

Systematic Review

Emerging Status of Multidrug-Resistant Bacteria and Fungi in the Arabian Peninsula

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Table S1. Country wise data for the number of articles from various database.

Country	Sco- pus	Pub- med	Google scholar	Scopus af- ter 2010	Pubmed from >2010	Number of arti- cle screened	excluded	Full-text articles as- sessed for eligibility	Full-text articles excluded, with reasons	Final
Saudi Ara- bia	400	547	17360	312	498	622	296	326	128	198
Bahrain		7	979	17	3	3	0	3	0	3
Kuwait	138	98	5710	92	65	66	25	41	3	38
Oman	40	46	4170	36	42	42	33	9	0	9
Qatar	59	59	2069	51	54	52	35	17	0	17
United Arab Emirates	53	81	3090	38	71	70	51	19	4	15
Jordan	92	136	22400	78	115	81	44	37	6	31
Iraq	278	124	9410	223	78	107	26	81	6	75
Yemen	38	19	2269	30	17	14	6	8	2	6
	1098	857	58047	877	828	1057	516	541	149	392*

* There were three papers reporting MDR microorganisms multiple countries. Sonnevend et al., 2016: Bahrain, Saudi Arabia and United Arab Emirates; Zowawi et al., 2015: Saudi Arabia, United Arab Emirates, Oman, Qatar, Bahrain, and Kuwait; Sonnevend et al., 2015: Saudi Arabia, Kuwait, Oman and United Arab Emirates.

Table S2. Number of multi drug resistant strains reported from countries of Arabian Peninsula.

[illegible]

43	<i>Proteus</i> sp.	217	1	2	8
44	<i>Providencia</i> spp	3		1213	3
45	<i>Staphylococcus capitis</i>	4			1
46	<i>Enterobacter aerogenes</i>	32		8	6
47	<i>Acinetobacter lwoffii</i>	11			3
48	<i>Staphylococcus sapro- phyticus</i>	12		8	3
49	<i>A. baumannii</i> complex	19			1
50	<i>A. baumannii/haemolyti- cus</i>	32			1
51	<i>Acinetobacter haemolyti- cus</i>	4			1
52	Vancomycin resistant <i>Enterococcus</i> (VRE)	255			4
53	<i>Proteus vulgaris</i>	722			3
54	<i>Pseudomonas luteola</i>	9			1
55	<i>Pantoea agglomerans</i>	9			1
56	<i>Serratia fonticola</i>	4			1
57	methicillin-resistant <i>Staphylococcus epider- midis</i> (MRSE)	1			1
58	penicillin-resistant <i>Streptococcus pyogenes</i>	1			1
59	<i>Bacillus</i> spp.	77			1
60	<i>Leclercia adecarboxylata</i>	1			1
61	<i>Pseudomonas</i> spp.	481			6
62	<i>Serratia</i> spp.	66			3
63	<i>Candida</i> Spp.	180			4
64	<i>Citrobacter</i> spp.	54			5
65	<i>Mycobacterium leprae</i>	1			1
66	<i>Chryseobacterium gleum</i>	1			1
67	<i>Vibrio vulnificus</i>	234			1
68	<i>Clostridioides difficile</i>	18			1
69	<i>Arcobacter butzleri</i>			100	1
70	<i>Arcobacter cryaerophilus</i>			20	1
71	<i>Prevotella</i> spp		14		1
72	<i>Vibrio cholerae</i>			20	1
73	<i>Nocardia crassostreae</i>			13	1
74	<i>Vibrio vulnificus</i>			23	1
75	<i>Enterococcus gallinarum</i>		1		1
76	<i>Salmonella</i> Enteritidis		15		2

Table S3. Source of isolates and Number of MDR microbial strains reported from Arabian Peninsula. .

Text citation	Number of Strain	Source of Isolates
Saudi Arabia		
Ahmed-Abakur et al., 2019	61 <i>Mycobacterium tuberculosis</i>	human/Sputum
AlJindan et al., 2021	18 <i>Clostridioides difficile</i>	human/ stool
Al-Zahrani et al., 2021	35 Carbapenem-resistant <i>Pseudomonas aeruginosa</i> (CRPA)	human
Alhaddad et al., 2018	11 <i>Acinetobacter baumannii</i>	human/(ICU) samples
Ejaz et al., 2020	370 <i>Enterobacteria</i>	human
El Mahalli et al., 2015	80 <i>M. tuberculosis</i>	human
Salem-Bekhit et al., 2012	206 <i>Enterococcus spp.</i>	human
Shah et al., 2019	135 <i>Acinetobacter baumannii</i>	human
Abd El Hafez et al., 2011	29 <i>Staphylococcus epidermidis</i>	human/blood culture, umbilical wound swabs and endotracheal aspirate specimens of neonates
Ahmad et al., 2015	52 <i>K. pneumoniae</i>	human/blood, urine, wound swabs and sputum
Khan et al., 2016	121 <i>P. aeruginosa</i> strains	human/ Respiratory, urine, Surgical, blood, Genital, eye, ear, burn,
Ahmed et al., 2019	89 Organism isolated; <i>Escherichia coli</i> 24, <i>Klebsiella pneumoniae</i> 11, <i>Proteus mirabilis</i> 4, <i>Pseudomonas aeruginosa</i> 4, <i>Enterobacter cloacae</i> 5, <i>Morganella morganii</i> 4, <i>Pantoea agglomerans</i> 4, <i>Citrobacter freundii</i> 4, <i>Klebsiella oxytoca</i> 3, <i>Proteus vulgaris</i> 2, <i>Acinetobacter baumannii</i> 3, <i>Enterobacter aerogenes</i> 3, <i>Acinetobacter lwoffii</i> 3, <i>Serratia marcescens</i> 3, <i>Enterococcus faecalis</i> 5, <i>Staphylococcus saprophyticus</i> 3, <i>Enterococcus faecium</i> 2, <i>Staphylococcus aureus</i> 2	human/urine
Al Bshabshe et al., 2016	105 <i>Acinetobacter</i> species; <i>A. baumannii</i> accounted for 49, <i>A. baumannii</i> complex 19, <i>A. baumannii</i> /haemolyticus 32, <i>Acinetobacter haemolyticus</i> 4, <i>Acinetobacter lwoffii</i> 1	human/Upper respiratory tract,lower respiratory tract,subcutaneous tissue,skin,gastrointestinal tract,wound swab,swab,endotracheal tube,eyes,bone & bone marrow,body fluids,cerebrospinal fluid,abscess,genito-urinary tract,miscellaneous specimens
Al Mayahi et al., 2019	131	human/sputum
AL Qurainees et al., 2016	1 <i>M. tuberculosis</i>	human/sputum
Al Wutayd et al., 2018	418	human/urine
Al-Agamy et al., 2017	27 <i>Acinetobacter baumannii</i>	human
Al-Anazi et al., 2012	1 <i>A. baumannii</i>	human/blood culture
Hoang et al., 2021	81 strains were isolated (1 carbapenem-resistant <i>Acinetobacter baumannii</i> , 12 MRSA, and 68 ESBL-E).	human/ respiratory and rectal samples
Al-Ayed et al., 2016	10	human/blood,urinary tract,ventilator-associated pneumonia
Al-Dorzi et al., 2015	9 <i>Acinetobacter bacteremia</i>	human/ blood culture.
Al-Ghafli et al., 2018	71 MDR-TB strains	human/smear
Al-Obeid et al., 2015	12 XDRA strains <i>Acinetobacter baumannii</i>	human
Al-Jindan et al., 2021	2 <i>C. auris</i>	human/urine culture

