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(RESEARCH ARTICLE)

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Medicinal herbs used by the local peoples in Rajshahi metropolitan area of Bangladesh

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Abstract

The present research aims to record the traditional knowledge of herbaceous plants used by the local peoples in the Rajshahi metropolitan area of Bangladesh. The field surveys were conducted in July 2018 to June 2021. A total of 63 informants (38 male and 25 female) between 19 and 77 years of age were interviewed. A total of 115 species belonging to 94 genera and 40 families were recorded. In this research, ninety-one human diseases were recorded and treated with various plant species and modes of administration. The current investigation will be useful in identifying the medicinal herbaceous vascular species for future research and also beneficial to evolve the herbal medicines.

Keywords: Medicinal herbs; Drug development; Rajshahi metropolitan area; Bangladesh

1. Introduction

A vital role plays of medicinal plants in our day-to-day life and plays a crucial role in the development of the modern health care system. The foundations of typical traditional systems of medicine for thousands of years that have been in existence have formed from plants. The plants remain to offer mankind new medicines. World Health Organization (WHO) decided that 80 per cent of people of developing countries and 70 per cent of people of developed countries use some form of alternative medicines [88]. The use of herbal medicine as one element of alternative medicine is increasing worldwide [84]. Even today, plants are not only indispensable in healthcare but form the best hope source for safe future medicines [85].

Most of the important drugs of the past 50 years, which have revolutionized modern medicinal practice, have been isolated from plants. These chemical ingredients exhibit the therapeutic properties of plant and animal drugs [5]. The WHO endorses and promotes the addition of herbal drugs in national health care programs because they are easily accessible at a price within the reach of a common man and are time tested and thus considered to be much safer than modern synthetic drugs [86].

The importance of medicinal herbs and their local uses have been documented in previous works in Bangladesh by [2], [6-12], [13-21], [22-61], [62-83] and [93-98]. The objectives of the current research are to identify and uses traditional knowledge of herbaceous vascular taxa in the Rajshahi metropolitan area of Bangladesh.

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2. Material and methods

2.1. Study area

Geographical position and climate in Rajshahi metropolitan area: Rajshahi is situated at 24.1500°N and 89.0667°E. Soil: Soil water suspension measured by glass electrode PH meter. This is the best soil for the growth of various plants. The winter season (November-January) is cool and has little rainfall; the summer season (April-October) is warm and has rainfall. The maximum monthly temperature can reach up to 39.9°C during April and the minimum monthly temperature 5.8°C during January [4].

2.2. Methodology

The present researches were documented in the medicinal herbaceous taxa of the Rajshahi metropolitan area, Bangladesh from July 2018 to June 2021. A total of 115 species belonging to 94 genera under 40 families were recorded. Medicinal information was obtained through semi-structured interviews with knowledgeable informants. A total of 63 informants (38 male and 25 female) between 19 and 77 years of age were interviewed [3]. Plant parts with either flowers or fruits were collected using traditional herbarium techniques to make voucher specimens for documentation and voucher specimens have been preserved at Herbarium of Rajshahi University.

2.3. Identification

Collected specimens have been examined, studied and identified. Identifications have been confirmed by consulting standard literature [1], [89] and [92]. Nomenclature has been updated following recent literature [1], [90] and [91].

3. Results

This research documented 115 species belonging to 94 genera and 40 families based on medicinal information used by the local people in the Rajshahi metropolitan area. The herbaceous medicinal plants were focused on their uses for the cure of 91 diseases.

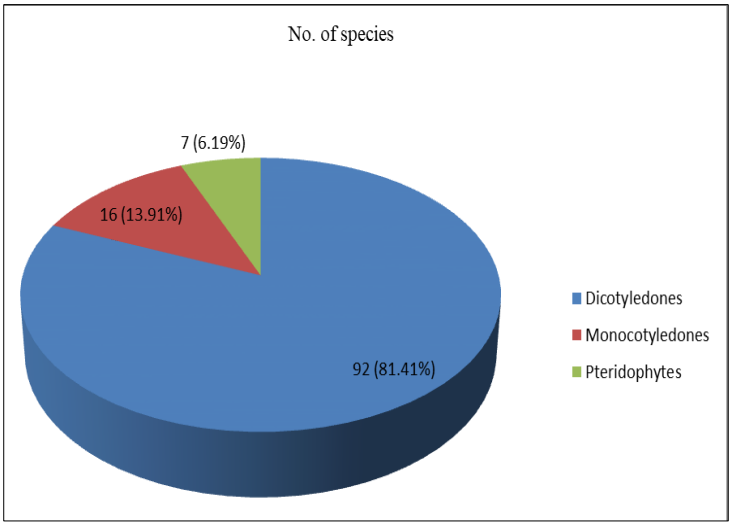

Figure 1 Recorded group wise medicinal plants were used in the study area

The medicinal plants are used by the local people to cure following the diseases like abscess, alopecia, anemia, arthritis, asthma, asthmatic bronchitis, backbone pain, bleeding, blood pressure, boils, bronchitis, burning sensation, cholera, chronic rheumatism, cold, colic, constipation, cough, cuts, diabetes, diarrhea, diuretic, dog-bite, dysentery, dyspepsia, earache, eczema, elephantiasis, excessive menstrual discharges, eye disease, fever, flu, fracture, gastric problems, gonorrhea, gout, hair disease, hallucination, headache, herpes, hiccup, high blood pressure, hyperacidity, hypertension, indigestion, inflammation, influenza, injuries, insect-bite, intestinal disorder, itches, jaundice, kidney disease, leprosy, leucoderma, lice-bite, lip sore, liver disease, loose motion, lung infection, malaria, menstrual disease, mouth ulcers, nervous affections, pain, piles, psoriasis, rheumatism, ringworm, scabies, skin disease, smallpox, snake-bite, sore, spleen disorder, stomach pain, stomachache, swelling, syphilis, toothache, tumors, typhoid, ulcers, urinary disease, vermifuge, vomiting, weakness of pregnant mother, whooping cough, worm and wound.

