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The Medicinal plants (MP) used by patients undergoing hemodialysis in public hemodialysis centers in the Tangier-Tetouan-Al Hoceima (TTA) region and their knowledge of the potential toxicity associated with certain MP.

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INTRODUCTION & AIM

Chronic kidney disease (CKD) in all its stages is a major public health problem. It is expected to become the fifth leading cause of death worldwide by 2040 [1].Due to the observed increase in the incidence and prevalence of End Stage Renal Disease (ESRD), it has been declared as a major public health priority in Morocco [2]. Medicinals plants (MP) are very common in ESRD patients, as they can offer a natural method of reducing side effects [3].However, these plants include active substances that can lead to very serious toxic incidents, ranging from mild digestive problems to more serious damage to organs such as the liver or kidneys [4].Hemodialysis patients, in particular, already suffer from reduced renal function, which could prevent the elimination of the active toxins in certain MP, thereby increasing the risk of nephrotoxicity [5].

To identify the MP used by hemodialysis patients and assess their understanding of the potential toxicities associated with certain MP, an ethnobotanical study was carried out in public hemodialysis centers in the Tangier-Tetouan-Al Hoceima (TTA) region.

METHOD

An ethnobotanical study was carried out between September 2024 and March 2025 to reveal the toxic nature of certain PM , used by ESRD patients in the public hemodialysis centers of the TTA region.

We collected various types of data using a battery of questionnaires from Benkhnigue's " Questionnaire on MP and phytotherapy" (2022) distributed by the investigator in direct contact with patients in the relevant departments. For illiterate patients, however, the questionnaire was completed by the investigator.

In addition, our study sample, made up of patients undergoing ESRD treatment, was divided into 8 stratum, which were combined to form the overall sample (323 patients). SPSS version 27 (Statistical Package for Social Sciences Inc., Chicago, IL, USA) was used for all statistical analyses.

RESULTS & DISCUSSION

The results identified 53 plants belonging to 26 families, with a predominance of Lamiaceaes (10 species **) (Table1).**

Family and species scientific names	Vernacular name	UV	Family and species scientific names	Vernacular name	UV
Aloeaceae :			**Fabaceae:**		
Aloe barbadensis Miller	Alouivera	0,004	Acacia senegal (Gum arabic tree)	A'Simgh Al'Arabi	0,080
Amaranthaceae :			Trigonella foenum-graecum L.	L'Helba	0,012
Beta vulgaris L.	Al'barba	0,012	Lens culinaris	L'Aâdes	0,012
Amaryllidaceae			**Lamiaceae :**		
Allium sativum L.	Thouma	0,092	Rosmarinus officinalis	Azir	0,032
Allium cepa	Al'Basla	0,036	Lavandula angustifolia	Lokhzama	0,040
Anacardiaceae :			Salvia officinalis L.	A'Salmia	0,004
Pistacia lentiscus L.	Drou	0,004	Origanum compactum Bentham	Zaâtar	0,028
Apiaceae :			Mentha spicata L.	A'Naânaâ	0,028
Petroselinum crispum	Maâdnous	0,008	Calamintha officinalis	Mintha	0,012
Carum carvi L	Al'Karouia	0,004	Mentha pulegium L.	Fliou	0,008
Ferula gummosa	Fassoukh	0,004	Origanum majorana L.	Merdedouche	0,004
Ammodaucus leucotrichus	Al'Kamoun Soufi	0,008	Melissa officinalis L.	Mersita	0,008
Pimpinella anisum L.	Habbat halâwa	0,020	Marrubium vulgare L.	Mriwt	0,004
Foeniculum vulgare	Nafaâ	0,004	**Lauracées :**		
Carum carvi L.	Karwiyâ	0,004	Laurus nobilis	Waraq Al'Rand	0,008
Astracées :			Oleum Laurus nobilis	Zit waraq Al'rand	0,008
Inula viscosa	Tirhil	0,004	**Linaceae :**		
Artemisia absinthium L.	Chiba	0,064	Linum usitatissimum	Zriaât Al'Kataan	0,012
Artemisia herba alba	Chih	0,016	**Moracées :**		
matricaria recutita	Al'Babounj	0,024	Ficus carica L.	Karmous	0,004
Cynara cardunculus L.	Alkharshouf albariyu	0,004	**Moringaceae :**		
Cynara scolymus L.	Kherchouf	0,008	Moringa oleifera	Moringa	0,048
Brassicacées:			**Myrtaceae :**		
Lepidium sativum L.	Hab rchad	0,008	Syzygium aromaticum	Al'Qronfel	0,008
Burséracées:			Eucalyptus globulus	Kalitûs	0,004
Boswellia Carterii	Louban A'Dakar	0,004	**Oléacées :**		
Capparaceae:			Olea europaea	Waraq Al'Zaytoun	0,048
Capparis spinose	el kebbar	0,004	**Pedaliaceae :**		
Caryophyllaceae:			Sesamum indicum L.	Zenjlan	0,012
herniaria hirsuta L.	Herast Lhjar	0,016	**Renonculacées:**		
Chénopodiacées :			Nigella sativa	Al'haba Asaoudae	0,048
anserine vermifuge (Chenopodium ambrosioides L.)	M'khinza	0,020	**Rutacées:**		
Cucurbitaceae:			Citrus x limon L.	A'Laymoun	0,024
Citrullus colocynthis	Lhdej	0,008	**Theaceae:**		
Cucurbita Pepo	Zriaât Leqraâ	0,004	Mentha spicata L	Atay	0,016
Verbénacées :			**Zingiberaceae:**		
Verbena officinalis L.	Louiza	0,048	Zingiber officinale	Al'Zanjabil	0,020
			Curcuma longa	Kharkoum	0,008

