

APPENDIX 1
Article authorship and citations according to language

Language	<i>TP</i>	%	<i>AU</i>	<i>APP</i>	<i>TC</i> ₂₀₁₉	<i>CPP</i> ₂₀₁₉
English	7 514	99.7	53 798	7.2	53 798	7.2
German	13	0.172	45	3.5	45	3.5
French	6	0.0796	20	3.3	20	3.3
Chinese	2	0.0265	15	7.5	15	7.5
Russian	2	0.0265	10	5.0	10	5.0
Turkish	2	0.0265	9	4.5	9	4.5

TP: number of publications; *AU*: number of authors; *APP*: number of authors per publication; *TC*₂₀₁₉: the total number of citations from Web of Science Core Collection since publication to the end of 2019; *CPP*₂₀₁₉: number of citations (*TC*₂₀₁₉) per publication (*TP*).

APPENDIX 2
Yearly distribution of articles, authors, pages and references for Sudanese articles

Year	<i>TP</i>	<i>AU</i>	<i>APP</i>	<i>NR</i>	<i>NR/TP</i>	<i>PG</i>	<i>PG/TP</i>
1923	1	1	1.0	0	0	9	9.0
1924	0	0	N/A	0	N/A	0	N/A
1925	1	1	1.0	0	0	1	1.0
1926	1	1	1.0	0	0	9	9.0
1927	0	0	N/A	0	N/A	0	N/A
1928	3	3	1.0	14	4.7	29	9.7
1929	1	2	2.0	6	6.0	12	12
1930	0	0	N/A	0	N/A	0	N/A
1931	0	0	N/A	0	N/A	0	N/A
1932	1	1	1.0	3	3.0	7	7.0
1933	0	0	N/A	0	N/A	0	N/A
1934	0	0	N/A	0	N/A	0	N/A
1935	1	1	1.0	10	10	5	5.0
1936	1	1	1.0	2	2.0	6	6.0
1937	0	0	N/A	0	N/A	0	N/A
1938	0	0	N/A	0	N/A	0	N/A
1939	1	3	3.0	10	10	5	5.0
1940	0	0	N/A	0	N/A	0	N/A
1941	0	0	N/A	0	N/A	0	N/A
1942	0	0	N/A	0	N/A	0	N/A
1943	0	0	N/A	0	N/A	0	N/A
1944	0	0	N/A	0	N/A	0	N/A
1945	0	0	N/A	0	N/A	0	N/A
1946	0	0	N/A	0	N/A	0	N/A
1947	0	0	N/A	0	N/A	0	N/A
1948	0	0	N/A	0	N/A	0	N/A