(Alamri et al., 2020)	1 drug-resistant strain of <i>P. aeruginosa</i> was isolated	human/blood culture
(Alamri et al., 2020)	207 multi-drug-resistant <i>A. baumannii</i> strains isolated	human/respiratory specimens, skin and soft tissue specimens, Blood, urine and sterile body fluids.
(AlAmri et al., 2020)	103 MDR <i>A. baumannii</i> isolates	human/respiratory specime(endotracheal tube aspirates, bronchial aspirates, sputum, and throat specimens), wound swabs, rectal swabs, blood, urine & other strains were collected from(catheter tips, skin, soft tissue, and body fluids)
Alanber et al., 2020	77 MDR <i>Bacillus</i> strain	nonhuman/milk samples
Al-Hamad et al., 2020	51 CRAB strains	nonhuman/various surfaces
Altalhi et al., 2010	119 <i>E. coli</i> strains	nonhuman/chicken
Abdel-Haleem et al., 2015	1 (MDR) <i>Stenotrophomonas maltophilia</i> strain isolated	human
Alateah et al., 2020	1123 isolates <i>Mycobacterium tuberculosis</i> .	human/ sputum, bronchoalveolar lavage, tracheal aspirate, tissues and biopsies, fine needle aspiration, abscesses, abdominal fluids, breast fluid, cerebrospinal fluid, spinal fluid, urine, knee fluid and synovial fluid, pericardial fluid, peritoneal dialysis, pleural fluid.
Albarrag et al., 2020	188 MRSA strains	human/nasal swabs
Albukhari et al., 2019	45 bacterial and fungal pathogens were isolated	human
Aldawsari et al., 2020	12 <i>K. pneumoniae</i> , <i>S. aureus</i> , <i>A. baumannii</i> , and <i>P. aeruginosa</i> (2016)/ 12 <i>E. coli</i> , <i>K. pneumoniae</i> , <i>S. aureus</i> , and <i>P. aeruginosa</i> (2017)	human
Algowaihi et al., 2016	1 MDR <i>Klebsiella pneumoniae</i>	human/ urinary tract infection
Alhussain et al., 2021	90 <i>P. aeruginosa</i>	human/ respiratory, urine, wound, blood and fluid
Alhussaini et al., 2016	46 MRSA isolates	human/ nasal swabs
Ali et al., 2017	32 MDR <i>A. baumannii</i>	human/ blood and wound infections
Alkofide et al., 2020	130 MDR <i>Enterobacteriaceae</i>	human.
Aljindan et al., 2015	47 <i>Acinetobacter baumannii</i> strains	human/ rectal swab
Aljindan et al., 2020	6 <i>Candida auris</i>	human/ blood, urine, ear swab, groin screening samples
Almaghrabi et al., 2020	8 <i>Candida auris</i>	human/ Pleural tissue, urine, wound swab, Surgical, Tracheal aspirate
Almaghrabi et al., 2018	94 <i>A. baumannii</i>	human
Khan et al., 2019	120 <i>Enterobacteriaceae</i> isolates	human/ blood, Pus, Stool, Urine, Sputum, Endotracheal tube, Vaginal swab, Peritoneal fluid.
Hassan et al., 2014	382 <i>Enterobacteriaceae</i> clinical isolates	human/ urine, wounds, blood, central venous lines, sputum, sterile body fluids, ear infections
Hassan et al., 2013	236 isolates	human/ wound swab, CSF, Sputum, blood, urine, other
Farman et al., 2019	155 <i>Enterococcus faecalis</i> isolates	human
Alosaimi et al., 2020	1 multidrug-resistant strain of <i>Leclercia adecarboxylata</i>	human
Alqasim et al., 2018	100 <i>E. coli</i> isolates	human/ urine
Alqasim et al., 2021	40 <i>E. coli</i> isolates	human/ urine
Alsanie et al., 2020	23 <i>K. pneumoniae</i> strains	human
Alshareef et al., 2020	91	human/ urine culture
Alshukairi et al., 2020	4 MDR-TB	human/ sputum
Altuwaijri et al., 2020	103 TB	human

