Amputation Patient and Physiotherapy Education in Sudan

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Abstract:

Background: Worldwide, limb amputation is a very common procedure that is indicated after severe complications of diseases and after major physical traumas which cause a damage that is untreatable. The most common type of major lower limb amputations is called Trans-tibial or below knee amputation. Any patient who undergoes an amputation will need thorough educational program to know more about his/her condition, avoid complications, and be able to return to his/her functional and normal life before the amputation. **Aim:** The aim of this study was to determine the effect of pre- and postoperative patient education on preventing knee flexion contractures in trans-tibial amputation patients in selected centers in Khartoum state. **Method:** A quantitative, descriptive, cross-sectional survey was used in this study. The data was collected using a self-administered questionnaire. A total of fifty participants from four facilities have participated in the study. **Result:** More than half of the participants who received education, did not have any complications and only 28% of them had complications. There were 42% came from outside Khartoum to seek rehabilitation services. There were 68% of participants received education from their physiotherapists. **Conclusion:** There are a shortage in Trans-tibial amputation rehabilitation services outside Khartoum city. Pre- and postoperative patient education is important as it can decrease the number and severity of complications an amputee might have after the surgery. **Recommendations:** Pre- and post-operative Patient education must be part of the rehabilitation protocol and awareness about it should be required for patient and the rehabilitation team.

Key words: Amputation, Trans-tibial, pre and post operative, patient education, flexion contracture. Sudan.

1. Introduction

Sudan is an African country located in the north east Africa sounded by many countries like Egypt, Ethiopia, Eretria, South Sudan, Chad, Libya, and Republic Central of Africa. It is one of the developing countries and disability is present as health sector challenge. Amputation is one of the most common causes leading to physical disability in Sudan (Abdelnour *et al,* 2023). There is significant correlation between the prevalence of diabetic and amputation in Sudan (Idris *et al*, 2023). In other words, the prevalence of Diabetic is high and it is one of the common causes for amputation in Sudan. This is related to the high sugar intake among Sudanese population as one of the causes of Debritic in Sudan as sugar is one of the main national products in the country (El Sayed *et al,* 2018).

According to the National Authority for Prosthetics and Orthotics (NAPO), Trans - tibial amputation represents the biggest number between the other levels of amputation in Sudan (Ibrahim, 2018). Trans – tibial amputation of the lower limbs is also known as below knee amputation and patient need physiotherapy rehabilitation before and after Trans – tibial amputation surgery. Patients' education recommended before and after surgery as part of the rehabilitation program. The program aims to prevent complications such as contracture, delay healing, pain, infection, and swelling. The idea of patient education in the rehabilitation program is to provide the patients and their caregivers with knowledge and skills to effectively care for and manage their conditions. This educational program improves the health behaviors, accelerates the treatment outcomes, reduces patients' dependence on others, and improves the quality of life of the patients (Correia *et al*, 2022). Effective education program guarantees a strong shift in the attitude of patients towards health in general and taking charge of their own health conditions in particular (Truccolo, 2016).

Up to this day, a considered number of amputees still develop complications after their surgeries. The patients' postures and attitudes have influenced the presence of contractures. Thus, in addition to assisting amputees during therapy sessions, consultation from doctors and therapists is also necessary (Ghazali *et al*, 2017). This shows that the importance of patients' education before and after the surgery needs to be emphasized.

This study is conducted to emphasize the importance of patients' education and its role in contractures' prevention among Sudanese patients. In Sudan, several institutions on governmental and public sectors offer rehabilitation services for patients with amputation. The nature and impact of the rehabilitation services are important subject to investigate and development.

2. Methodology

The study employs a quantitative, descriptive, cross-sectional study. It was conducted in Khartoum state in two governmental facilities and two private facilities. Al Amal City for People with Disabilities and Sudanese Union for People

with Disabilities are governmental facilities. Aotad factory for Prosthetics and Orthotics and Paramedic for Rehabilitation are private facilities. All facilities located in Khartoum State, Sudan. Sample size was 50 participants with Trans – tibial amputation who agreed to be involved in the study. data was collected using a questionnaire developed by Shargawi & Mahmoud (2021), in previous study titled "Perception, Knowledge, and Attitude about Physiotherapy Rehabilitation in Lower Limb Amputees at NAPO". The questionnaire included total of 25 questions on demographic data, experience of amputation, knowledge of the amputees, and patient's education received. The data were analyzed using Statistical Package for the Social Sciences (SPSS) Version 21. The data was analyzed descriptively to produce frequency and percentage tables and were then presented in the appropriate tables and charts format. All ethical approval was obtained and to maintain anonymity and confidentiality, no identifiable data were asked and only the researchers had access to data.

