, and the angle of the back, as well as the technological aspects of the chair help to kill the sense of time, this may help achieve psychological and physical comfort for the patient may help in the healing process.

Objectives:

This study aims to:

- 1- Define dialysis and its types.
- 2- Determine some types of chairs and beds used for dialysis patients in government hospitals in Egypt, and identifying their disadvantages and advantages for the patient.
- 3- Develop a design for a dialysis chair that achieves greater comfort and well-being for patient, which may contribute in improving his psychological and physical condition, which may contribute to raising recovery rates.

Significance:

The importance lies in the following points: -

- 1- The importance of kidney failure due to the high number of people infected with it inside Egypt
- 2- The importance of achieving physical and psychological comfort for patients, which may contribute in raising the rate of recovery.
- 3- The importance of applied arts in serving the community by providing products that serve the human being and achieve physical and psychological comfort, because the human being is the focus of the nation's progress

Delimitations:

1. **According to the place limits:** governmental dialysis hospitals and centers inside Egypt.
2. **According to time limits:** Inside governmental dialysis hospitals and centers inside Egypt during the past two years.

Table number (1) illustrates definition of dialysis concept and its types, Health Information Translations (2020)

Comparisons	Hemodialysis	Peritoneal dialysis
Definition	In Hemodialysis small amounts of blood are pumped out of the body through a machine that has a filter called an artificial kidney . This machine filters extra fluids and wastes from the body. the blood is pumped back into the body.	In peritoneal dialysis catheter is put into the abdomen in surgery that works as a natural filter. Special fluid is put into the abdomen for several hours as wastes move from the blood to the fluid then drained from the body through the catheter.
The place of receiving the treatment	This treatment can be done at home or dialysis centers.	Patient is trained by a dialysis nurse for a week or two after that he must be able to do it on their own at home.
Duration	4 hours three times a week In a Dialysis Centre At home it needs more days of the week and shorter periods of time	3 to 5 times daily as the fluid stays in the abdomen for 4-6 hours or more. 8 to 10 hours during the night.
Furniture Used	Dialysis Chaise Longue	Dialysis Chaise Longue

Methodology:

1. **Descriptive and analytical approach** through describing samples of dialysis rooms and furniture in some government hospitals in Egypt.
2. **The critical curriculum approach** through critique and analysis of models of samples of dialysis rooms and furniture in some government hospitals in Egypt.
3. **Applied approach** by designing and manufacturing a smart dialysis chair

Structure of Research:

- 1- Definition of dialysis concept and its types.
- 2- A look at government dialysis hospitals in Egypt and the furniture used in them.
- 3- A questionnaire to measure patients' satisfaction with the furniture used during dialysis
- 4- 4- The applied project: a smart dialysis chaise longue for better health.
- 5- A questionnaire to measure patients' and hospital teams' satisfaction with smart dialysis chaise longue

1- Definition of dialysis concept and its types.

Dialysis is a treatment used when the Kidney stops working well. So extra fluids and wastes are removed from the human body with dialysis. There are two types of dialysis shown in diagram number (1) The difference between them was explained in Table No (1).

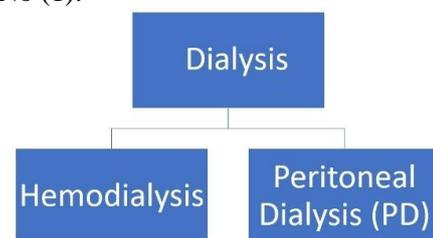


Diagram number (1) shows the types of dialysis.

2-A look at government dialysis hospitals in Egypt and the furniture used in them.

According to the latest statistics of the Egyptian Kidney Association, Egypt has nearly 460 private and governmental centers to perform dialysis operations. (Othman, A. & Hisham, M. & Hosni, M. 2018).