Alyamani et al., 2019	69 <i>M. tuberculosis</i> isolates	human/ sputum
Elhassan et al., 2017	622 <i>Mycobacterium tuberculosis</i> isolates	human/ sputum
Almutairy et al., 2020	121	human
Aly et al., 2016	503 <i>A. baumannii</i> isolates	human/ Tracheal, Unk, blood, urine, Sputum, Bronchial, Tissue.
El-Kersh et al., 2016	<i>Enterococcus faecalis</i> (n=73) and <i>Staphylococcus</i> spp. (n=18)	human/ faeces
EL-AGEERY et al., 2012	MRAB isolates (15 patient samples and 3 environmental samples)	human/ blood, Wound swab, Sputum, Abdominal drainfluid, Tracheal aspirate; environmental samples/ Suction switch, Ventilator button
El Ghany et al., 2018	10 MDR <i>Escherichia coli</i> isolates	human
BOURGHILI et al., 2019	1 multidrug-resistant <i>Pseudomonas aeruginosa</i> .	human
(Balkhy et al., 2020)	1544	human
Bosaeed et al., 2020	19 MDR <i>P. aeruginosa</i>	human/ Respiratory, Skin tissue, Urine, Intra-abdominal fluid, Bone tissue, blood.
(Balkhy et al., 2020)	1260	human
El-Saed et al., 2020	84	human
Lagha et al., 2021	30 <i>K. pneumoniae</i> isolates	human/ blood, Wound swab, Sputum, urine.
Lopes et al., 2015	46 <i>A. baumannii</i> isolated	human/ Respiratory secretions, sputum, urine, Endotracheal tube aspirate, Wound swab, Tracheal swab.
Marie et al., 2013	4250 isolates	human/ blood, urine, wounds, sputum and other body fluids.
Marie et al., 2015	54 <i>A. baumannii</i> isolates.	human/ blood and respiratory samples.
Mazi et al., 2014	20 isolates	human
Mazi et al., 2020	28 MRSA isolates	human/ skin soft tissue, blood, Nasal, BURN, PNEU, SSI.
Rana et al., 2014	2 MDR strains of <i>E. coli</i> and <i>A. baumannii</i>	human/ blood, urine, Pleural fluid.
Salahuddin et al., 2016	41	human
Sambas et al., 2020	8 MDR TB	human/ sputum
Senok et al., 2015	12 MDR <i>A. baumannii</i> isolates	human/ urine, wound swab, sputum, endotracheal tube aspirates.
Shibl et al., 2013	60 <i>K. pneumoniae</i> isolates	human/blood, rectal swabs, sputum, urine, wound, and suction swab.
Somily et al., 2012	117 MDR strains (84 isolates of <i>A. baumannii</i> and 33 isolates of <i>P. aeruginosa</i>)	human/ blood/sterile body fluids and tissue, Superficial swabs and catheter tips, Urine, Wounds, sputum, bronchoalveolar lavage and tracheal aspirates.
Sonnevend et al., 2016	1 <i>E. coli</i> isolates	human/ blood
Taha et al., 2018	76 MDR <i>E. coli</i> isolates	human/ wound, urine, stool and blood.
Taher et al., 2019	415 isolates	human/ urine.
Varghese et al., 2013	98 TB isolates	human
Varghese et al., 2014	135 MDR TB	human
Varghese et al., 2017	83 MDR-TB isolates	human
Vellappally et al., 2017	150 <i>S. aureus</i> isolates	human/ dental caries samples.
Vijayakumar et al., 2018	44 MDR	human
Zikri et al., 2019	1 MDR <i>Pseudomonas aeruginosa</i>	human
Yasir et al., 2019	1 <i>Acinetobacter baumannii</i> isolate	human
(Yasir et al., 2020)		
Genomic and antimicrobial resistance genes diversity in	19 ESBL-positive <i>E. coli</i> isolates	human/ urine and tissue swabs.

multidrug-resistant CTX-M-positive isolates of <i>Escherichia coli</i> at a health care facility in Jeddah.		
Yasir et al., 2018	211 ESBL-producing <i>E. coli</i> isolates	human/ urine, urine catheters, wound swabs, blood samples.
Rabaan et al., 2017	9 MDR <i>Acinetobacter</i>	human/ nose swab, wound swab.
Olaitan et al., 2015	5 MDR <i>Salmonella</i> spp.	human/ rectal swabs.
Shin et al., 2011	9 <i>S. pneumoniae</i> isolates	human
Varghese et al., 2012	151 <i>M. tuberculosis</i> isolates	human
Bindayna et al., 2010	100 isolates; <i>E. coli</i> =84, <i>K. pneumoniae</i> = 16	human/ blood, Wound, urine, other body sites.
Aly et al., 2014	253 isolates (MDR) <i>Acinetobacter baumannii</i> strains	human/ blood, Wound, urine, burn, respiratory, others.
Aljadani et al., 2019	2 MDR-TB	human
Al-Hajoj et al., 2013	1,609 isolates TB	human
Almazrou et al., 2016	46 <i>S. pneumoniae</i> isolates	human/ Blood, Cerebro-spinal fluid, Pleural fluid
Hamid et al., 2011	210 <i>S.aureus</i> isolates	human
Hameed et al., 2019	202 isolates	human/ urine.
Al Johani et al., 2010	4192 isolates	human/ Respiratory, urine sample.
Khan et al., 2016 (The impact of onset time on the isolated pathogens and outcomes in ventilator associated pneumonia)	293 VAP isolated	human/ endotracheal aspiration sampling.
Guan et al., 2020	1 MDR <i>Mycobacterium leprae</i>	human
Almangour et al., 2020	86 isolates	human/ bronchoalveolar lavage, mini bronchoalveolar lavage, protected specimenbrush, endotracheal aspirate, sputum induction, nasotracheal suctioning.
Abdelfattah et al., 2019	4 organisms isolated	human/ blood culture.
Abulreesh et al., 2017	50 <i>S. aureus</i> isolates	human/ blood cultures, wound swabs, urine sample, nasal swabs, and sputum.
Alavudeen et al., 2017	15 strains isolated	human/ urine, blood, sputum, Endotracheal tube, Wound, Tracheal secretion, Throat swab, Abscess, Bedsore swab, Nasal swab, Rectal swab, Skin swab, Stool.
Albarrag et al., 2020	17 MRSA isolates	human/ nasal swabs.
Alghizzi et al., 2021	94 <i>S. aureus</i> isolates	non-human / Turkey, Salami, Sausages.
Alghoribi et al., 2019	200 isolates Non-typhoidal <i>Salmonella</i>	human/ Stool, Urine, Tissue, Abdominal fluid, Wound, Blood.
Alharbi et al., 2015	18 <i>A. baumannii</i> strains	human
AlOtair et al., 2015	71 isolates	human/ sputum
Asaad et al., 2012	68 <i>M. tuberculosis</i> isolates	human/ sputum, wound swabs, urine, ENT swabs, blood, trachial swab, genital swab, body fluid, tip catheter.
Alsanie et al., 2018	30 MDR isolates	human/ urine and stool swabs
Alyamani et al 2016	1 <i>E.coli</i> strain	human
Asghar et al., 2012	478 <i>Pseudomonas aeruginosa</i> isolates	human/ sputum, wound swabs, urine, ENT swabs, blood, trachial swab, genital swab, body fluid, tip catheter.
Azab et al., 2021	162 isolates	human/ urine, vaginal swab, ear swab, blood, abscess, endotracheal tube, sputum, throat swab, nasal swab, urethral swab.
Balkhy et al., 2012	177 isolates <i>Acinetobacter</i> spp.	human