3. Results

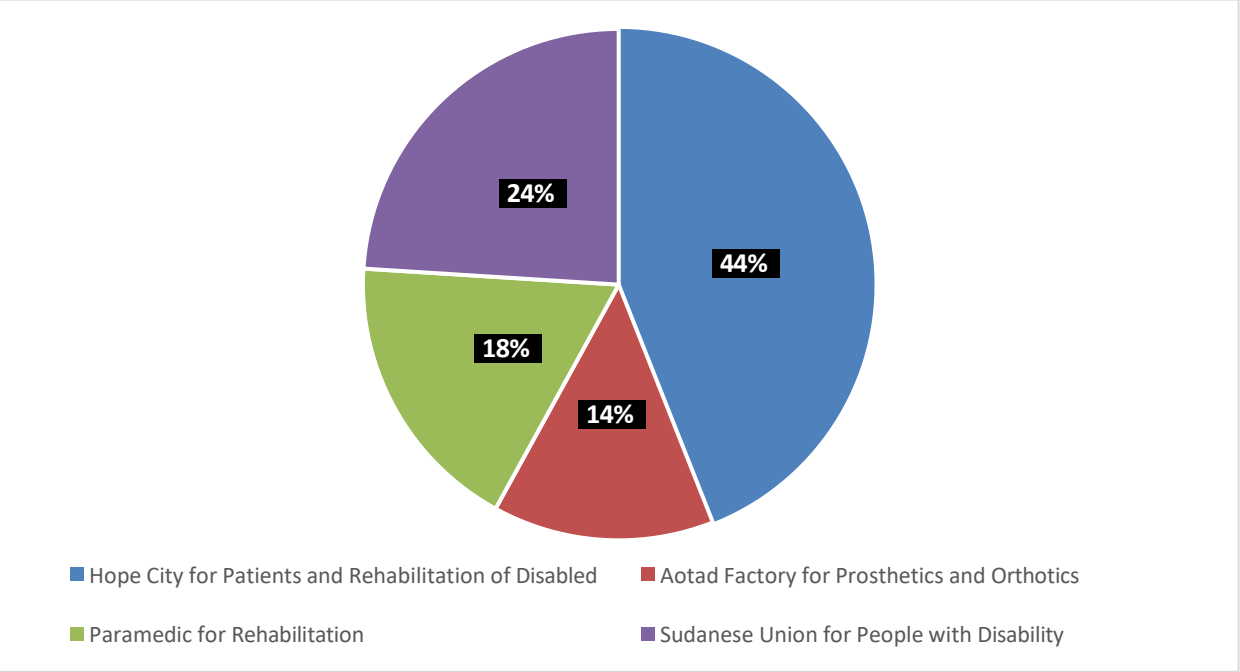
Demographic data included information's on sociodemographic characteristics as presented in table 4.1.

Table 4.1: Sociodemographic Characteristics of Study Participants.

Sociodemographic Characteristic	Frequency	Percentage
Age		
30 – 50 years old	31	62 %
50 – 70 years old	15	30 %
> 70 years old	4	8 %
Gender		
Male	39	78 %
Female	11	22 %
Address		
Khartoum	19	38 %
Bahri	2	4 %
Omdurman	8	16 %
Other	21	42 %
Education		
Illiterate	4	8 %
Undergraduate	37	74 %
Graduate	8	16 %
Postgraduate	1	2 %
Marital Status		
Single	13	26 %
Married	35	70 %
Divorced	2	4 %
Widowed	0	0 %
Have Children		
Yes	32	64 %

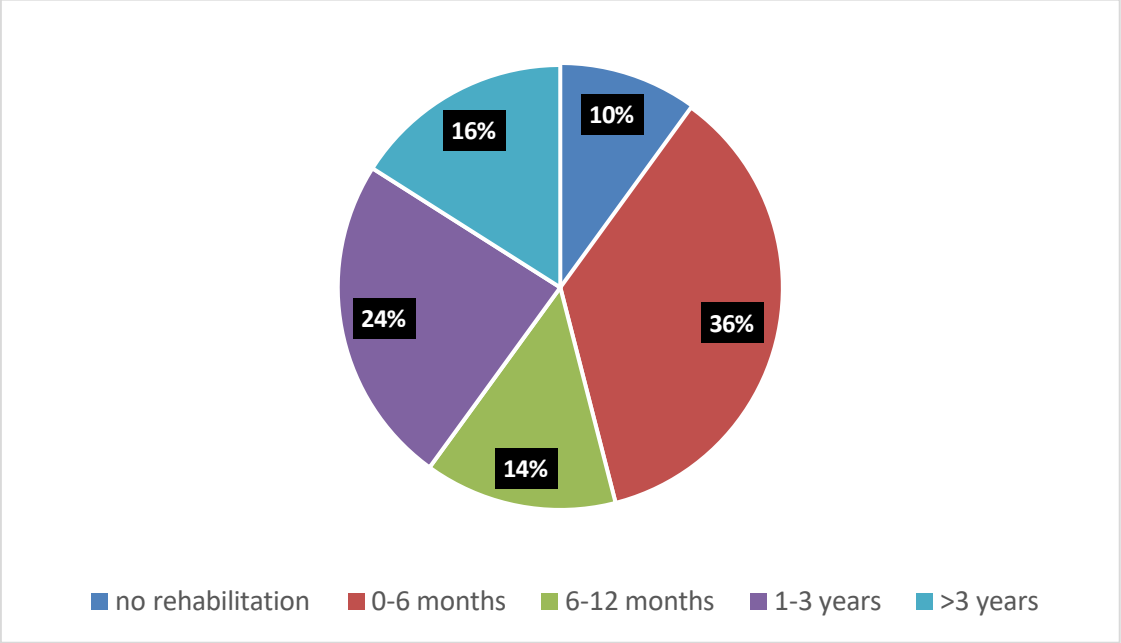
No	18	36 %
Occupation		
Housewife	11	22 %
Employee	12	24 %
Retired	9	18 %
Private sector	18	36 %