The majority of plants belonged to Asteraceae (24 species), Amaranthaceae (8 species), Euphorbiaceae (8 species), Acanthaceae (6 species), Araceae (5 species), Fabaceae (4 species), Malvaceae (3 species), Caesalpiniaceae (3 species), Solanaceae (3 species), Poaceae (3 species), Liliaceae (3 species), Zingiberaceae (3 species), Chenopodiaceae (2 species), Molluginaceae (2 species), Onagraceae (2 species), Oxalidaceae (2 species), Polygonaceae (2 species), Pteridaceae (2 species), and 20 families included only one species (Table 1).

Out of 115 herbaceous species, 81.41% species were Dicotyledones, 13.91% species were Monocotyledons and 6.19% species were Pteridophytes (Table 1; Figure 1). Different plant parts of different spp. are used as medicine for treating various diseases like leaf 48.69% followed by whole plant (28.69%), root (20.86%), seed (8.69%), flower (4.34%), corm (3.47%), latex (1.73%), fruit (1.73%), bulb (1.73%), frond (1.73%), rhizome (1.73%) and tuber (0.86%) (Figure 2).

Out of 40 families, Asteraceae (20.86%), Amaranthaceae (6.95%), Euphorbiaceae (6.95%), Acanthaceae (5.21%), Araceae (4.34%), Fabaceae (3.47%), Solanaceae (2.60%), Caesalpiniaceae (2.60%), Malvaceae (2.60%), Liliaceae (2.60%), Poaceae (2.60%) and Zingiberaceae (2.60%) were families dominant in the study area (Figure 3). Out of 91 categories of diseases, cough (15.62%), skin disease (15.62%), wound (14.78%), fever (13.91%), dysentery (12.17%), diarrhoea (8.69%), stomachache (8.69%), constipation (7.82%), asthma (6.08%) and bronchitis (6.08%) was dominant diseases in the study area (Figure 4).

Table 1 Herbaceous medicinal plants are used by the local people in Rajshahi metropolitan area of Bangladesh

Scientific name and family	Local name	Parts used	Diseases and modes of administration
Achyranthes aspera L. (Amaranthaceae)	Apang	Leaf, seed, root	Cholera: Root powder mixed with water is taken internally. Piles: Seed power mixed with water is taken orally. Skin disease: Leaf paste is taken externally.
Ageratum conyzoides L. (Asteraceae)	Ochunti	Leaf, whole plant	Cuts and wounds: Leaf paste is taken externally. Skin disease: Leaf and stem paste is taken externally. Jaundice and fever: Fresh leaf juice is taken orally.
Argemone mexicana L. (Papaveraceae)	Shial kanta	Root, seed	Jaundice: Root extract is used orally. Skin disease: Root paste is used externally.
Aerva sanguinolenta L. (Amaranthaceae)	Karadia	Leaf, flower	Bronchitis, asthma and jaundice: Dry leaves and flowers are used internally.
Aerva lanata (L.) Juss. ex Schult (Amaranthaceae)	Chaya	Whole plant, flower	Wounds and injuries: Whole plant and flower paste are taken externally. Headache, cough and sudden swellings, diuretic, vermifuge: Whole plant juice is taken internally.
Alternanthera sessilis R.Br. ex Roem & Schult (Amaranthaceae)	Sachi shak	Whole plant, root	Hair treatment: Whole plant paste is taken externally. Eye disease: Root juice is taken internally.
Amaranthus spinosus L. (Amaranthaceae)	Kanta notey	Root	Eczema, gonorrhoea: Root paste is taken externally. Dysentery: Root juice mixed with sugar is taken orally. Diarrhoea: Root juice mixed with tea is taken twice daily.
Amaranthus lividus L (Amaranthaceae)	Gobura notey	Leaf, root	Abscess, boils and burns: Leaves and root decoction is taken externally. Dysentery: Root juice mixed with sugar is taken orally.
Amaranthus viridis L. (Amaranthaceae)	Gaikhura, Shaknotey	Whole plant	Burning sensation, hallucination, leprosy, bronchitis, piles, leucorrhoea and constipation: Curry made from whole plant is taken internally.
Abutilon indicum (L.) Sweet (Malvaceae)	Petari	Whole plant	Leprosy, ulcers, headache, and gonorrhoea: Whole plant paste is taken externally.
Anagallis arvensis L. (Primulaceae)	Pakhi chosha	Leaf	Fever and headache: The juice of leaves is used internally.