Damietta Governorate has 10 centers specialized in



dialysis that operate at full power, and the largest of them is in Damietta General Hospital, which has 35 dialysis machines, followed by Damietta Specialized Hospital with 30 machines, then Faraskour Central, which has 25 machines. (Al Zoghbi, Z. (2018)). [Photos n0\(1\), \(2\), \(3\), \(4\) show different dialysis centers in Egypt.](#)



Photo no. (1) & (2) show medical centers for dialysis in Mansoura city in Egypt (Ali, E. 2021)



Photo no. (3) & (4) show A medical center for dialysis in Aswan(Ehab, F. 2020)

Photos number (1),(2),(3),(4) show different dialysis chaise longue in different hospitals in Egypt.

3-A questionnaire to measure patients' satisfaction with the furniture used during dialysis.

Through field visits to some dialysis centers as shown in photos n. (1),(2),(3),(4). the researcher noticed that some centers use accommodation beds instead of using chairs dedicated to the dialysis process, and with the patient's need to spend long number of hours as shown in Table No. (1) to

complete the dialysis session. The researcher designed a questionnaire to measure the patient's comfort with the available chair in the hospital, and the result was as shown in chart No. (1), (2). The questionnaire also asked about the availability of chairs used in the hospital for the changing the position of the chair from sitting to relaxing as shown in chart No. (3), (4).

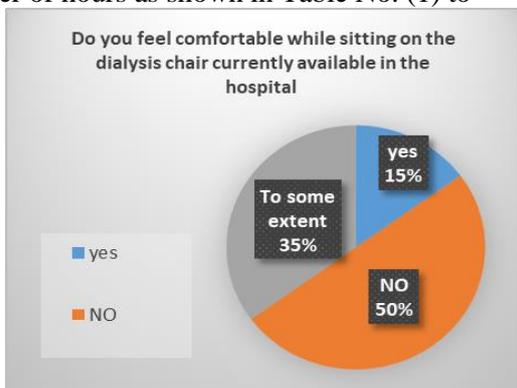


Chart No. (1) shows the patient's comfort with the available chair in the hospital

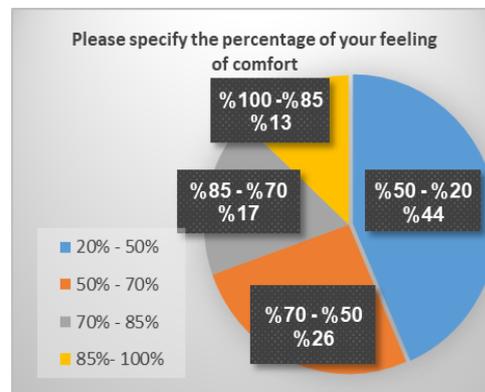


Chart No. (2) shows the percentage of feeling of comfort with the dialysis chair in the hospital

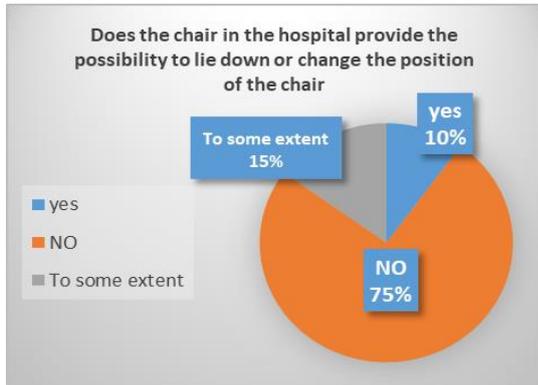


Chart No. (3) shows the percentage of chairs that provide the possibility to lie down or change position

100 patients answered the questionnaire and when they were asked how they spend their time during the washing process, what activities they prefer to