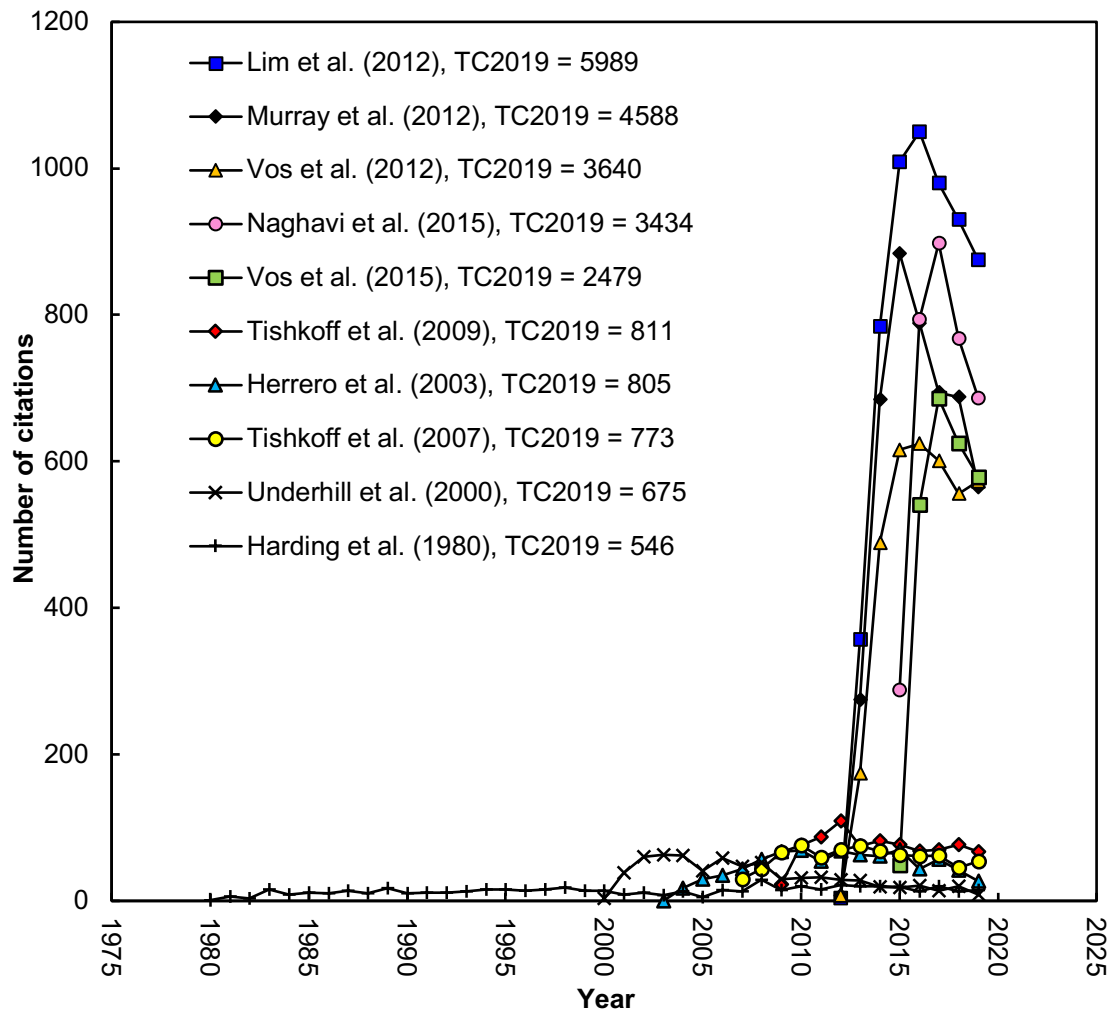
1949	0	0	N/A	0	N/A	0	N/A
1950	0	0	N/A	0	N/A	0	N/A
1951	0	0	N/A	0	N/A	0	N/A
1952	0	0	N/A	0	N/A	0	N/A
1953	0	0	N/A	0	N/A	0	N/A
1954	0	0	N/A	0	N/A	0	N/A
1955	1	1	1.0	10	10	8	8.0
1956	1	1	1.0	17	17	9	9.0
1957	2	3	1.5	9	4.5	13	6.5
1958	1	1	1.0	9	9.0	15	15
1959	6	7	1.2	64	11	67	11
1960	2	2	1.0	45	23	36	18
1961	0	0	N/A	0	N/A	0	N/A
1962	0	0	N/A	0	N/A	0	N/A
1963	0	0	N/A	0	N/A	0	N/A
1964	0	0	N/A	0	N/A	0	N/A
1965	0	0	N/A	0	N/A	0	N/A
1966	0	0	N/A	0	N/A	0	N/A
1967	0	0	N/A	0	N/A	0	N/A
1968	0	0	N/A	0	N/A	0	N/A
1969	0	0	N/A	0	N/A	0	N/A
1970	0	0	N/A	0	N/A	0	N/A
1971	1	3	3.0	8	8.0	1	1.0
1972	7	18	2.6	108	15	43	6.1
1973	52	114	2.2	776	15	316	6.1
1974	80	148	1.9	1 219	15	531	6.6
1975	91	164	1.8	1 262	14	595	6.5
1976	93	215	2.3	1 323	14	622	6.7
1977	88	174	2.0	1 216	14	666	7.6
1978	116	269	2.3	1 401	12	664	5.7
1979	95	234	2.5	1 499	16	684	7.2
1980	86	234	2.7	1 109	13	553	6.4
1981	108	260	2.4	1 320	12	697	6.5
1982	97	253	2.6	1 466	15	654	6.7
1983	114	321	2.8	1 709	15	796	7.0
1984	140	353	2.5	2 268	16	981	7.0
1985	132	402	3.0	1 988	15	892	6.8
1986	118	309	2.6	1 829	16	784	6.6
1987	114	334	2.9	2 066	18	860	7.5
1988	120	373	3.1	1 714	14	789	6.6
1989	99	336	3.4	1 472	15	731	7.4
1990	91	355	3.9	1 261	14	552	6.1
1991	94	346	3.7	1 631	17	627	6.7