Alysicarpus vaginalis DC. (Fabaceae)	Pan nata	Root, seed	Cough: Decoction of root is taken internally. Dysentery and colic: Infusion of the powdered seeds is applied internally.
Acalypha indica L. (Euphorbiaceae)	Mukta jhuri	Root, leaf	Tumours: Pill made from roots is taken internally. Arthritis and scabies: Fresh leaf juice taken orally. Ringworm: Leaf paste with lime juice is taken internally. Earache: Leaf decoction is applied internally.
Andrographis paniculata (Burm.f.) Wall ex Nees (Acanthaceae)	Kalomegh	Leaf	Leprosy: Leaf paste is taken externally. Lung infection: Leaf juice is taken internally.
Allium cepa L. (Liliaceae)	Piaj	Bulb	Cough: A medium sized bulb is kept in hot ash for 10-20 min and eaten with a teaspoonful of honey.
Allium sativum L. (Liliaceae)	Rosun	Bulb	Hyperacidity: Leaf bulb is eaten raw in empty stomach, early in the morning for 15 days.
Alocasia macrorrhizos (L.) G Don in Sweet (Araceae)	Mankachu	Root, corm	Snake-bite: Paste made from root stalk mixed with honey is applied externally. Constipation: Vegetable made from corm is taken internally.
Amorphophallus campanulatus (Roxb.) Blume ex Decne (Araceae)	Olkachu	Corm	Constipation, piles, dyspepsia, inflammation, tumours, elephantiasis, rheumatism and anaemia: Curry made from corms is taken internally.
Asperagus resemosus L (Liliaceae)	Satamuli	Root	Blood pressure, ulcers: Juice of fresh root is applied internally.
Adiantum caudatum Klotzsch (Pteridaceae)	Biddapata	Frond	Diabetes, cough and fever: The frond is taken internally. Skin disease: Paste of frond is taken externally.
Adiantum raddianum C.Presl (Pteridaceae)	Biddapata	Frond	Skin disease: Paste of frond is taken externally.
Ampleopteris prolifera (Retz.) Copel. (Thelypteridaceae)	Dhekia	Leaf	Weakness of pregnant mother: Leaf juice is taken internally.
Boerhaavia diffusa L (Nyctaginaceae)	Punor nova	Leaf	Anaemia and liver disease: Leaf juice is taken orally.
Barleria prionitis L. (Acanthaceae)	Kanta Janti	Leaf	Skin disease: Leaf paste is applied externally. Whooping cough, inflammation: Leaf juice is taken orally.
Blumea lacera (Burm.f) DC. (Asteraceae)	Kuksim	Leaf, root	Piles and diuretic: Leaf juice is taken orally. Cholera and dysentery: Root juice mixed with pepper is applied internally.
Brassica napus L. (Brassicaceae)	Sarisha	Seed	Cough and cold: Oil extract from seed mixed with onion is applied externally.
Chrozophora rottleri (Geiseler) A. Juss.ex Spreng (Euphorbiaceae)	Khudi okra	Whole plant	Wound: Whole plant paste is taken externally.
Croton bonlandianus Baill. (Euphorbiaceae)	Banjhal	Leaf, seed, latex	Cough: Leaf juice is taken orally. Eczema and ringworm: Seed paste is externally applied. Cuts and wound: Latex is applied externally.
Chenopodium album L. (Chenopodiaceae)	Batua shak	Whole plant	Stomach-ache: Curry made from whole plant is taken internally.

Chenopodium ambrosioides L (Chenopodiaceae)	Ban botua	Leaf	Eczema: Leaf paste is taken externally.
Celosia argentea L. (Amaranthaceae)	Morog phul	Flower, seed	Excessive menstrual discharges: Flower extracts is used in internally. Dysentery: Decoction of the seeds with sugar is prescribed against dysentery.
Cleome viscosa L. (Capparaceae)	Holde hurhurey	Leaf	Headache: Paste of leaves is taken externally.
Centella asiatica (L.) Urban (Apiaceae)	Thankuni	Whole plant	Loose motion, dysentery and stomach pain, indigestion: Whole plant paste is taken internally.
Cirsium arvense (L.) Scop. (Asteraceae)	Shial-kata	Root	Toothache: The root has been chewed as a remedy for toothache. Worms: A decoction of the roots has been used to treat worms.
Chromolaena odorata (L.) King & Robin (Asteraceae)	Germanlata	Leaf	Colds and flu: Juice of leaves mixed with honey is taken internally.
Curcuma longa L. (Zingiberaceae)	Holud	Rhizome	Wounds: Paste made from rhizome is taken externally.
Curcuma zedoaria (Christ) Rose (Zingiberaceae)	Shati	Whole plant	Inflammation, pain, and skin disease, wounds: Whole plant paste is taken externally. Menstrual irregularities and ulcers: Whole plant juice is taken orally.
Colocasia esculenta (L.) Schott. (Araceae)	Kachu	Whole plant, corm	Alopecia: Corm juice is taken externally. Constipation, diarrhoea: Vegetable made from whole plant is taken internally.
Colocasia gigantea (Blume) Hook. f. (Araceae)	Salad Kachu	Leaf	Constipation: Curry made from leaves is taken internally.
Commelina benghalensis L. (Commelinaceae)	Kanchira	Leaf	Chronic rheumatism, psoriasis and chronic skin eruption: Leaf juice is taken externally.
Cyperus rotundus L. (Cyperaceae)	Mutha Ghas	Tuber, root	Fever, diarrhoea: Decoction of tuber is taken internally. Wound and sore: Root paste is applied externally.
Cynodon ductylon (L.)Pers. (Poaceae)	Durba ghas	Whole plant	Cuts and wounds: Paste of whole plant is applied externally. Diarrhoea and piles: Decoction of whole plant is applied internally.
Desmodium triflorum (L.) DC. (Fabaceae)	Kodalia	Leaf, root	Dysentery, rheumatism and fever: Leaf juice is applied orally. Stomach-ache and skin problems: A decoction of the roots is used internally.
Digera muricata L. (Amaranthaceae)	Gunga tiay	Whole plant	Kidney stone and urinary tract disorders: Whole plant juice is taken internally.
Diplazium esculentum (Rretz.)Sw. (Athyriaceae)	Dhekia Shak	Leaf	Weakness of pregnant mother: Leaf juice is taken internally.
Enhydra fluctuans Lour. (Asteraceae)	Helencha	Leaf	Fever and typhoid: Curry made from leaves is taken internally. Bronchitis, inflammation, nervous affections: Leaves juice is taken internally.
Eclipta alba (L.) Hassk (Asteraceae)	Kalokeshil	Whole plant	Hair disease and skin disease: Whole plant paste is taken externally. Jaundice, fevers, and sores: Juice of whole plant is taken orally.
Euphorbia helioscopia L. (Euphorbiaceae)	Mahabi	Seed, latex	Cholera: Seeds are given with roasted pepper is taken internally.