Figure 4.1: The Facilities Patients Participated from.



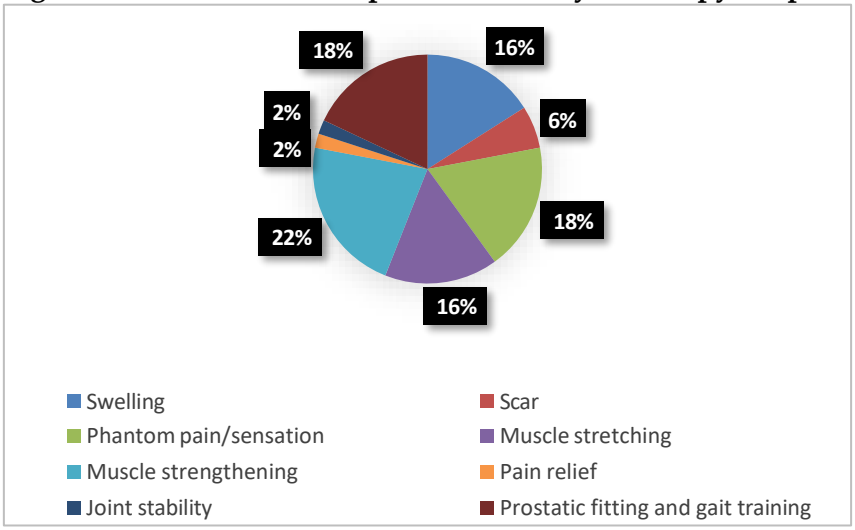
The study participants were from 4 different facilities as showed in figure 4.1 above. 44% of them were from Hope City for Patients and Rehabilitations of disabled in Jabal Awlia locality, 24% were from the Sudanese Union for People with Disability from the headquarters in Bahri and 2 branches in Ombadda and Sharg Elnile, 18% were from Paramedic for Rehabilitation in El Salama, and 14% were from Aotad Factory for Prosthetics and Orthotics in Khartoum, Omak Street.

Figure 4.2: Time between the Amputation and the Start of the Rehabilitation Program.



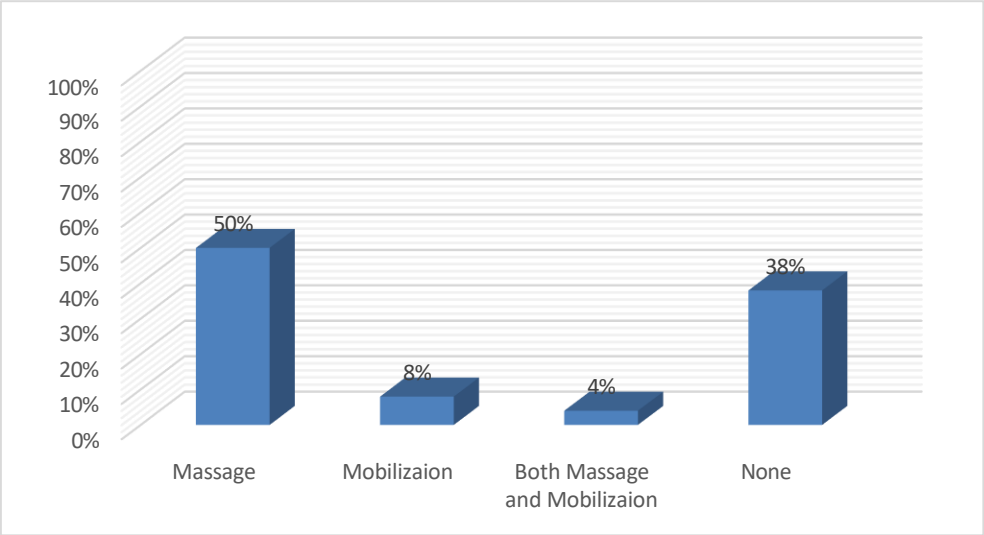
As shown in figure 4.2 above, the time between the amputation surgery and the beginning of the rehabilitation program, 5 participants (10%) did not do any rehabilitation program. The highest percentage of the amputees (36%) stated that they started in a period of 0 to 6 months after the surgery. 14% started it after more than 6 but less than 12 months, 24% started it after more than 1 but less than 3 years, and 16% started it after more than 3 years.