1992	116	460	4.0	2 005	17	838	7.2
1993	94	360	3.8	1 525	16	606	6.4
1994	87	358	4.1	1 766	20	555	6.4
1995	80	321	4.0	1 428	18	533	6.7
1996	71	298	4.2	1 168	16	435	6.1
1997	81	328	4.0	1 764	22	554	6.8
1998	115	518	4.5	2 473	22	815	7.1
1999	103	463	4.5	2 240	22	705	6.8
2000	77	358	4.6	1 860	24	566	7.4
2001	71	355	5.0	1 780	25	521	7.3
2002	92	442	4.8	2 211	24	684	7.4
2003	95	451	4.7	2 300	24	679	7.1
2004	100	449	4.5	2 268	23	661	6.6
2005	118	552	4.7	2 638	22	780	6.6
2006	113	538	4.8	2 926	26	859	7.6
2007	141	744	5.3	3 603	26	953	6.8
2008	146	734	5.0	3 496	24	1 011	6.9
2009	218	1 404	6.4	6 240	29	1 622	7.4
2010	276	1 557	5.6	8 138	29	2 095	7.6
2011	285	1 506	5.3	7 868	28	2 147	7.5
2012	257	2 328	9.1	8 492	33	2 099	8.2
2013	298	1 793	6.0	10 064	34	2 540	8.5
2014	322	2 664	8.3	12 020	37	2 995	9.3
2015	330	3 477	11	11 757	36	2 991	9.1
2016	402	5 253	13	15 668	39	3 898	9.7
2017	424	3 946	9	16 747	39	4 042	9.5
2018	497	7 263	15	20 239	41	5 090	10
2019	570	8 011	14	23 948	42	6 152	11
Total	7 539	52 175		207 476		60 695	
Average			6.9		28		8.1

TP: number of articles; *AU*: number of authors; *NR*: number of cited references; *PG*: page counts; *APP*: number of authors per publication; N/A: not available.

APPENDIX 3

Citation histories of the ten most frequently cited articles with Sudan participation