Euphorbia hirta L. (Euphorbiaceae)	Dhudiya	Whole plant	Dysentery and Diarrhoea: Whole plant juice is taken internally. Lip sore: Latex is applied externally.
Euphorbia thymifolia L. (Euphorbiaceae)	Choto dhuhia	Whole plant	Worm: Whole plant juice is taken orally.
Exacum pedunculatum L. (Gentianaceae)	Chirattam	Whole plant, leaf	Diabetes: Whole plant juice is taken orally. Skin disease: Leaf paste is taken externally.
Emilia sonchifolia (L.) DC. (Asteraceae)	Mechitra	Whole plant	Piles and fever: Crush of whole plant juice mixed with butter milk is taken internally.
Eleusine indica (L.)Gaerth (Poaceae)	Malan kuri	Whole plant	Fracture: Paste of whole plant is taken externally. Liver disorder: Whole plant extract is applied internally.
Fumaria indica Lamk (Fumariaceae)	Ban salpha	Whole plant	Kidney disease and vomiting: whole plant decoction is taken internally.
Glinus oppositifolius L (Mulloginaceae)	Gimma shak	Leaf	Constipation, stomachic: Curry made from leaves is taken internally. Itches, skin disease: Paste of leaves is taken externally.
Gnaphalium luteo-album L. (Asteraceae)	Barakamra	Leaf	Intestinal disorder: Slightly warmed juice of the leaves mixed with a little salt is used orally.
Gnaphalium polycaulon Pers. (Asteraceae)	Barakamra	Whole plant	Backbone pain: Whole plant paste is taken externally.
Grangea maderaspatana (L.) Poir. (Asteraceae)	Namuti	Leaf	Stomachic: The juice of leaves is taken internally. Earache: Leaf juice is applied externally.
Gomphrena globosa L. (Amaranthaceae)	Botamful	Leaf	Cough, diabetes and hypertension: Decoction of leaves is applied internally.
Heliotropium indicum L. (Boraginaceae)	Hatisur	Whole plant	Dog bite, insect bite: Whole plant juice is taken externally.
Helianthus annuus L. (Asteraceae)	Surjamukhi	Seed	Heart disease: Oil extract from seeds is applied internally.
Hemigraphis hirta (Vahl.) T. Anderson (Acanthaceae)	Buri pana	Leaf	Mouth ulcers: Leaves are chewed with betel is taken orally.
Hyptis suaveolens (L) Poit.(Lamiaceae)	Tokma	Leaf	Fever: Leaf juice is taken orally.
Hygrophila schulli (Buch-Ham) M.R & . M.Almeida (Acanthaceae)	Kulekharha	Leaf	Rheumatism and pain: Paste of leaves is applied externally.
Ludwigia adscendens (L.) Hara (Onagraceae)	Kesordam	Leaf, whole plant	Dysentery: Leaf juice is taken internally. Skin disease: Whole plant paste is applied externally.
Ludwigia perennis L. (Onagraceae)	Kesordam	Whole plant	Fever: Decoction of whole plant is taken orally. Wound, fracture, and headache: Paste of whole plant is applied externally.
Leucas aspera (Wlld.) Link (Lamiaceae)	Dondo kolosh	Leaf	Chronic rheumatism: Leaf juice is taken internally.
Leonurus sibiricus L. (Lamiaceae)	Roktodron	Leaf	Menstrual disease: Leaf juice is taken orally.
Launaea aspleniifolia DC. (Asteraceae)	Tikchana	Leaf	Wounds and skin disease: Leaf paste is taken externally.
Lygodium flexuosum (L.) Sw. (Lygodiaceae)	Dhekia	Root	Rheumatism, scabies, eczema and wounds: Paste of root is taken externally.