El-Ahmady et al., 2016	130 actinomycete strains	nonhuman/ soil sample
Elsohaby et al., 2021	20 isolates	nonhuman/ birds
George et al., 2021	246 isolates of enterococci (VRE)	human/ urine, pus, rectal swab
Gowda et al., 2014	380 <i>A. baumannii</i> isolates	human / blood
Hassan et al., 2014	154 isolates	nonhuman/ animals fecal samples
Ibrahim et al., 2018	290 Gram-negative isolates	human/ Wound swabs, sputum, tracheal aspirates, umbilical swabs, throat and eye swabs, urine, blood.
Khan et al., 2018	157 strains isolated	human and hospital environment/ swabs were collected from a range of body sites from patients, staff and from the hospital environment like walls, beds, taps, computer keyboards and ventilator surfaces.
Marie et al., 2013	4250 isolates	human/ blood, urine, wounds, sputum and other body fluids.
Mazi et al., 2021	15 isolates	human
Sambas et al., 2020	158 TB	human
Varghese et al., 2013	1904 isolates MDR-TB	human
Yassin et al., 2020	3 <i>Candida</i> strains	human/ vaginal swabs
Zowawi ey al., 2015	80 <i>A. baumannii</i> isolates	human/ Blood, urine, swab, sputum.
Abdalhamid et al., 2016	1 <i>Chryseobacterium gleum</i>	human/ Blood.
Abdalla et al., 2013	150 acinetobacter isolates	human/ nasal swab, blood.
Ahmad et al., 2012	916 gram-negative bacilli isolated	human/ urine, pus, sputum, blood
Ahmed et al., 2015	906 <i>Acinetobacter baumannii</i> isolates, 3626 other isolates	human/ sputum, blood, urine, Throat Swab, Rectal Swab, Wound Swab, Tracheal Aspirates, Endo, BAL, eye, ear, tissue, fluid, abscess.
Al-Agamy et al., 2019	6 strains isolated: (4) being <i>Klebsiella pneumoniae</i> and (2) <i>Enterobacter cloacae</i> .	human/ blood, sputum, wound.
Al-Baloushi et al., 2018	1 <i>K. pneumoniae</i> isolate	human/ Endotracheal aspirate.
Al-Hajoj et al., 2015	381 TB isolates	human
Al-Mazrou et al., 2014	(6) <i>S. pneumoniae</i> isolates, (8) <i>H. influenzae</i> isolates	human/ Middle ear fluid.
Al-Qahtani et al., 2014	98 <i>Klebsiella pneumoniae</i> isolates	human/ blood, sputum, Wound swab, urine, HVS.
Alabdullatif et al., 2020	4760 isolated gram-negative bacteria	human/ sputum, vaginal, urine, blood, trachial, wound, throat.
Al-Waili et al., 2012	<i>S. aureus</i> , <i>E. coli</i> and <i>C. albicans</i> isolates	human
Alanazi et al., 2018	101 <i>E. coli</i> isolates	human/ urine.
Alghoribi et al., 2020	1 <i>K. pneumoniae</i>	human/ urine.
Aljindan et al., 2018	60 isolates of <i>A. baumannii</i>	human/ Abscess, blood, urine, Wound swab, Throat swab, Transtracheal, aspiration, Intravenous, catheter tip, Nasal Swab, Peritoneal fluid, Pleural fluid, Rectal swab, Skin swab, sputum.
Alkharsah et al., 2018	106 MRSA isolates	human/ Scalp abscess, Endotracheal aspirate, Nasal swab, Breast abscess, Skin swab (cellulitis), urine, wound swab.
Alnimr et al., 2017	77 <i>S. pneumoniae</i> isolate	human
Alraddadi et al., 2019	10 <i>Klebsiella pneumoniae</i> , 28 <i>Escherichia coli</i> .	human
Alsalem et al., 2018	234 isolates of <i>V. vulnificus</i> .	nonhuman/ seawater samples
Azim et al., 2019	70 isolates/ (25) <i>P. aeruginosa</i> , (23) <i>K. pneumoniae</i> , (16) <i>E. coli</i> , (6) <i>A. baumannii</i> .	human

Balkhy et al., 2014	248 isolates; <i>Acinetobacter</i> spp.(n = 87), <i>P. aeruginosa</i> (n = 63), <i>Staphylococcus aureus</i> including methicillin-resistant <i>Staphylococcus aureus</i> (MRSA) (n = 43), <i>Klebsiella</i> spp.(n = 15), <i>Enterobacter</i> spp.(n = 10), <i>Haemophilus</i> spp.(n = 9), <i>Stenotrophomonas maltophilia</i> (n = 8), <i>Coagulase-negative staphylococci</i> (n = 7) and <i>Escherichia coli</i> (n = 6)	human
Chaudhry et al., 2012	1681 <i>M. tuberculosis</i> isolates	human
Eed et al., 2019	143 <i>H. pylori</i>	human
El-Ageery et al., 2011	154 MRSA isolates	human and environmental sites.
El-Ghareeb et al., 2020	17 <i>E. coli</i> isolates	nonhuman/ minced meat samples
El-Mahdy et al., 2017	10 <i>A. calcoaceticusbaumannii</i> isolates	human
El-Tayeb et al., 2017	33 <i>S. enterica</i> strains	(human/ stools, urine and blood samples) & (nonhuman/ Sewage Treatment Plant)
Fadlelmula et al., 2016	59 <i>E. coli</i> isolates	human & nonhuman (camel)
Garaween et al., 2016	48 <i>salmonella</i> isolates	human/stool, blood, perianal abscess, urine,wound, chest drain and bone marrow.
Hala et al., 2019	286 MDR <i>Klebsiella</i> spp. isolates	human
Hassan et al., 2016	12 isolates of <i>Enterococcus</i> spp.	human
Helmi et al., 2013	98 Gram-positive isolates (MRSA)	human/ urine, blood, wound and respiratory secretion.
Ibrahim et al., 2014	120 MDR <i>E. coli</i> isolates	human/ urine, Wound pus, Vaginal swab, Blood culture, Stool, Ear swab.
Khairy et al., 2011	5 isolates	human
Memish et al., 2015	242 isolates Gram-negative bacteria (<i>Enterobacteriaceae</i> , <i>P. aeruginosa</i> and <i>A. baumannii</i>)	human
Pal et al., 2017	32 <i>Escherichia coli</i> Isolates	human
Saeed et al., 2010	319 isolates	human
Shobrak et al., 2013	118 bacterial isolates	nonhuman/ birds
(Somily et al., 2010)	83 gram positive isolates & 254 MDR gram negative isolates	human
(Somily et al., 2010)	273 isolates	human
Somily et al., 2014	568 <i>Mycobacterium tuberculosis</i> isolated.	human
Varghese et al., 2013	322 drug-resistant TB isolates	human
(Varghese et al., 2013)	524 <i>Mycobacterium tuberculosis</i> isolates	human
Zaman et al., 2014	23 <i>Klebsiella pneumoniae</i> isolates	human
Zaman et al., 2018	71 CRKP isolates	human
Abulreesh et al., 2011	37 <i>staphylococcus aureus</i>	nonhuman/ food and environment in makkah
Nasser et al., 2020	39 <i>P. aeruginosa</i> isolates	human
Abdalhamid., 2018	3 <i>C. auris</i>	human
Oman		
Sonnevend et al., 2016	-	Human / blood/ urine/ wound