APPENDIX 4

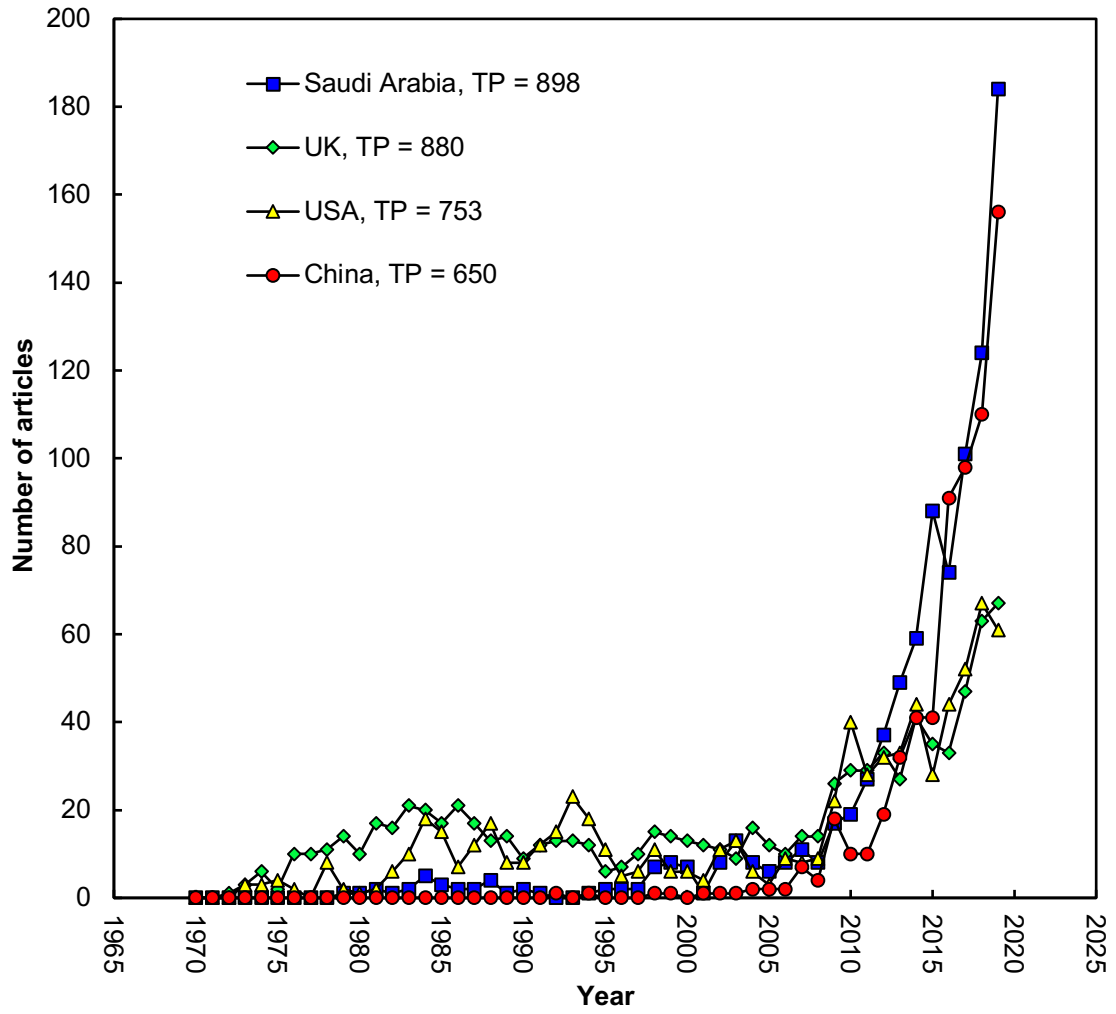
Authorship and citation of the 13 countries with over 200 articles published in collaboration with Sudan ($TP > 200$)

Country	TP	$TP R$ (%)	$FP R$ (%)	$RP R$ (%)	CPP_{2019}
Saudi Arabia	898	1 (12)	2 (5.9)	2 (6.2)	25
UK	880	2 (12)	3 (4.6)	3 (4.3)	47
USA	753	3 (10)	5 (3.5)	4 (3.6)	58
China	650	4 (8.6)	1 (6.4)	1 (6.6)	41
Germany	551	5 (7.3)	4 (3.5)	5 (3.5)	58
Egypt	360	6 (4.8)	11 (1.3)	10 (1.5)	33
Malaysia	355	7 (4.7)	6 (2.6)	6 (2.9)	28
South Africa	333	8 (4.4)	7 (2.1)	7 (2.3)	86
Netherlands	290	9 (3.8)	8 (1.6)	8 (1.8)	96
France	250	10 (3.3)	12 (1.2)	12 (1.3)	115
Sweden	240	11 (3.2)	9 (1.6)	11 (1.4)	104
Japan	223	12 (3)	10 (1.3)	9 (1.5)	108
Kenya	216	13 (2.9)	16 (0.56)	17 (0.49)	98

$TP R$ (%): total number of articles and rank; $FP R$ (%): total number of first-author articles and rank; $RP R$ (%): total number of corresponding-author articles and rank; CPP_{2019} : citations per publication ($CPP_{2019} = TC_{2019}/TP$).