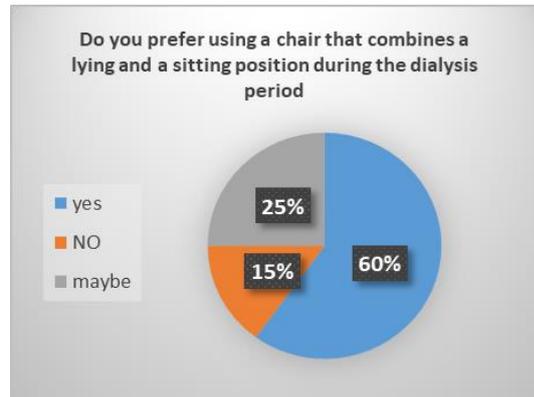


Chart No. (4) the percentage of preferring using a chair that combines a lying and a sitting position during the dialysis period

do while dialysis treatment, their answers were drawn in the chart No. (5), (6) and (7).

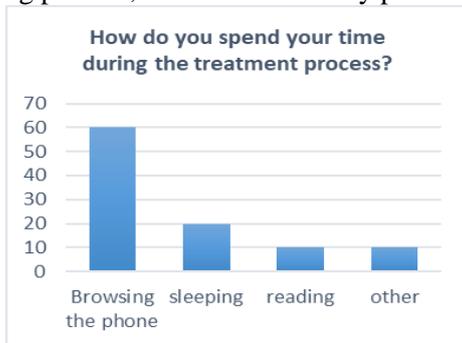


Chart No. (5) shows how patient spend time during the treatment process

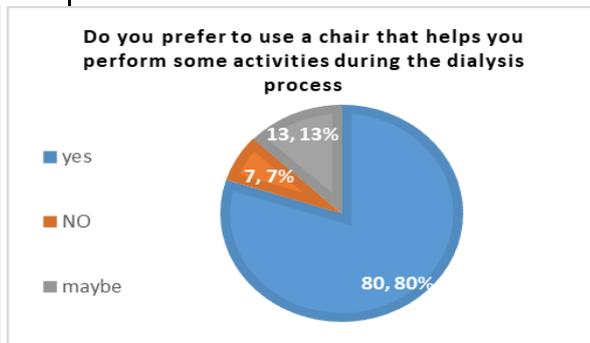


Chart No. (6) shows the percentage of preferring of using a chair that helps in performing some activities during the dialysis process

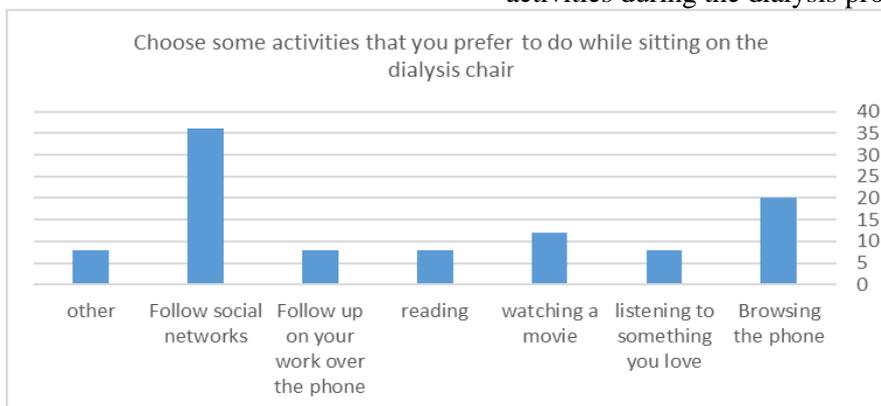


Chart No. (7) shows some activities that patients prefer to do while sitting on the dialysis chair