Balkhair et al., 2015	total =329; 107 <i>Acinetobacter baumannii</i> ; 60 <i>Escherichia coli</i> (ESBL); 35 Methicillin-resistant <i>Staphylococcus aureus</i> ; 34 <i>Klebsiella pneumoniae</i> (ESBL); 27 <i>Pseudomonas aeruginosa</i> ; 26 <i>Klebsiella pneumoniae</i> (CRE); 25 <i>Stenotrophomonas maltophilia</i> ; 5 <i>Escherichia coli</i> (CRE); 5 <i>Burkholderia cepacia</i> ; 4 <i>Enterobacter cloacae</i> ; 2 <i>Enterococcus faecalis/faecium</i> (VRE)	Human / Bloodstream infection/ Pneumonia/ Urinary tract infection/ Surgical infection
Alkharousi et al., 2019	14 enterobacterial/ 6 <i>E.coli</i> , 4 <i>Enterobacter cloacae</i> , one of each isolate each of <i>Citrobacter freundii</i> , <i>Enterobacter asburiae</i> , <i>Enterobacter hormaechei</i> , and <i>Enterobacter ludwigii</i>	Non-Human / fresh fruits and vegetables.
Sonnevend et al., 2015	Strains No.1, 2, 4, 6, 13, 15 <i>K. pneumoniae</i> and 3 <i>E. coli</i>	Human / respiratory/ blood / urine/ screening
Zowawi et al., 2015	117 <i>A. baumannii</i>	Human
Poirel et al., 2010	419 <i>Klebsiella pneumoniae</i> .	Human / urinary catheter
Alwaidy et al., 2018	-	Human
pal et al., 2017	4 MDR <i>E.coli</i> strain	Human
Metry et al., 2017	-	Human
Qatar		
Taj Aldeen et al., 2013	13 <i>Nocardia</i> isolates (from 2006 to June 2010.)	Human / pus aspirate / sputum/ corneal/ scraping/ swab/ blood
Elshafie at al., 2016	134 <i>Streptococcus pneumoniae</i>	Human / blood and cerebrospinal fluid specimens
Garcell et al., 2016	12 beta-lactamase producers (ESBL) <i>Escherichia coli</i> , 4 <i>Pseudomonas aeruginosa</i> , and	Human
	1 <i>E. coli</i> , 1 <i>Enterococcus faecalis</i> , 1 <i>Klebsiella pneumoniae</i> (ESBL) and 1 group <i>B Streptococcus</i>	
Alsamawi et al., 2016	372 <i>A. baumannii</i>	Human / Blood/ Respiratory tract/ Urine
O. Eltal et al., 2018	90 <i>E.coli</i>	Non-Human / chicken cloacal samples
Khan et al., 2014	10 <i>Klebsiella pneumoniae</i> .	Human / sputum, blood, wound , urine
Ahmed et al., 2020	75 MDR- <i>P. aeruginosa</i>	Human
Rolain et al., 2016	48 MDR <i>A. baumannii</i>	Human
AbdulWahab et al., 2014	16,11, 12,3 <i>P. aeruginosa</i> .	Human / sputum or deep-pharyngeal swab samples from CF patients and non CF patients and other Environmental .
Ali et al., 2020	223 MDR-TB. (patients number)	human
AbdulWahab et al., 2017	61 <i>Pseudomonas aeruginosa</i>	Human / lower respiratory samples of pediatric and adult CF patients
Al mulla et al., 2014	116 isolated strains of Gram-positive and Gram-negative bacteria.	Human / blood
O. Eltai et al., 2020	17 <i>E. coli</i>	Human / diarrheagenic stool positive samples
Khan et al., 2010	167 total of gram positive and gram negative Bacteria; 12 <i>Acinetobacterspp</i> , 21 <i>Enterobacter</i> , 97 <i>Escherichia coli</i> , 39 <i>Klebsiella spp.</i> , 21 <i>Pseudomonasaeruginosa</i> , 39 <i>SalmonellaTyphi</i> , 13 <i>Salmonellaspp</i> , 53 <i>Staphylococcusaureus</i> , 33 <i>CoagulasenegativeStaphylococci</i> , 34 <i>Streptococcuspneumoniae</i> , 22 <i>Streptococcispp</i> , 19 <i>Enterococcusspp</i>	Human / IV catheter/Genitourinary system/ Respiratory system/ Gastrointestinal system/ Wounds/ Nervous system/Skin/soft tissue/ Surgical sites
Ghunaim et al., 2015	total 174, only 73 <i>Campylobacter</i>	Human