Marselia minuta L. (Marsileaceae)	Susnishak	Leaf	Cough, bronchitis: Decoction of Leaf mixed with ginger is taken internally.
Marselia quadrifolia L. (Marsileaceae)	Susnishak	Leaf	Cough, bronchitis: Decoction of Leaf mixed with ginger is taken internally.
Mollugo pentaphylla L. (Mulloginaceae)	Gima, Gima-sak	Whole plant	Asthma, earache: Leaf extract is taken internally.
Melilotus indica (L.) All (Fabaceae)	Ban methi	Seed	Diarrhoea: The seed is made into gruel and is used internally.
Nicotina plumbaginifolia Viv. (Solanaceae)	Bantamak	Leaf	Stomach pain: Juice of leaf is taken internally.
Oxalis corniculata L (Oxalidaceae)	Amrul	Leaf, flower	Fever, influenza, and diarrhoea: Leaf and flower juice is taken internally.
Oxalis rubra L. (Oxalidaceae)	Boro amrul	Whole plant	Influenza, fever, urinary tract infections, and diarrhoea: Whole plant juice is taken internally.
Pouzolzia indica (L.) Bennet (Urticaceae)	Pouzolzia	Whole plant	Dysentery, urinary problem and fever: Whole plant juice taken orally. Cuts and wounds: Whole plant paste is taken externally.
Portulaca oleracea L. (Portulacaceae)	Nuniashak	Leaf	Skin disease, boils, eczema, insect-bite, burns, wound, and inflammation: Leaf paste is taken externally.
Persicaria hydropiper L. (Polygonaceae)	Pani morich	Flower	Gout: The Juice of flowers is taken externally.
Persicaria orientalis (L.) Spach (Polygonaceae)	Boro panimorich	Leaf	Lice-bite: Leaf juice is taken externally.
Phyllanthus niruri L. (Euphorbiaceae)	Bhuiamla	Whole plant	Cough, dysentery, diabetes: Whole plant juice mixed with honey is taken orally.
Phyllanthus urinaria L (Euphorbiaceae)	Hajarmani	Leaf	Constipation, hiccup, and cough: Leaf juice is applied internally.
Physalis minima L. (Solanaceae)	Kopal phutki	Leaf, fruit	Earache: Leaf juice mixed with mustard oil is taken internally. Gonorrhoea and spleen disorder: Fruits are taken orally.
Phyla nodiflora (L.) Greene (Verbenaceae)	Bhuiokra	Whole plant, root	Fevers, coughs and cold: Whole plant juice is taken internally. Gastric problems: Root juice is taken orally.
Parthenium hysterophorus L. (Asteraceae)	Gandibooti	Leaf	Fever and cough: The juice of leaves is applied orally.
Ranunculus scleratus L. (Runanculaceae)	Potika	Whole plant	Wounds, Leucoderma and Scabies: Whole plant paste is taken externally.
Rauvolfia serpentina (L.) Benth ex Kurz (Apocynaceae)	Sarpa gandha	Root	High blood pressure, dysentery: Root extract is applied internally.
Ruellia tuberosa L. (Acanthaceae)	Chatpoty	Root	Kidney disease, diuretic, syphilis, diabetes, and gonorrhoea: A decoction of dried and powered root is applied internally.
Rungia pectinata (L.)Nees in DC. (Acanthaceae)	Pindi	Leaf	Smallpox: Juice of leaves is taken externally. Pain and swelling: Bruised leaves are applied externally.

Rorippa indica (L.) Hiern (Brassicaceae)	Bansarisha	Seed	Asthma: Seeds are laxative and applied for treatment of asthma.
Raphanus sativus L. (Brassicaceae)	Mula	Root	Piles and urinary disease: Extract of root is applied internally.
Senna sophera L Roxb. (Caesalpiniaceae)	Kalka sundha	Leaf	Fever, ringworm: A crushed leaf Juice is given internally.
Senna tora L. (Caesalpiniaceae)	Chakunda	Leaf	Constipation, stomach-ache: The juice of leaf is taken internally.
Senna occidentalis L. (Caesalpiniaceae)	Barachal kasunda	Leaf, root	Ringworms: leaf juice is applied internally. Wounds, skin disease and burns: Root paste is taken externally.
Sida cordata (Burm.f) Bross. (Malvaceae)	Junka	Leaf	Asthmatic bronchitis: Leaf juice is taken internally.
Solanum nigrum L. (Solanaceae)	Titbegun	Whole plant	Skin disease: Whole plant paste is taken externally. Liver disease, piles and dysentery: Whole plant juice is taken internally.
Sonchus asper (L.) Hill (Asteraceae)	Banpalang	Root, leaf	Jaundice, cough, and bronchitis, asthma: Root juice is taken internally. Swellings: Leaf juice is applied externally.
Spilanthes calva DC. (Asteraceae)	Marhatatiga	Leaf	Scabies: Leaf juice is taken externally. Toothache: Leaf extract is taken orally.
Synedrella nodiflora (L.) Gaertn (Asteraceae)	Gunjoni vutraj	Leaf	Stomach-ache: Leaf juice is taken orally.
Tagetes erecta L. (Asteraceae)	Gadaphul	Leaf	Cuts and wounds: Leaf juice is applied externally.
Tagetes patula L. (Asteraceae)	Genda	Leaf	Cuts and wounds: Leaf juice is taken externally.
Tridax procumbens L. (Asteraceae)	Tridhara	Leaf	Cuts and bleeding, hair fall: Leaf paste is taken externally. Bronchial catarrh, dysentery, and diarrhoea: Leaf juice is taken internally.
Trapa bispinosa Roxb. (Trapaceae)	Paniphal	Fruit	Bleeding: The power of the fruits is taken externally.
Typhonium trilobatum (L.) Schott. (Araceae)	Ghet Kochu	Corm	Piles, cough, asthma, vomiting, and ulcers: Curry made from corms is applied internally. Abscess and snake-bite: Paste of corm is applied externally.
Urena lobata L. (Malvaceae)	Bon okra	Root	Diuretic and colic: Root juice is taken internally.
Uraria picta (Jacq.) Desv (Fabaceae)	Shankar Jata	Whole plant	Fracture: Whole plant paste is taken externally. Cough, common cold, asthma and bronchitis: Whole plant juice is applied orally.
Vernonia cinerea (L.) Less (Asteraceae)	Kuksim	Root	Excessive menstruation: The paste of root is used in control excessive menstruation.
Vernonia patula (Aiton.) Merrill. (Asteraceae)	Shialmutra	Leaf, root, whole plant	Herpes, eczema, ringworm: Leaf juice is taken externally. Diarrhoea, stomach-ache: Decoction of root is taken internally. Piles, malaria: Whole plant juice is taken orally.
Vetiveria zizanioides (L.) Nash in Small (Poaceae)	Binna gash	Leaf, root	Skin disease: Leaf paste is taken externally. Nervous system, ringworm, indigestion: Root juice is taken internally.