Figure 4.3: Problems Participants Think Physiotherapy Helps with.



Regarding the patients' knowledge about the role of physiotherapy after the amputation surgery, all the patients haven't done or been told to do any pre-operative exercise. 45% believed that physiotherapy has a role after surgery, figure 4.3 shows the problems which the participants think physiotherapy has a role in.

Figure 4.4: What Patients Do for Scar.



80% of participants answered that they how to care for the residual limb and scar. Regarding the scar tissue care, half of the patients do only massage, 8% only do mobilization, and 4% do both scar tissue massage and mobilization. 38% of them don't do anything to the healed scar tissue (figure 4.4 above).

Figure 4.5: What Participants Do for Swelling

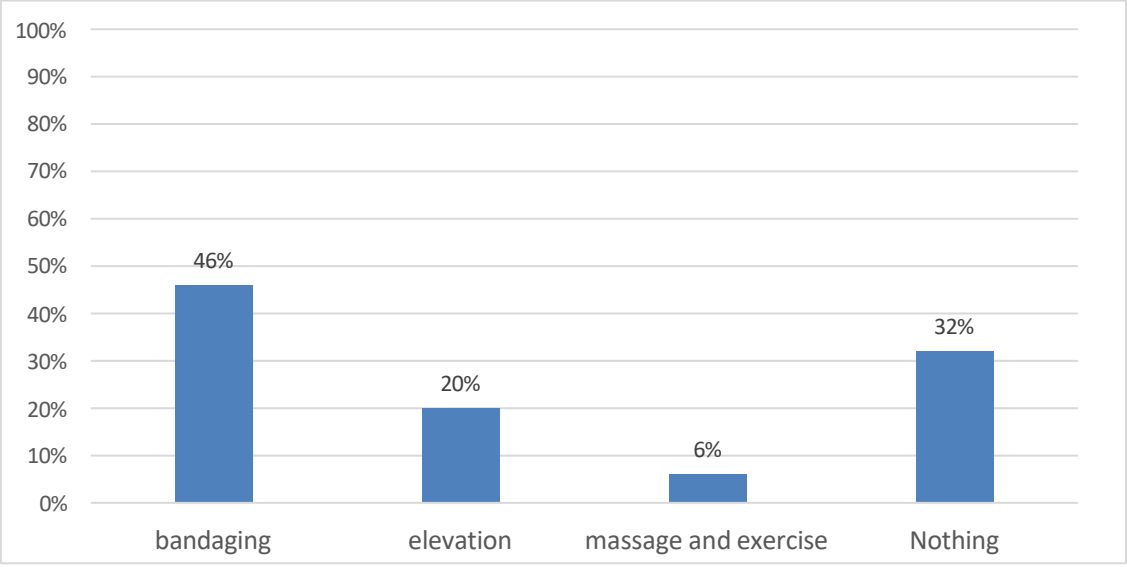
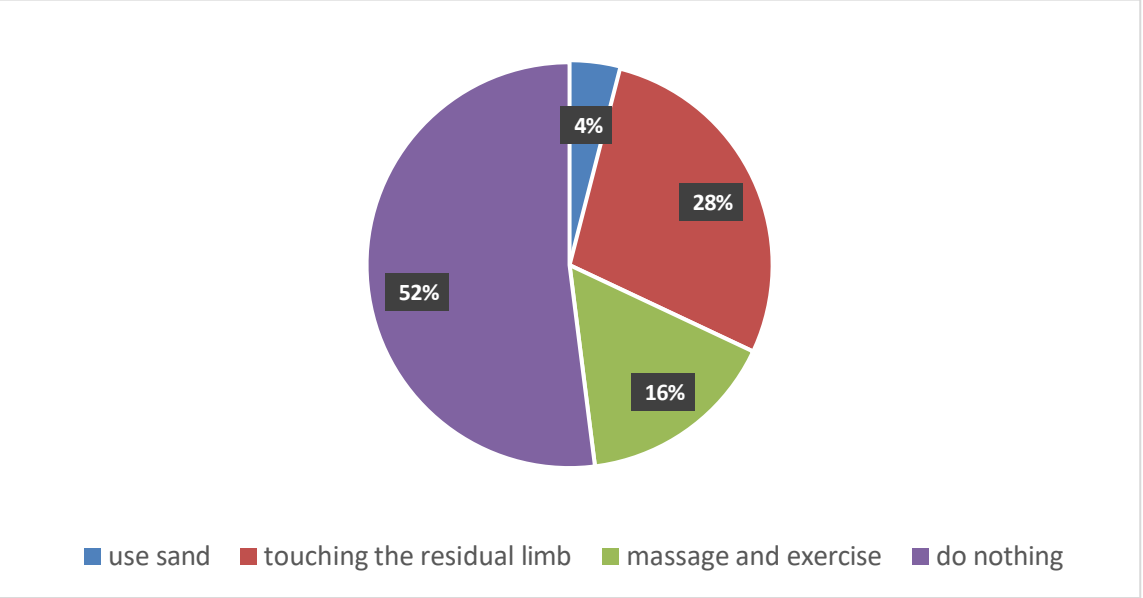


Figure 4.5 above shows what patients do to manage swelling. 46% of the patients mentioned that they bandage the residual limb, 28% said they don't need help doing it, and the other 18% who need help are helped by a family member. A marked percentage of them (32%) don't do anything to manage their swelling.