Al-Dulaimi et al., 2019	60 <i>V. vulnificus</i> only 23 <i>V. vulnificus</i> isolates from Qatar	non- human / from Mercenaria mercenaria
Hasan et al., 2020	-	human/ blood culture and urine culture
United Arab Emirates		
Alatoom et al., 2017	23 ESBL <i>E. coli</i> ; 6 <i>K. pneumoniae</i> ; 31 <i>P. aeruginosa</i> ;49 <i>K. pneumoniae</i> ; 11 <i>E. coli</i>	Human / blood, and urine, and other body tissues and fluids including wounds and abdomen
Alatoom et al., 2018	-	Human / blood
Mechkarska et al., 2010	6 strains of methicillin-resistant <i>S. aureus</i> (MRSA) strains and 5 multidrug-resistant <i>Acinetobacter baumannii</i> (MDRAB) strains	Non-Human/ skin secretions of the tetraploid frog <i>Xenopus borealis</i> Parker(frog)
Nekidy et al., 2017	-	Human/ Urine culture
Narchi et al., 2010	26 <i>E.coli</i>	Human/ urine by bag specimen
Mechkarska et al., 2013	6 MRSA/ 5 <i>A. baumannii</i> strains / 8 independent carbapenemase-producing isolates	human / wounds of patients
Conlon et al., 2011	5 independent colistin-susceptible <i>A. baumannii</i> strains	non- human/ frog skin
Habous et al., 2021	1116 <i>M. tuberculosis</i>	Human
Alzarouni et al., 2010	-	Human
Conlon et al., 2010	5 independent <i>A. baumannii</i> strains	Non- human/ skin secretions of the midwife toad <i>Alytes obstetricans</i>
Sonnevend et al., 2016	4 <i>E. coli</i> isolates ; 1 from UAE	Human
Conlon et al., 2012	<i>Acinetobacter baumannii</i> strain NM8; <i>Stenotrophomonas maltophilia</i> B32/4 strain/ RP62A/1 <i>S. epidermidis</i> , and RP62A/1 <i>S. epidermidis</i>	Non- Human / from skin secretions of the midwife toad, <i>Alytes obstetricans</i>
pal et al., 2017	41 NDM-producing <i>Enterobacteriaceae</i>	Human
Abro et al., 2017	-	Human/ blood culture
Mutti et al., 2017	-	Human
Kuwait		
Abulhasan et al., 2020	84 were <i>Enterobacteriaceae</i> / 15 <i>P aeruginosa</i> / 11 were <i>Enterococcus faecalis</i> / Seven of the 15 <i>Staphylococcus aureus</i> isolates were MRSA	Human / respiratory infection , wound infections , polymicrobial infections
Ahmad et al., 2011	39 <i>M. tuberculosis</i> from the Middle Eastern	Human
Al-Mutairi et al., 2018	60 MDR-TB	Human
Al-Mutair et al., 2019. - Occurrence of disputed <i>rpoB</i>	242 <i>M. tuberculosis</i>	Human / pulmonary , extrapulmonary, pleural fluid, lymph node, tissue, cerebrospinal fluid, and gastric aspirate, specimens collected from TB patients
Al-Mutairi et al., 2010	125 <i>M. tuberculosis</i>	Human
Al-Sweih et al., 2010	94 <i>Acinetobacter baumannii</i>	Human / respiratory tract infections, bloodstream infections, wound infections, urinary tract infections ,and miscellaneous infections.
Al-Mutair et al., 2019- Molecular characterization	93 MDR-TB	Human/ pulmonary and extra-pulmonary specimens
Albert et al., 2019	9 <i>Enteritidis</i> and 11 <i>s.enteritidis</i> , 6 <i>S.typhimurium</i> , and 6 <i>S.typhimurium</i>	Human / blood culture

Alfadli et al., 2018	41 total :17 <i>Acinetobacter baumannii</i> , 8 <i>Klebsiella pneumoniae</i> , 6 <i>Staphylococcus aureus</i> , 6 <i>Pseudomonas aeruginosa</i> , 2 <i>Enterococcus faecalis</i> , 1 <i>Serratia marcescens</i> , 1 <i>Enterococcus gallinarum</i>	Human
Alfouzan et al., 2020	71(17 candidemic and 54 colonized) patients including 26 with candiduria / 7 environmental samples yielded <i>C. auris</i> .	Human / obtained from axilla, groin, anterior nares, vascularline exit site, oropharynx, respiratory and/or urinary tract from patients with or without clinical signs of infection. Environmental samples from rooms/units occupied by all <i>C. auris</i> -infected/colonized patients: medical instruments, linen, walls/floor, furniture and high touch areas such as doorknob, bed railings/bedside drawer and toilet faucet/flush handles
Jamal et al., 2013	14 carbapenem non-susceptible enterobacterial/9 <i>K. pneumoniae</i> , 3 <i>Escherichia coli</i> , 1 <i>Enterobacter cloacae</i> and 1 <i>K. oxytoca</i>	Human / blood culture, urine, wound and central venous pressure Most patients were male .
Jamal et al., 2016	764 <i>Enterobacteriaceae</i> - <i>K. pneumoniae</i> (n = 25), <i>E. coli</i> (n = 22), <i>Morganella morganii</i> (n = 6), <i>Enterobacter cloacae</i> (n = 5), <i>Enterobacter aerogenes</i> (n = 2), and <i>Providencia stuartii</i> (n = 1)	Human / blood/ Urine/ Wound/ screening rectal swab / screening throat swab/ tissue / CVP tip
Khan et al., 2014	2 cholesterol-dependent <i>Candida glabrata</i> (Kw1018/12 and Kw1154/12)	Human / blood sample
Sonnevend et al., 2016	-	
Khan et al., 2018	17 isolates <i>Candida auris</i>	Human / blood sample
Sonnevend et al., 2019	5 <i>Klebsiella pneumoniae</i> , 1 <i>Enterobacter cloacae</i> , 1 <i>Escherichia coli</i>	Human
Wibberg, 2018	<i>A. baumannii</i> strain K50	Human / urine
Vali et al., 2014	173 ESBL-producing <i>K. pneumoniae</i>	Human / urine, bile, and catheter.
Pa' l et al., 2017	total 157, only 16 NDM-producing <i>Enterobacteriaceae</i> isolated from Kuwait	Human
Dashti et al., 2014	83 MDR <i>E. coli</i>	Human
Alfouzan et al., 2019	209 <i>Staphylococcus aureus</i>	Human/ medical wards, surgical wards , Obstetrics & gynaecology ward, Intensive care units,
Udo et al., 2017	total, 6,922 MRSA isolates	Human / Skin and soft tissues, Nasal swabs, Blood, Urine, Throat swabs, ear swabs,
Zowawi et al. 2015	117 isolates <i>Acinetobacter baumannii</i> / only Kuwait (n = 8)	Human / swab specimens /sputum/ blood
Ahmad et al. 2016	70 <i>Mycobacterium tuberculosis</i> isolates	Human
Ahmad et al. 2019	314 <i>Candida auris</i>	Human
Al-Mutairi et al. 2020	47 <i>Mycobacterium tuberculosis</i>	Human
AlFouzan et al. 2012	291 <i>Staphylococcus aureus</i>	Human
Al-Mutairi et al. 2011	48 <i>Mycobacterium tuberculosis</i> strains	Human
AL-sweih et al. 2011	250 <i>Acinetobacter baumannii</i> isolates	Human
Hamza et al. 2018	71 patients	Human
Ibrahim et al. 2018	954 patients	Human
Jamal et al. 2014	<i>Acinetobacter baumannii</i> (13), <i>Haemophilus influenzae</i> (2) <i>Klebsiella pneumoniae</i> (10), <i>Klebsiella oxytoca</i> (2) <i>Legionella pneumophila</i> (2), <i>Proteus sp.</i> (1) <i>Pseudomonas aeruginosa</i> (12), <i>Serratia marcescens</i> (3)	Human