APPENDIX 5

Historical trends of the four countries that have published more collaborative articles with Sudan in the last five decades



APPENDIX 6

Foreign institutions with most collaborative publications with Sudanese institutions

Institute	<i>TP</i>	<i>TP R (%)</i>	<i>FP R (%)</i>	<i>RP R (%)</i>	<i>CPP</i> ₂₀₁₉
King Saud University, Saudi Arabia	257	1 (3.4)	1 (1.5)	1 (1.9)	9.0
University of Putra Malaysia, Malaysia	102	2 (1.4)	3 (0.74)	3 (0.86)	9.2
London School of Hygiene & Tropical Medicine, UK	100	3 (1.3)	10 (0.42)	15 (0.39)	154
University of Copenhagen, Denmark	98	4 (1.3)	16 (0.36)	16 (0.38)	68
Yangzhou University, China	80	5 (1.1)	2 (1.0)	2 (0.90)	4.4
Cairo University, Egypt	75	6 (1.0)	25 (0.28)	18 (0.36)	91
Sultan Qaboos University, Oman	75	6 (1.0)	11 (0.41)	12 (0.42)	11
University of Cape Town, South Africa	73	8 (1.0)	30 (0.24)	25 (0.27)	311
University of Edinburgh, UK	72	9 (1.0)	16 (0.36)	11 (0.43)	315
University of Witwatersrand, South Africa	68	10 (0.90)	51 (0.15)	40 (0.20)	189

TP: total number of articles; *TP R (%)*: rank of total number of articles and percentage; *FP R (%)*: rank of first-author articles and percentage; *RP R (%)*: rank of corresponding-author articles and percentage; *CPP*₂₀₁₉: citations per publication ($CPP_{2019} = TC_{2019}/TP$).