Figure 4.6: What Participants Do for Phantom Pain / Sensation



Regarding the phantom pain/sensation, more than half of the participants 52% stated that they don't do anything about it (figure 4.6 above) shows what participants do for phantom pain / sensation.

Figure 4.7: Sources of Patient's Education Provided to the Participants

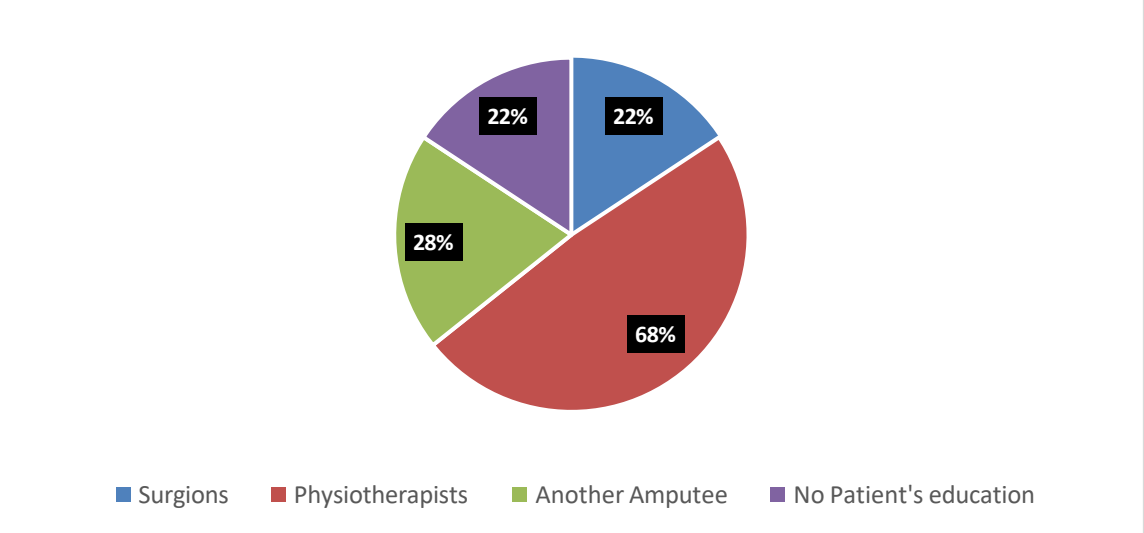
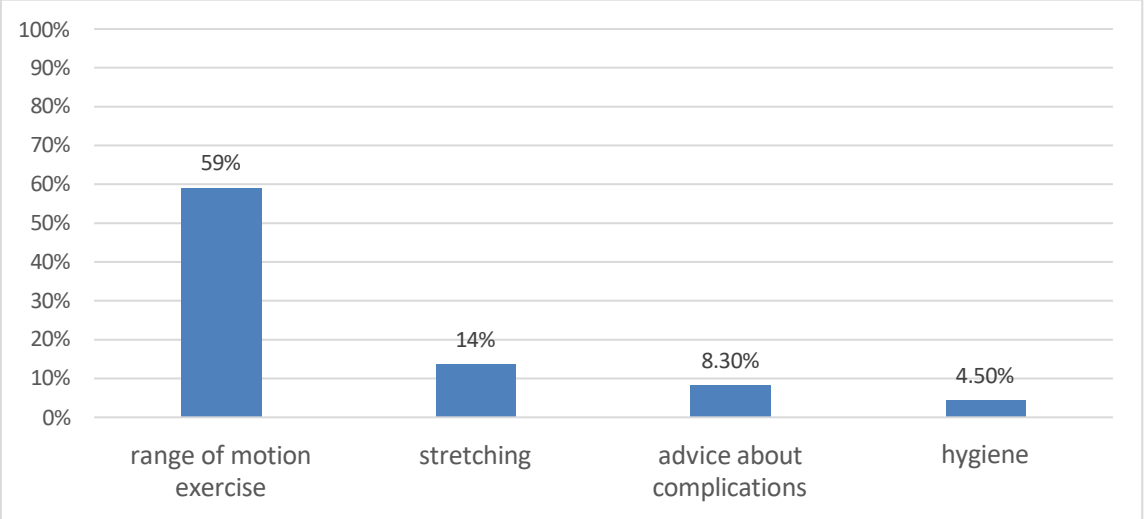


Figure 4.7 above was about whether the participants received patient education or not and by who. 22% of the participants did not receive any patient's education. Regarding the sources from which they received the patient's education, the highest percentage of them (68%) received education from their physiotherapists, 28% received it from another amputee, and 22% received it from their surgeons. Some of the participants received education from more than one source.