<i>Staphylococcus aureus</i> (5)		
Jamal et al. 2015	66 <i>Enterobacteriaceae</i> isolates	Human
Khan et al. 2018	280 <i>Candida</i> spp.	Human
Lesho et al. 2016	<i>Salmonella enterica</i> (-)	Human
Mokaddas et al. 2016	452 <i>Mycobacterium tuberculosis</i> Isolates	Human
Nasser et al. 2018	6 <i>Acinetobacter baumannii</i> strains	Human
Sonnevend et al. 2015	17 <i>Klebsiella pneumoniae</i>	Human
5 <i>E. coli</i>		
3 <i>Enterobacter cloacae</i> +2 others		
Toprak et al. 2018	14 <i>Prevotella bivia</i> , 1 <i>Prevotella disiens</i> , 1 <i>Prevotella nigrescens</i>	Human
Emara et al. 2015	1 <i>Candida auris</i>	Human
Bahrain		
Sonnevend et al. 2016	2 <i>E. Coli</i> strains	Human
Thani, 2019	1 <i>E. Coli</i> strain	Human
Zowawi et al. 2015	8 <i>Acinetobacter Baumannii</i> isolates	Human
Jordan		
Abdel-Halim et al. 2019	3 <i>E. Coli</i> strains	Human
Alaboudi et al. 2020	32 <i>Campylobacter</i> isolates	Chickens
Älgå et al. 2018	36 MDR bacteria	Human
Al-lawama et al. 2016	19 <i>Acinetobacter</i> spp.	Human
Almomani et al. 2015	119 <i>Acinetobacter baumannii</i>	Human
Al-Zoubi et al. 2015	358 <i>Staphylococcus aureus</i> isolates	Human
Badran et al. 2015	142 <i>E. Coli</i>	Human
Batarseh et al. 2015	116 <i>Acinetobacter baumannii</i>	Human
Burjaq et al. 2020	29 <i>Salmonella</i> spp.	Irrigation water
Darwish et al. 2010	2 <i>E. Coli</i> strains	Human
Haddadin et al. 2019	68 <i>E. Coli</i> strains, 70 <i>E. Coli</i> strains	Human, Green vegetables
Ibrahim et al. 2019	269 <i>E. Coli</i> strains	Chicken
Nairoukh et al. 2018	150 <i>E. Coli</i> strains	Human
Nimri et al. 2011	100 <i>Mycobacterium tuberculosis</i> strains	Human
Obaidat et al. 2015	156 <i>Staphylococcus aureus</i> isolates	Fish
Obaidat et al. 2020	53 <i>L. monocytogenes</i> 287 <i>S. enterica</i> 17 <i>E. coli</i> isolates	Beef cattle
Obeidat et al. 2014	74 <i>Acinetobacter baumannii</i>	Human
Osaili et al. 2013	5 <i>Salmonella</i>	Meat products
21 <i>Listeria monocytogenes</i>		
Samrah et al. 2015	-	Human
Tarazi et al. 2020	34 <i>E. coli</i> isolates	Chicken
Tarazi et al. 2021	15 <i>Pseudomonas aeruginosa</i>	Drinking water
16 <i>Pseudomonas aeruginosa</i>		
Abu Salah et al. 2013	52 <i>E. Coli</i>	Human
Al-Dabaibah et al. 2012	63 <i>A. baumannii</i>	Human
Alkhawaja et al. 2020	<i>Propionibacterium acnes</i> , <i>Staphylococcus aureus</i> , <i>Staphylococcus epidermidis</i>	Human

Al-Lahham et al. 2017	241 <i>Streptococcus pneumoniae</i>	Human
Burjaq et al. 2013	17 <i>E. Coli</i>	Vegetables
Ghanem et al. 2018	21 <i>E. Coli</i>	Hospital and home environment
Ismail et al. 2017	30 <i>Staphylococcus aureus</i>	Cows milk
Nimri et al. 2014	41 <i>E. Coli</i> , 37 <i>Salmonella spp.</i>	Meat
Obaidat et al. 2017	140 <i>Staphylococcus aureus</i>	dairy cattle, sheep, and goat bulk tank milk
Sallam et al. 2019	544 <i>Streptococcus pneumoniae</i>	Human
Iraq		
Ahmed et al. 2014	270 <i>Mycobacterium tuberculosis</i> isolates	Human
Ahmed et al. 2018	25 <i>Pseudomonas aeruginosa</i>	Human
Al-Delaimi et al. 2020	20 <i>Pseudomonas aeruginosa</i> (patient samples)	Human
Al-Guranie et al. 2020	112 <i>E. Coli</i> strains, 17 MDR	Human
Al-Kadmy et al. 2017	21 <i>Acinetobacter baumannii</i>	Human
Al-Mayahie et al. 2013	61 <i>E. Coli</i> isolates	Human
Al-Muhanna et al. 2016	17 <i>Morganella morganii</i> isolates	Human
Al-Rubaye et al. 2015	110 isolates, 40 MDR <i>Mycobacterium tuberculosis</i> strains	Human
Huang et al. 2012	38 <i>Enterobacteriaceae</i> isolates, 13 MDR strains	Human
Ibrahim et al. 2014	10 <i>E. Coli</i> isolates	Human
	10 <i>E. Coli</i> isolates	River water
Jasim et al. 2020	100 <i>Arcobacter butzleri</i>	Cattle meat product
	20 <i>Cryaerophilus</i>	
Kareem et al. 2017	30 <i>Acinetobacter baumannii</i>	Human
Kusradze et al. 2011	8 <i>Acinetobacter baumannii</i> strains	Human
Mahdi et al. 2017	14 <i>Acinetobacter baumannii</i> isolates	Camel milk
Mahdi et al. 2019	37 <i>Pseudomonas aeruginosa</i>	Human
Merza et al. 2010	12 <i>Mycobacterium tuberculosis</i> strains	Human
Muslim et al. 2017	51 <i>Acinetobacter baumannii</i>	Human
Pishtiwan et al. 2019	20 <i>Klebsiella pneumoniae</i>	Human
	48 <i>E. Coli</i>	
Talat et al. 2020	1 <i>Staphylococcus epidermidis</i> ST35 strain	Human
AbdAlhussen et al. 2016	40 <i>Pantoea spp.</i>	Human and hospital environment
Abed et al. 2020	142 <i>E. Coli</i> isolates	Chicken
Ahmed et al. 2015	3 <i>Listeria monocytogenes</i>	Chicken
Al Zebary et al. 2017	85 <i>S. aureus</i> isolates	Human
Alaa et al. 2020	87 <i>E. coli</i>	Human and different animals
AL-Fatlawy et al. 2020	231 <i>Salmonella Typhi</i>	Human
Al-Gburi et al. 2020	4 <i>Providencia spp.</i>	Cow's milk
Alhamdani et al. 2020	41 <i>Pseudomonas aeruginosa</i>	Human and hospital environment
AL-Harmoosh et al. 2016	10 <i>A. baumannii</i>	Human
Ali et al. 2018	148 <i>E. Coli</i>	Human usinary tract
Ali et al. 2020	40 <i>Pseudomonas aeruginosa</i>	Human