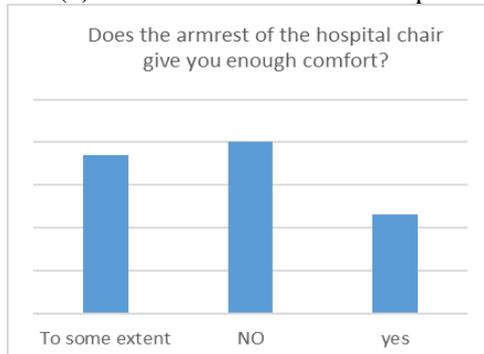


Chart No. (8) shows if the armrest of the hospital chair is comfort

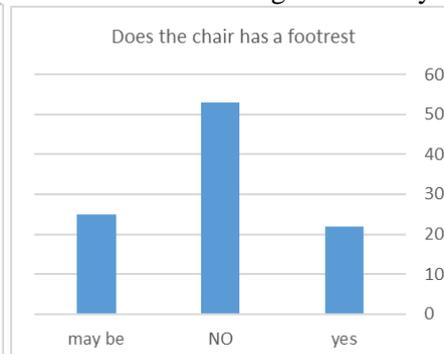


Chart No. (9) shows if the chair has a footrest

When asked about the extent to which physical comfort is achieved through the furniture used during dialysis, their answers varied as shown chart No. (8) and (9).

4- The applied project: a smart dialysis chaise longue for better health.

After many visits to **dialysis** hospitals, collecting data through internet and the questionnaire above. The researcher has suggested a design for a **dialysis Chaise Longue** that takes into account achieving more comfort for user through several aspects as shown in photo n. (6). First, adjusting the dimensions of the chair and the angle of the back

according to the ergonomic measurements of human body, then, the possibility of changing the position of the chair from sitting as shown in photo n. (5) & (6) to lying down as shown in photo n. (7) to achieve better comfort due to long hours the patient needs for treatment. This chair is smart due to the addition of the ability to charge phones as shown in photo n. (9), as well as the presence of an electric LED lamp for evening lighting for those who want to read as shown in photo n. (11). This chair is designed for both home care and hospital dialysis.



Picture No. (5) The chair in a sitting position



Picture No. (6) Describes the characteristics of the chair



Picture No. (7) The chair is in the reclining position from the front



Picture No. (8) The chair is in a reclining position from side

Source: Designed and photographed by the researcher

The researcher tried to kill time by adding the feature of charging phones so that the patient could

watch a movie or listen to music, and this is what the patients chose through the questionnaire, and



the lighting was suggested for those who prefer reading at night.



Picture No. (9) shows the possibility of charging mobile phones, where there are 5-3 exits, as well as LED light.



Picture No. (10) shows the chair during use with the benefit of charging the computer to use it for browsing.

A solution holder shown in photo no (12) is separate from the chair was used for several reasons, firstly because changing the position of the chair from sitting to lying does not provide a vertical line to the ground, but rather tilts with changing the position of the chair. Therefore, the



Picture No. (11) shows the use of LED lamp for night reading

solution holder will tend to fall, and it will not provide the appropriate treatment service. Also, the chair can be used by an ordinary person who is not sick as a smart chair that achieves the advantages mentioned before. Photos n.(13),(14) show the chair for regular use.



Picture No. (12) shows the solution holder which is separated from the chair and can be moved for the best patient result.



Picture No. (13) The chair in a sitting position



Picture No. (14) The chair is in a reclining position

5-A questionnaire to measure patients' and hospital teams' satisfaction with smart dialysis chaise longue

The chair was tested in a hospital as a practical experiment. A survey of patients' opinions as well as the hospital's opinion were made. The

questionnaire was designed to measure the quality of the chair and its response to the patient's physical and psychological needs, and to measure the suitability of the chair for hospital work or home care for a dialysis patient. The answers are shown in diagrams no.(11),to no (15).

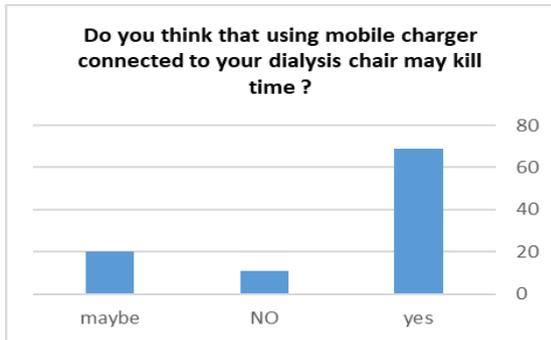


Chart No. (10) shows the percentage of patient s opinion of using mobile charger connected to dialysis chair



Picture No. (15) shows mobile charger connected to dialysis chair. There is more than one charger in the case of a damage in one of them.