Wedelia trilobata (L.) Hitchc (Asteraceae)	Keshraj	Whole plant, leaf, root	Hair fall and headache: Whole plant paste is taken externally. Stomachic: Root and leaf juice is taken internally.
Wedelia chinensis (Osbeck) Merr. (Asteraceae)	Moha vringoraj	Leaf	Skin diseases, alopecia: Leaf paste is taken externally. Hair tonic, cough: Fresh leaf juice is taken internally. Vomiting: Leaf juice mixed with salt is taken orally.
Xanthium indicum J. Koening ex Roxb. (Asteraceae)	Hagra	Stem, whole plant	Diabetes: Curry made from young leaf is applied internally. Urinary problems: Decoction of whole plant is taken internally.
Xanthosoma violaceum Schott. (Araceae)	Dudh Kachu	Leaf	Constipation: Curry made from young leaves is taken internally.
Zingiber officinale Rose (Zingiberaceae)	Ada	Rhizome	Cough and cold: Juice of rhizome mixed with tea is taken orally.

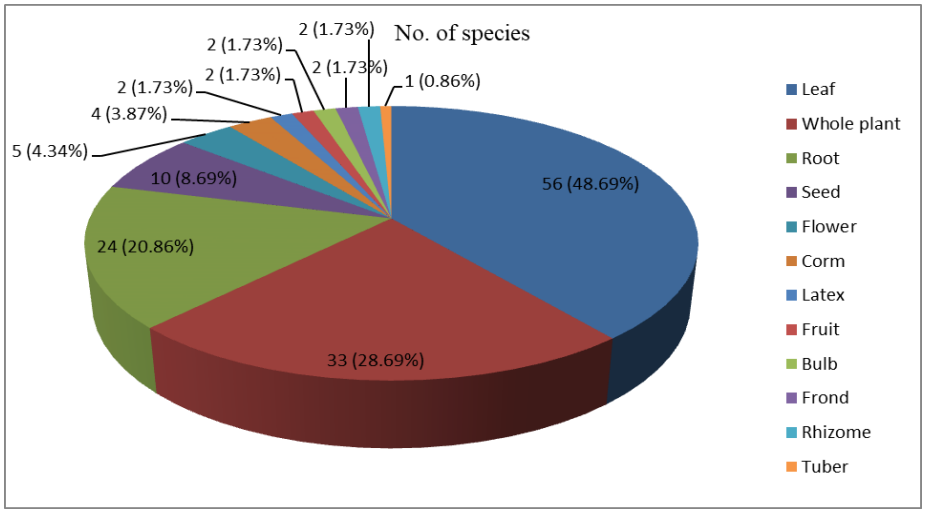

Figure 2 Recorded plant parts used as medicinal purposes

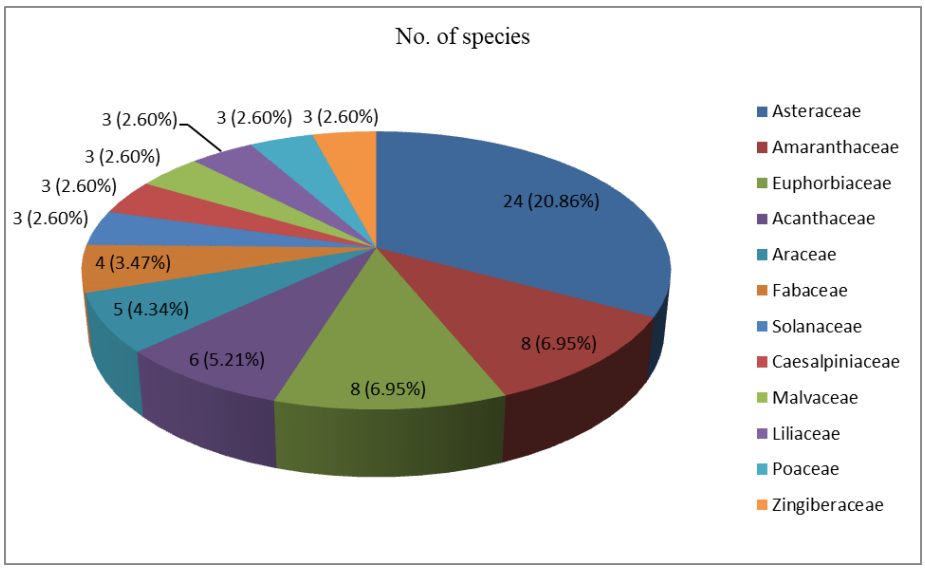

Figure 3 Recorded dominant plant families used as medicine

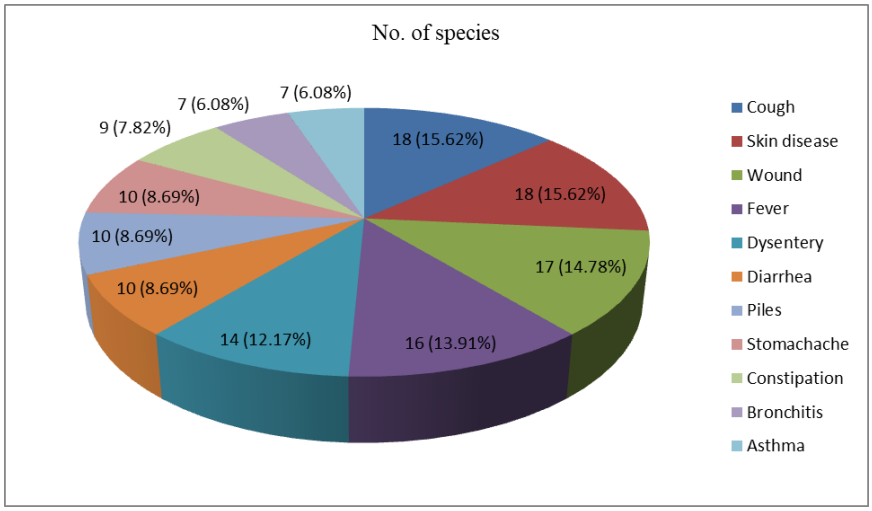

Figure 4 Recorded dominant diseases in the study area

4. Discussion

Medicinal herbs used by the local peoples in Rajshahi metropolitan area of Bangladesh were carried out from July 2018 to June 2021. A total of 115 medicinal herbaceous species belonging to 94 genera and 40 families were recorded. The documented medicinal information is comparable with the result of other studies in Abroad and Bangladesh. In Kenya, a total of 66 plant species under 58 genera belonging to 36 families were reported as medicinal values [99].In India, a total of 40 plant species 37 genera and 28 families were recorded for medicinal purposes [104]. In Pakistan, A total of 150 medicinal plants