Figure 4.8: Education Provided by Surgeons



22% of patients received education from their surgeons about what is presented in figure 4.8 above, 68% were educated by their physiotherapists about what is shown in figure 4.9 and 28% were educated by another amputee about what is presented in figure 4.10. 22% of patients did not receive any type of education.

Figure 4.9: Education Provided by Physiotherapists

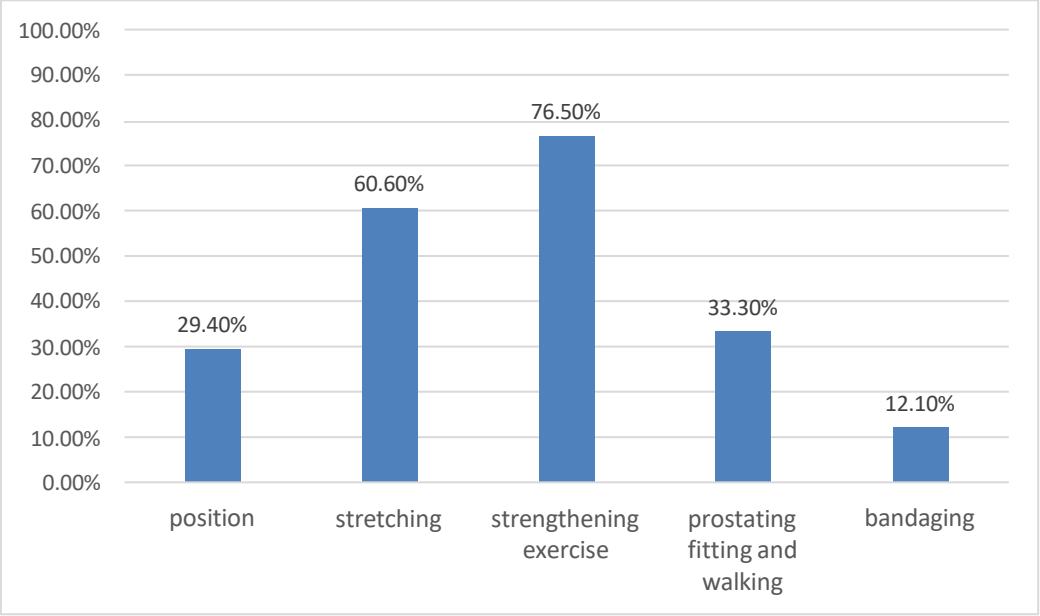


Figure 4.10: Education by Other Amputees

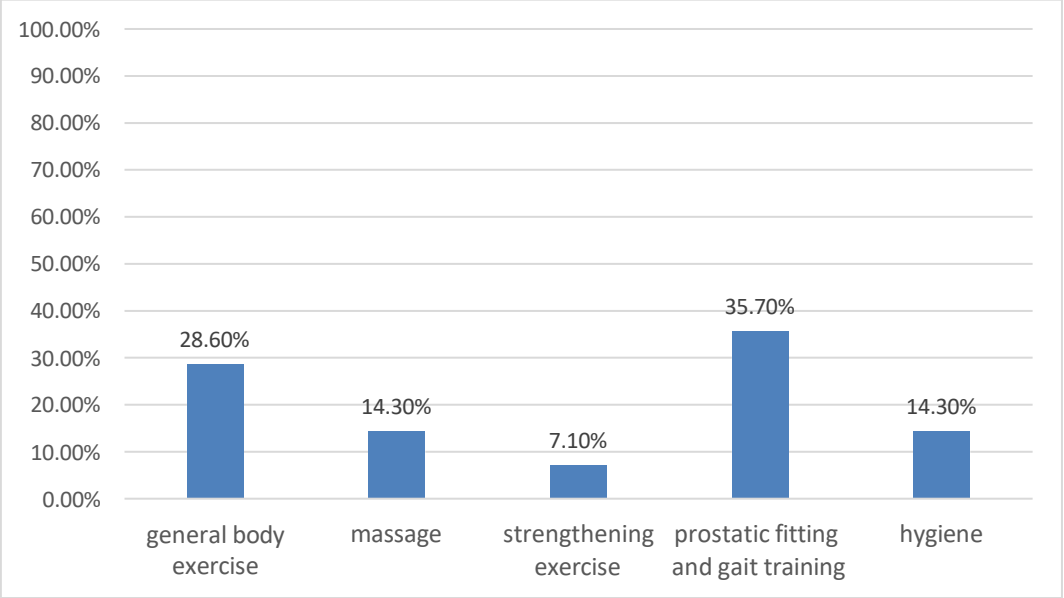
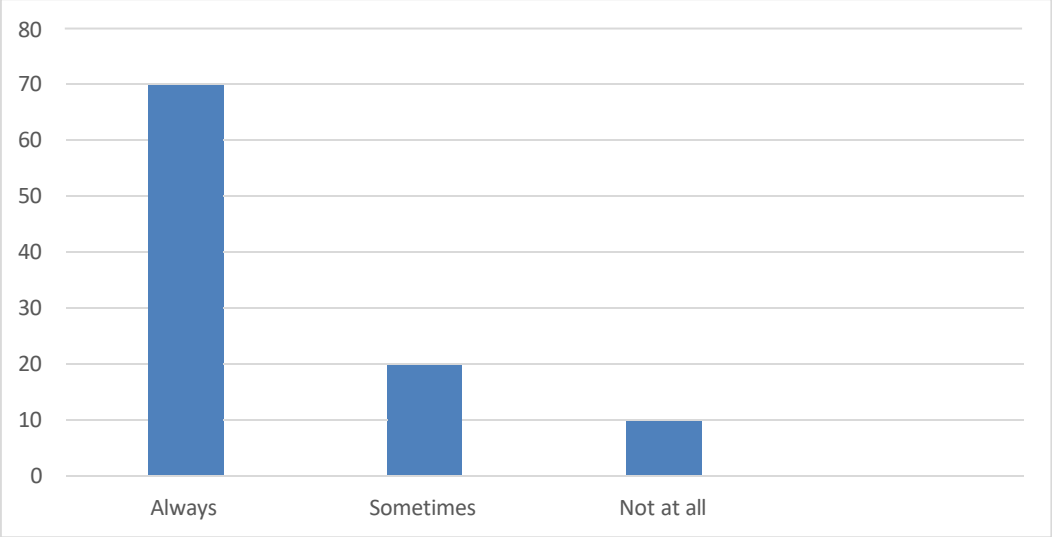
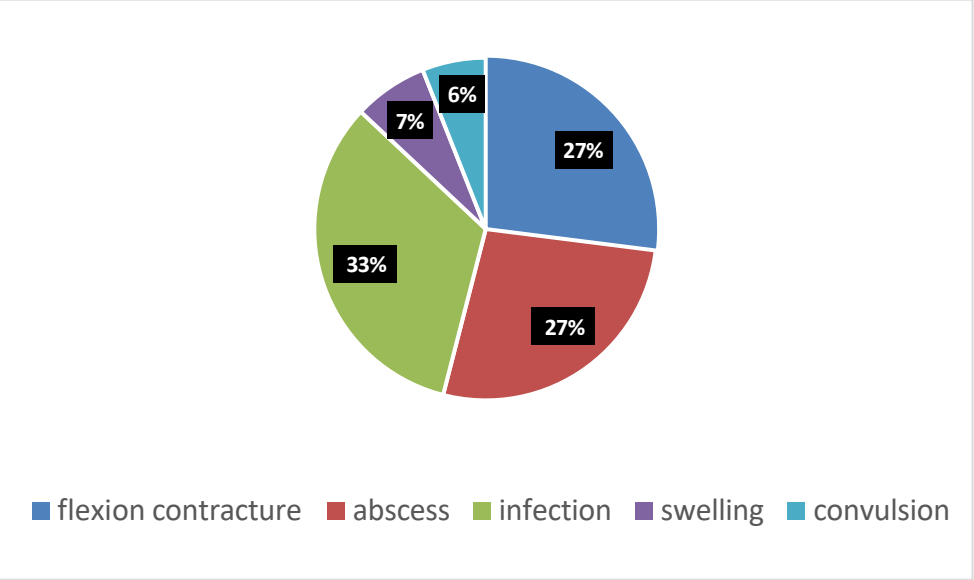


Figure 4.11: The Participants' Commitment to the Home Exercises Program



Special advice about home exercise was provided to 80% of participants and 20% were not receive any. Of those who did, 70% of them always do the recommended exercises, 20% did it sometimes and 10% didn't do it at all as shown in figure 4.11.

Figure 4.12: Types of Complications Experienced by the Participants



The patients were asked about if they had any complications after the surgery, 30% answered by yes. Type of complications patients experienced are presented in figure 4.12 above.

4. Discussion:

The majority of the study participants were males (78%) and only 22% were females. According to Abdelnour et al (2023), the male prevalence to disability is higher than females and it is due to factors related to males' exposure to risk factors of disability such as war, accidents, and health related complications. Among the participants, 62% were in the age range of 30-50 years, 30% were in the range of 50-70, and only 8% were aged older than 70. This can be linked to the fact that many of them had the amputation due to combat injuries including but not limited to landmines and gunshots. Combat injury is one of the two most common causes of amputation along with diabetes according to a study conducted in the year 2013 by the researchers Sarvastani and Azam. It is more common in younger age groups who perform activities or have occupations that are more dangerous than the older aged individuals. The term Khartoum city refer to the capital of Sudan and it is divided into three main divisions which are Khartoum, Khartoum north, and Omdurman. In this study many patients came from outside Khartoum city which is indicates that they are more likely don't get access into amputation services outside Khartoum (Abdelnour, 2020). On the same issue, there were 10% of this study didn't attend any rehabilitation services after amputation as shown in figure 4.2.