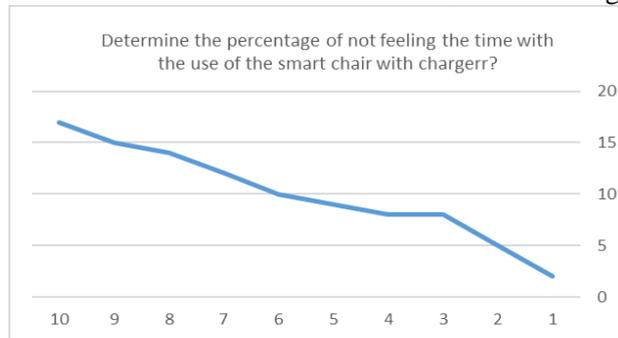


Chart No. (11) shows the percentage of patients' opinions of not feeling the time with the use of the smart chair with charger



Chart No. (12) shows the percentage of patients' opinions of using leather as a chair covering material.

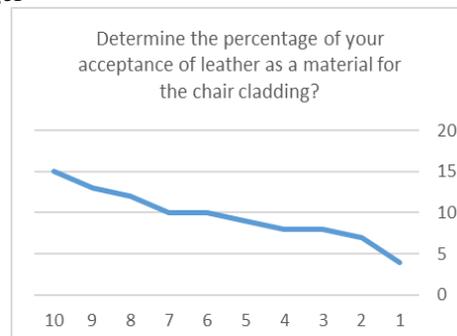


Chart No. (13) shows the percentage of patients' acceptance of leather as a material for the chair covering

Using leather in covering the chair has a functional purpose, which is to reduce the transmission of

infection, considering that the leather is a non-absorbent material.

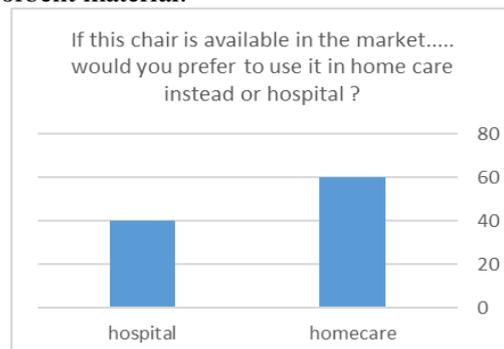
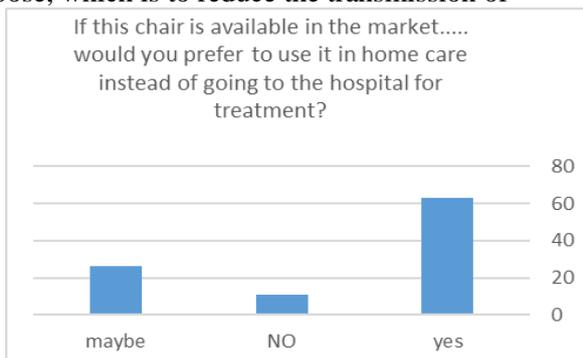


Chart No. (14) shows the percentage of patients' opinions of preferring using this chair for home care. Hospital teams opinions of preferred using this chair for home care because of the lack of a wheel for the chair. It facilitates movement, some patients have to move from one place to another according to the

Chart No. (15) shows the percentage of hospital team opinions of preferring using this chair for home care medical condition of the patient. If that a wheel is available for the chair, there is no objection to using the chair in hospital