belonging to 98 genera and 60 families were documented [100]. In Nigeria, A total of one hundred and three (103) medicinal species belonging to fifty-two (52) families were identified [101]. In Ethiopia, 47 medicinal plant species belonging to 23 families were reported by the traditional healers for the treatment of various human ailments [103]. In Pakistan, a total of 81 plants are recorded as medicinal belonging to 45 families and 75 genera [102]. In Bangladesh, A total of 86 plant taxa belonged to 84 genera under 46 families were recorded in Garo ethnic community, Tangail [2]. A total of 111 species under 93 genera of 53 families have been documented which are used for the treatment of various diseases [105]. A total of 70 medicinal plant species under 36 families were recorded in the Bandarban district [106].

Similar results of other studies in Bangladesh like Rahman [9-18] were documented that *Achyranthes aspera* L., *Ageratum conyzoides* L., *Argemone mexicana* L., *Amaranthus spinosus* L., *Amaranthus viridis* L., *Acalypha indica* L., *Andrographis paniculata* (Burm.f.) Wall ex Nees, *Allium cepa* L., *Amorphophallus campanulatus* (Roxb.) Blume ex Decne, *Boerhaavia diffusa* L., *Blumea lacera* (Burm.f) DC., *Croton bonlandianus* Baill., *Cirsium arvense* (L.) Scop., *Curcuma zedoaria* (Christ) Rose, *Colocasia esculenta* (L.) Schott., *Cyperus rotundus* L., *Enhydra fluctuans* Lour., *Eclipta alba* (L.) Hassk., *Glinus oppositifolius* L., *Helianthus annuus* L., *Ludwigia perennis* L., *Rauvolfia serpentina* (L.) Benth ex Kurz, *Solanum nigrum* L., *Spilanthes calva* DC., *Vernonia patula* (Aiton.) Merrill., *Wedelia trilobata* (L.) Hitchc, *Xanthium indicum* J. Koening ex Roxb. and *Zingiber officinale* Rose have various medicinal values.