Ali et al. 2021	19 <i>K. pneumoniae</i> , 14 <i>E. coli</i> , 7 <i>P. aeruginosa</i> , 3 <i>Enterbacter</i> spp., 2 <i>K. oxytoca</i> , 2 <i>A. baumannii</i> , 1 <i>Citrobacter koseri</i>	Human
Aljanaby et al. 2017	122 <i>P. aeruginosa</i> , 83 <i>K. pneumoniae</i> , 32 <i>E. Coli</i> , 5 <i>A. baumannii</i> , 2 <i>Proteus</i> spp.	Human
Aljanaby et al. 2018	80 <i>K. pneumoniae</i>	Human
Aljanaby et al. 2018	<i>Staphylococcus saprophyticus</i> 8, 109 <i>Escherichia coli</i> , <i>Klebsiella pneumoniae</i> 85, <i>Acinetobacter baumannii</i> 32, <i>Pseudomonas aeruginosa</i> 18, <i>Serratia marcescens</i> 11	Human
AL-Khikani et al. 2020	2 <i>Klebsiella oxytoca</i> , 16 <i>K. pneumoniae</i>	Human
Alm'amoori et al. 2020	49 <i>E. Coli</i>	Human
Al-Mayahi et al. 2018	1209 <i>Providencia</i> sp.	Human, chickens, soil, wastewater , food
Al-Mayahi et al. 2020	6 <i>Listeria monocytogenes</i>	Human
AL-Muqdad et al. 2019	69 <i>K. pneumoniae</i>	Human
Al-Ouqaili et al. 2018	44 <i>A. baumannii</i> , 9 <i>Pseudomonas aeruginosa</i>	Human
Al-Sa'ady et al. 2019	5 <i>E. faecalis</i>	Human
Al-Sa'ady et al. 2020	10 <i>Streptococcus pneumoniae</i>	Human
Alyousef et al. 2017	97 <i>K. pneumoniae</i>	Human
Awayid et al. 2019	90 <i>E. Coli</i>	Human
Azeez et al. 2019	11 <i>Acinetobacter baumani</i>	Human
Aziz et al. 2019	99 <i>Staphylococcus aureus</i>	Human
Babakir-Mina et al. 2012	1063 <i>Staphylococcus aureus</i>	Human
Behbahani et al. 2019	63 <i>Pseudomonas aeruginosa</i>	Human
Dawood et al. 2020	12 <i>E. Coli</i>	Human
Dibby et al. 2020	60 <i>Salmonella enterica</i>	Human
Fazaa et al. 2020	55 <i>Pantoea</i> spp.	Human
Flaifel et al. 2020	60 <i>Mycobacterium Tuberculosis</i>	Human
Ghaima et al. 2016	48 <i>Acinetobacter baumannii</i>	Human
Hammoudi et al. 2019	18 <i>K. pneumoniae</i> , 10 <i>P. aeruginosa</i> , 6 <i>P. mirabilis</i> , 31 <i>E. Coli</i>	Human
Hanan et al. 2019	20 <i>Vibrio cholerae</i>	Human
HARB et al. 2017	33 <i>Salmonella enterica</i>	Human
Hasan et al. 2019	36 <i>Pseudomonas aeruginosa</i>	Human
Hayder et al. 2019	30 <i>Citrobacter freundii</i>	Human
Jaaffar et al. 2019	82 <i>Pseudomonas aeruginosa</i>	Human
Jassim et al. 2020	4 <i>Salmonella</i> spp.	Milk
Kanaan et al. 2019	35 <i>Staphylococcus aureus</i>	Meat
Kanaan et al. 2020	20 <i>Campylobacter jejuni</i>	Chicken
Kareem et al. 2019	<i>P. aeruginosa</i> , <i>A. baumannii</i>	Human
Karomi et al. 2020	13 <i>E. Coli</i>	Human
Majeed et al. 2018	<i>E. coli</i> 49, <i>K. pneumonia</i> 35, <i>Pseudomonas aeruginosa</i> 18, <i>Citrobacter freundii</i> 12, <i>Enterobacter aerogenes</i> 8, <i>Proteus mirabilis</i> 4	Human
Qasim et al. 2019	10 <i>Acinetobacter Baumannii</i>	Human
Radhi et al. 2019	21 <i>Acinetobacter baumannii</i>	Human

Ridha et al. 2019	124 <i>Acinetobacter baumannii</i>	Human
Sahan et al. 2020	50 <i>Serratia marcescens</i>	Human
Salman et al. 2018	66 <i>Klebsiella pneumoniae</i>	Human
Shlash et al. 2018	50 <i>K. pneumoniae</i>	Human
Suhail et al. 2020	21 <i>Mycobacterium tuberculosis</i>	Human
Tuwaij et al. 2020	30 <i>K. pneumoniae</i>	Human
Wahaab et al. 2021	<i>Escherichia coli</i> , <i>Klebsiella pneumoniae</i> , <i>Acinetobacter baumannii</i> , <i>Staph. Epidermidis</i> , <i>Staph. hemolyticus</i> , <i>Staph. aureus</i>	Human
Yemen		
Bakour et al. 2014	3 <i>Acinetobacter baumannii</i> strains	Human
Jaber et al 2019	52 <i>Mycobacterium tuberculosis</i> isolates	Human
Jaber et al. 2019	115 <i>Mycobacterium tuberculosis</i> isolates	Human
AL Baidani et al. 2011	60 <i>Staphylococcus aureus</i>	Human
Al-Mahbashi et al. 2012	120 <i>Mycobacterium tuberculosis</i>	Human
Nasser et al. 2019	65 <i>Pseudomonas aeruginosa</i>	Human

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