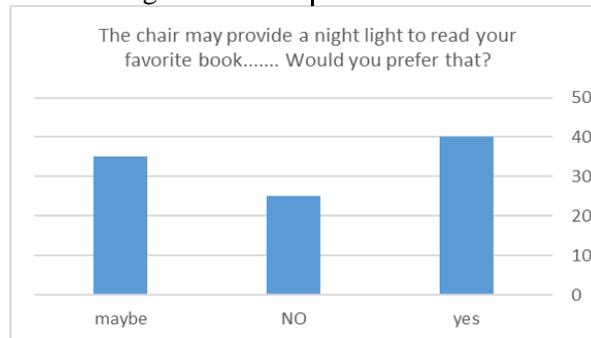


Chart No. (16) shows the percentage of patients' opinions of preferring a LED light connected to the chair

Results:

1. Dialysis hospitals care more about the quality of the equipment than the selection of furniture used in dialysis treatment.
2. Care must be taken on the physical and psychological aspects of patients with kidney failure by achieving comfort through the furniture used during treatment, which may contribute in raising the recovery rate.
3. The use of smart furniture may help the dialysis patient not feel the time.

Discussion

It is necessary to increase the number of kidney centers in the central villages in various parts and governorates in Egypt to expand the operations of kidney transplantation and dialysis, taking into account the high population density in the villages of the Egyptian countryside, which represents 57.7% of the total population, in addition to the lack and weakness of medical and health services in them, as well as the increase in pollution rates especially water there, which is one of the main factors for kidney disease, especially kidney failure. Attention must be paid to the quality of medical equipment as well as pieces of furniture used for better human health.

Conclusion

The human being is the national wealth of any country. Through human effort, nations rise. Therefore, it is necessary to provide him with adequate health care for the sake of a better future. Because of the importance and spread of kidney failure in Egypt, the Ministry of Health must give it a priority in care in terms of providing centers dedicated in treating these patients. These hospitals must be properly furnished to ensure the user's physical and psychological comfort. Some cases of dialysis patients can receive home care, and here the patient must choose a comfortable and

appropriate piece of furniture that helps him kill time and improve his psychological and physical condition, which are the factors on the basis of which the proposed smart dialysis chaise longue was designed.

References:

1. Al Zoghbi, Z. (2018) " *Patients with kidney failure in Damietta between suffering pain, poor capabilities and lack of solutions*" Retrieved October 2020 from <https://www.elbalad.news/3496761>
2. Ali, E. (2021) " *At a cost of 300 million.... Developing the dialysis service in Dakahlia* " | Retrieved October 2021 from http://www.almasryanews.com/news_details.php?id=374094928364487228265veo
3. Damietta University Faculty of Applied Arts website - *Community Service and Environmental Affairs Sector* (2021) Retrieved January 1,2021, from <http://www.du.edu.eg/faculty/app/up/unitData.aspx?id=32&n=155>
4. Ehab, F.(2020)" *Theft of a hemodialysis device from the center of Aswan: the thief took the right one and left one dead*" Retrieved January 1,2021, from <https://alwan.elwatannews.com/news/details/>
5. ESNT- Retrieved from *Egyptian Society of Nephrology and Transplantation* website, Retrieved August 3, 2021, from <https://www.esnt-online.com>
6. Health Information Translations (2020) " *Dialysis*" Retrieved September 2020 from <https://www.healthinfotranslations.org/>
7. Magdi, A. (2021) . *Al-Sisi's initiative for "kidney transplantation" says goodbye to suffering -60 thousand patients who have reached the last stage, each of them needs 13 washing sessions per month.* Retrieved

August 3, 2021, from
<https://www.elwatannews.com/news/details/5530521>

8. Othman, A. & Hisham, M. & Hosni, M. (2018).
“Al-Masry Al-Youm” is on a tour of the

“kidney dialysis” centers in Cairo. Retrieved
January 1,2021, from
<https://www.almasryalyoum.com/news/details/1323596>