The leaves of *Achyranthes aspera* L., *Ageratum conyzoides* L., *Aerva sanguinolenta* L., *Amaranthus lividus* L., *Andrographis paniculata* (Burm.f.) Wall ex Nees, *Boerhaavia diffusa* L., *Croton bonlandianus* Baill., *Chenopodium ambrosioides* L., *Chromolaena odorata* (L.) King & Robin, *Exacum pedunculatum* L., *Grangea maderaspatana* (L.) Poir., *Hemigraphis hirta* (Vahl.) T. Anderson, *Leucas aspera* (Wlld.) Link, *Oxalis corniculata* L, *Portulaca oleracea* L., *Rungia pectinata*(L.)Nees in DC., *Vernonia patula* (Aiton.) Merrill., *Wedelia trilobata* (L.) Hitchc. are used for the treatment of skin disease, cuts, wounds, bronchitis, asthma, jaundice, abscess, boils,burns,leprosy, lung infection, cough, eczema, cold, flu, stomachache, earache, mouth ulcer, chronic rheumatism, fever, influenza, diarrhea,insect-bite,inflammation, smallpox, herpes, ringworm, alopecia, hair disease and vomiting. Similar results were found like [19-37] and [93-98].

Argemone mexicana L., *Ageratum conyzoides* L., *Adiantum caudatum* Klotzsch ,*Eclipta alba* (L.) Hassk, *Sonchus asper* (L.) Hill, *Solanum nigrum*L., *Launaea aspleniifolia* DC.,*Wedelia chinensis* (Osbeck) Merr. are useful for jaundice and skin disease [51-70]. *Alysicarpus vaginalis* DC., *Desmodium triflorum* (L.) DC.,*Euphorbia hirta*L., *Exacum pedunculatum* L., *Melilotus indica* (L.) All, *Pouzolzia indica* (L.) Bennet, *Tridax procumbens* L.are useful for diarrhoea, diabetes and dysentery [38-50]. Related diseases were found in the present investigation.

Similar results of other research in Bangladesh like Rahman *et al.* [29-33] reported that roots of *Achyranthes aspera* L., *Argemone mexicana* L., *Alternanthera sessilis*R.Br. ex Roem & Schult, *Amaranthus spinosus* L., *Amaranthus lividus* L., *Acalypha indica* L., *Alocasia macrorrhizos* (L.) G Don in Sweet, *Asperagus resemosus* L., *Blumea lacera* (Burm.f) DC., *Cirsium arvense* (L.) Scop., *Cyperus rotundus*L., *Lygodium flexuosum*(L.) Sw. *Rauvolfia serpentina* (L.) Benth ex Kurz, *Ruellia tuberosa* L., *Senna occidentalis* L., *Sonchus asper* (L.) Hill, *Urena lobata* L., *Vernonia cinerea* (L.) Less., *Vetiveria zizanioides* (L.) Nash in Small are used for cholera, jaundice, eye disease, eczema, gonorrhea, diarrhea, dysentery, tumors, snake-bite, blood pressure, ulcer, toothache, worms, wound, sore, rheumatism, scabies, eczema, kidney disease, diuretic, syphilis, diabetes, ringworm, burns, skin disease, cough, bronchitis, asthma, colic, nervous system, indigestion and excessive menstruation.

Aerva lanata (L.) Juss. ex Schult, *Chrozophora rottleri* (Geiseler) A. Juss.ex Spreng, *Eclipta alba* (L.) Hassk, *Ranunculus scleratus* L., *Tagetes erecta* L., *Wedelia chinensis* (Osbeck) Merr. whole plant pasteis used for cuts, injuries, wounds, scabies, itches, eczema and other skin diseases [71-83]. Rahman et al. [21-24] reported that corms of *Alocasia macrorrhizos* (L.) G Don in Sweet ,*Amorphophallus campanulatus* (Roxb.) Blume ex Decne, *Colocasia esculenta* (L.) Schott., *Colocasia gigantea* (Blume) Hook.f., *Typhonium trilobatum* (L.) Schott.are used for piles and constipation. Comparable diseases were highlighted in this research.

The current research recommends that the herbaceous species contain other phyto-chemical constituents which need to be investigated in future. Similar research works were compared by [2], [6-12], [13-21], [22-61], [62-83] and [93-98]. The observation discusses that the local peoples were used medicinal herbs as their primary health care. The present paper is useful for further researches in the field of phytochemistry, ethnobotany, taxonomy and development of the newer drug from herbaceous vascular species.

5. Conclusion

Medicinal herbaceous vascular taxa were recorded in the Rajshahi metropolitan area of Bangladesh. A total of 115 medicinal herbaceous species belonging to 94 genera and 40 families were recorded. Out of the recorded species, 92 species were Dicotyledones, 16 species were Monocotyledons and 7 species were Pteridophytes. Asteraceae, Amaranthaceae, Euphorbiaceae, Acanthaceae, Araceae and Fabaceae were dominant families used for medicinal purposes. The medicinal plants are used by the local people to cure 91 diseases. Out of recorded diseases, cough, skin disease, wound, fever, dysentery, diarrhea, stomachache, constipation, asthma and bronchitis was dominant diseases in the study area. The medicinal herbaceous species which are being used by the local peoples of the study area are not only cost-efficient but also shows a prominent potential in curing various types of diseases. Now a day's population is increasing in the area, young generation tends to renounce their traditional lifestyle accordingly, mush of this wealth of knowledge is being lost as the traditional culture is disappearing. Consequently, documentation of traditional practices of herbal medicine will be continuity in the future generation.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that there are no conflicts of interests.

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