The present study identified several species, used in ESRD management in the study area, which may be toxic. These include Artemisia absinthium, Artemisia herba alba, Salvia officinalis L. , Nigella sativa , Aloe barbadensis Miller , Citrullus colocynthis, Zingiber officinale,Syzygium aromaticum, Laurus nobilis, anserine vermifuge, Moringa oleifera, Herniaria hirsuta L., Eucalyptus globulus. However, according to the results of this present study, 52% of haemodialysis patients noted that they were unsure about the toxicity of a good number of PM, 46,4% confirmed that plants have no toxic effects, while only 1.6% confirmed that some plants may be toxic (figure 1).

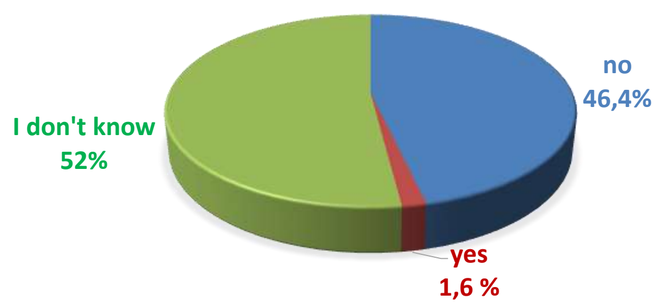

Figure 1: Knowledge of the toxicity of certain PM

In fact, the disorderly use of toxic plants is common, with great ignorance of the associated dangers. As a result, the toxicity of these plants is a neglected issue, and prevention requires increased public awareness [6].

The results also revealed that the majority of respondents use inaccurate and high dosage, and almost half of respondents (42.3%) are not attentive to plant use precautions (figure 2). It should be noted that some plants contain compounds that can rapidly become toxic even in small quantities [7], so inaccurate dosing can easily cause an accumulation of nephrotoxic substances, exacerbating the already impaired renal function of hemodialysis patients [8].

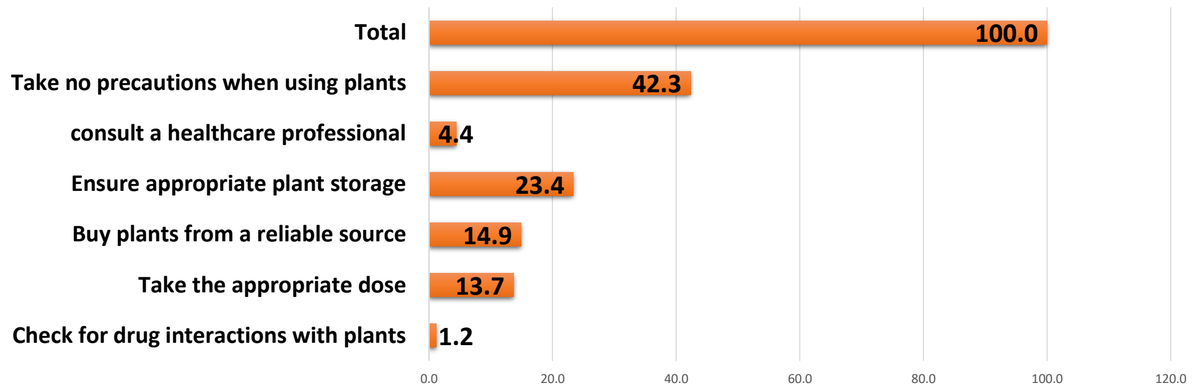

Figure 2 : Precautions for plant use

CONCLUSION

In public hemodialysis centers in the TTA region , our study identified 53 species belonging to 26 families. PM-associated toxicity is often downplayed by patients. This is due to the fact that they rely on imprecise and high dosage, without taking the necessary precautions. In addition, the lack of clinical studies focusing on the adverse effects and toxicity of Plants amplifies the risks associated with herbal medicine. It is therefore essential to consult a health professional before considering any herbal self-medication and to conduct research in this field to ensure safe use.

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FUTURE WORK

- Investigate the satisfaction of hemodialysis patients
- Researche the effect of PM on the treatment of hemodialysis patients