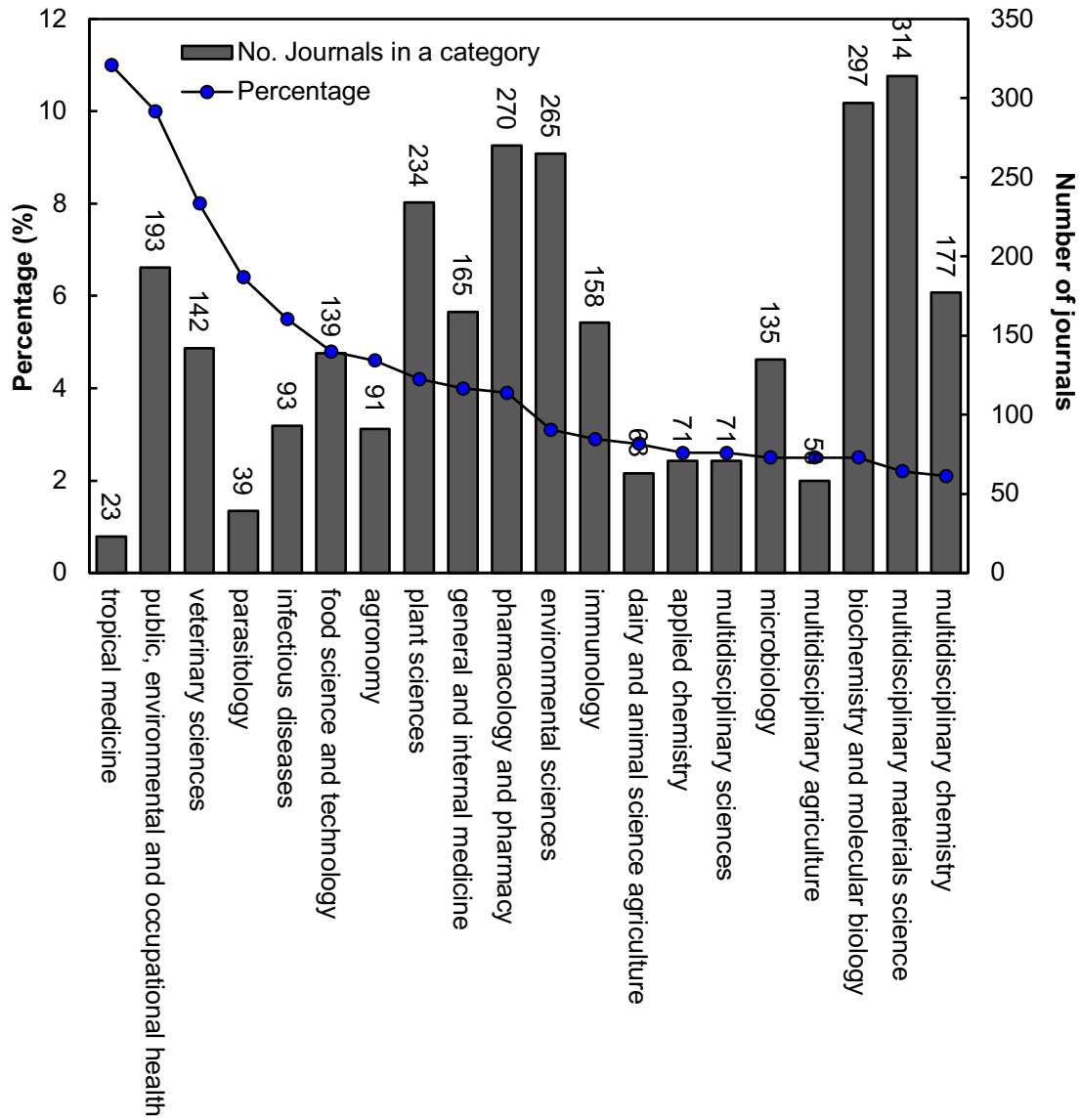
APPENDIX 7
Top ten productive Sudan institutes

Institute	<i>TP</i>	<i>TP R</i> (%)	<i>IP R</i> (%)	<i>CP R</i> (%)	<i>FP R</i> (%)	<i>RP R</i> (%)	<i>SP R</i> (%)	<i>CPP</i> 2019
University of Khartoum	36 87	1 (49)	1 (57)	1 (46)	1 (25)	1 (25)	1 (51)	15
Sudan University of Science and Technology	46 3	2 (6.1)	6 (1.5)	2 (7.7)	2 (2.2)	3 (1.9)	4 (2.8)	8.5
University of Gezira	45 4	3 (6.0)	3 (3.5)	3 (6.9)	3 (2.0)	2 (2.0)	3 (3.1)	12
Federal Ministry of Health	28 1	4 (3.7)	14 (0.79)	4 (4.7)	7 (0.80)	8 (0.60)	6 (1.4)	68
Agricultural Research Corporation	20 0	5 (2.7)	2 (3.7)	7 (2.3)	4 (1.4)	4 (1.4)	2 (5.4)	8.5
Al Neelain University	18 8	6 (2.5)	8 (1.0)	5 (3.0)	5 (0.93)	5 (0.84)	8 (1.1)	6.9
National Centre for Research	15 0	7 (2.0)	17 (0.69)	6 (2.4)	6 (0.82)	7 (0.74)	37 (0.26)	14
Sudan Atomic Energy Commission	12 5	8 (1.7)	8 (1.0)	9 (1.9)	8 (0.72)	6 (0.77)	54 (0.13)	9.2
Omdurman Islamic University	11 9	9 (1.6)	38 (0.21)	8 (2.0)	13 (0.4)	16 (0.32)	26 (0.38)	5.7
Ahfad University for Women	97	10 (1.3)	22 (0.48)	10 (1.6)	12 (0.46)	12 (0.46)	15 (0.64)	11