The study of Bushra *et al* (2023), showed how it is important to manage the phantom pain as one of the post amputation complications. This study showed that patients are doing nothing in management of such complications as showed in figures 4.4, 4.5, 4,6.

The highest percentage of patient education provided to the study participants was from their physiotherapists. The education was about strengthening exercises, stretching exercise, residual limb positioning, trained on the prosthetic

fitting, balance, and gait training, and trained on the application of the bandage. Regarding the patient education and according to Yetzer *et al*. the patient education program should include psychological aspects, phantom limb sensation and pain, type of limb dressing or cast, postoperative pain control, discharge plan, positioning, care of the residual limb, transfer techniques, prosthetic care, and the other foot care (Yetzer *et al*, 1994).

When asked about the home program, 80% of the participants said they were advised to do certain exercises at home but not all of them kept on doing them. Only 69.8 of them were diligent to the exercises, 20% did them sometimes, and 9.3% said they did not do the recommended exercises at all. Adherence to home exercises in rehabilitation is a significant problem. Patients adhere poorly to their prescribed home program and this has been shown to be as high as 50 - 65% for general musculoskeletal conditions. Nonadherence of home program increases the risk of recurrent the health problems or flare-ups with less positive outcomes on the long term. The reasons behind it are many, including -but not limited to- the prescription of too many exercises or advices that the patient cannot remember or find the time to do at home, and the lack of social support, in other words, the patient might not find an assistant to do the exercises with at home (Ritchie & Biggar, 2016).

After the patient education they were exposed to and the home programs they had, the participants were asked about their experience with post- surgical complications, and 30% of them answered by yes. They mentioned different types of complications and the flexion contractures -along with abscess- was the second most occurring complication with a percentage of 27% right after infection which had the highest percentage (33%). Respectively, 7% and 6% of the participants said that they experienced swelling and convulsions. Most of these complications were experienced in a short period of time and were treated within the acute or subacute phase. None of these complications was severe or caused any of the participants a lifelong side effect.

5. Conclusion

The greatest percentage of education that participants were exposed to was from the physiotherapists, followed by education from the surgeons, and the least in amount and effectiveness was of the education they received from other amputees. The participants who received education, had less complications although the difference in the occurrence of complications wasn't greatly remarkable between the participants who received patient education and those who did not.

6. Recommendations

Patient physiotherapy education must be part of the rehabilitation protocol and awareness about it should be required for patient and the rehabilitation team.

7. References

- Abdelnour, H. Abuelgasim, M. Duaa, E. Balsam, A. (2023). Physical Disabilities and Rehabilitation Services in Khartoum State, Sudan. *The International Journal of Humanities & Social Studies,* 11(9): 79-83.
- Bushra, N. Francis, R. Abdelnour, H. Bleedy, N. (2023). Effectiveness of Mirror Therapy for Amputation Patients at National Authority of Prosthesis and Orthosis in Sudan. *Fizjoterapia Polska,* 5(23), 253-257. ISSN: 253-257.
- Correia, J. C., Waqas, A., Aujoulat, I., Davies, M. J., Assal, J. P., Golay, A., & Pataky, Z. (2022). Evolution of therapeutic patient education: a systematic scoping review and scientometric analysis. *International Journal of Environmental Research and Public Health*, 19(10), 6128.
- El-Sayed, E. F., Awadalla, H., Noor, S. K., Elmadhoun, W. M., Sulaiman, A. A., Almobarak, A. O., & Ahmed, M. H. (2018). Sugar intake in Sudanese individuals was associated with some features of the metabolic syndrome: population-based study. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, *12*(3), 245-250.
- Ghazali, M. F., Abd Razak, N. A., Osman, N. A. A., & Gholizadeh, H. (2018). Awareness, potential
- factors, and post-amputation care of stump flexion contractures among transtibial amputees. *Turkish journal of physical medicine and rehabilitation*, *64*(3), 268.
- Idris, M. A., Osman, O. S., Salah, S. E., Latif, M. A., Almobarak, A. O., Badi, S., ... & Ahmed, M. H. (2023). Knowledge, practice and attitude towards foot care among adults living with diabetes in Gadarif State, Eastern Sudan: Cross-sectional study. *Ethics, Medicine and Public Health*, *28*, 100898.
- Truccolo, I., Cipolat Mis, C., Cervo, S., Dal Maso, L., Bongiovanni, M., Bearz, A., ... & De Paoli, P. (2016). Patient-centered cancer care programs in Italy: Benchmarking global patient education initiatives. *Journal of Cancer Education*, *31*, 405-412.
- Sarvastani, A. S., & Azam, A. T., (2013). Amputation: a ten-year survey. *Trauma monthly,* 18,3: 126-129.
- Yetzer E. A., Kauffman G., Sopp F., Talley L. (1994). Development of a Patient Education Program for New Amputees. *Rehabilitation Nursing*. 19(6): 356-357.
- Ibrahim, Y. Y. E. (2018). *Design of Prosthetic Foot Using Computer Aided Design* (Doctoral dissertation, Sudan University of Science and Technology).