TP: total number of articles; *TP R* (%): rank of total number of articles and percentage; *IP R* (%): rank of institute independent articles and percentage; *CP R* (%): rank of inter-institutionally collaborative articles and percentage; *FP R* (%): rank of first-author articles and percentage; *RP R* (%): rank of corresponding-author articles and percentage; *SP R* (%): rank of single author articles and percentage; *CPP*₂₀₁₉: citations per publication ($CPP_{2019} = TC_{2019}/TP$).

APPENDIX 8

Distribution of the 20 most productive Web of Science categories in the Science Citation Index Expanded



APPENDIX 9

The ten most frequently cited articles that only have Sudanese authorship addresses

Rank (TC_{2019})	Rank (C_{2019})	Article titles	references
33 (191)	2 065 (1)	Effects of algal grazing and aggressive-behavior of fishes <i>Pomacentrus lividus</i> and <i>Acanthurus sohal</i> on coral-reef ecology	Vine (1974)
61 (132)	250 (8)	Mycetoma: a thorn in the flesh	Fahal (2004)
64 (129)	205 (9)	Compositional changes during guava fruit ripening	Bashir and Abu-Goukh (2003)
70 (124)	370 (6)	Chemical-composition and quality attributes of goat meat and lamb	Babiker et al. (1990)
85 (110)	1 336 (2)	Cosmological models with variable cosmological and gravitational “constants” and bulk viscous models	Arbab (1997)
98 (102)	84 (15)	Fractionation, solubility and functional properties of cowpea (<i>Vigna unguiculata</i>) proteins as affected by pH and/or salt concentration	Ragab et al. (2004)
115 (92)	2 065 (1)	Antiplasmodial activity of selected Sudanese Medicinal plants with emphasis on <i>Maytenus senegalensis</i> (Lam.) Exell.	El Tahir et al. (1999)
115 (92)	2 065 (1)	Further observations on primary paranasal <i>Aspergillus</i> granuloma in Sudan - morphological study of 46 cases	Veress et al. (1973)
120 (89)	1 336 (2)	Singularity-free decaying-vacuum cosmologies	Abdelrahman (1992)
123 (88)	105 (13)	Solubility and functional properties of sesame seed proteins as influenced by pH and/or salt concentration	Khalid et al. (2003)

TC_{2019} : the total number of citations from Web of Science Core Collection since publication year to the end of 2019; C_{2019} : number of citations in 2019.

APPENDIX 10

The ten most frequently cited articles with Sudanese addresses

Rank (TC_{2019})	Rank (C_{2019})	Article titles	references
1 (5 989)	1 (875)	A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010	Lim et al. (2012)
2 (4 588)	5 (565)	Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010	Murray et al. (2012)
3 (3 640)	4 (573)	Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010	Vos et al. (2012)
4 (3 434)	2 (686)	Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013	Naghavi et al. (2015)
5 (2 479)	3 (578)	Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013	Vos et al. (2015)
6 (811)	13 (67)	The Genetic Structure and History of Africans and African Americans	Underhill et al. (2009)
7 (805)	28 (27)	Human papillomavirus and oral cancer: The international agency for research on cancer multicenter study	Herrero et al. (2003)
8 (773)	14 (54)	Convergent adaptation of human lactase persistence in Africa and Europe	Tishkoff et al. (2007)
9 (675)	205 (9)	Y chromosome sequence variation and the history of human populations	vin et al. (2000)
10 (546)	84 (15)	Mental-disorders in primary health-care - a study of their frequency and diagnosis in 4 developing-countries	Harding et al. (1980)

TC_{2019} : the total number of citations from Web of Science Core Collection since publication year to the end of 2019; C_{2019} : number of citations in 2019.