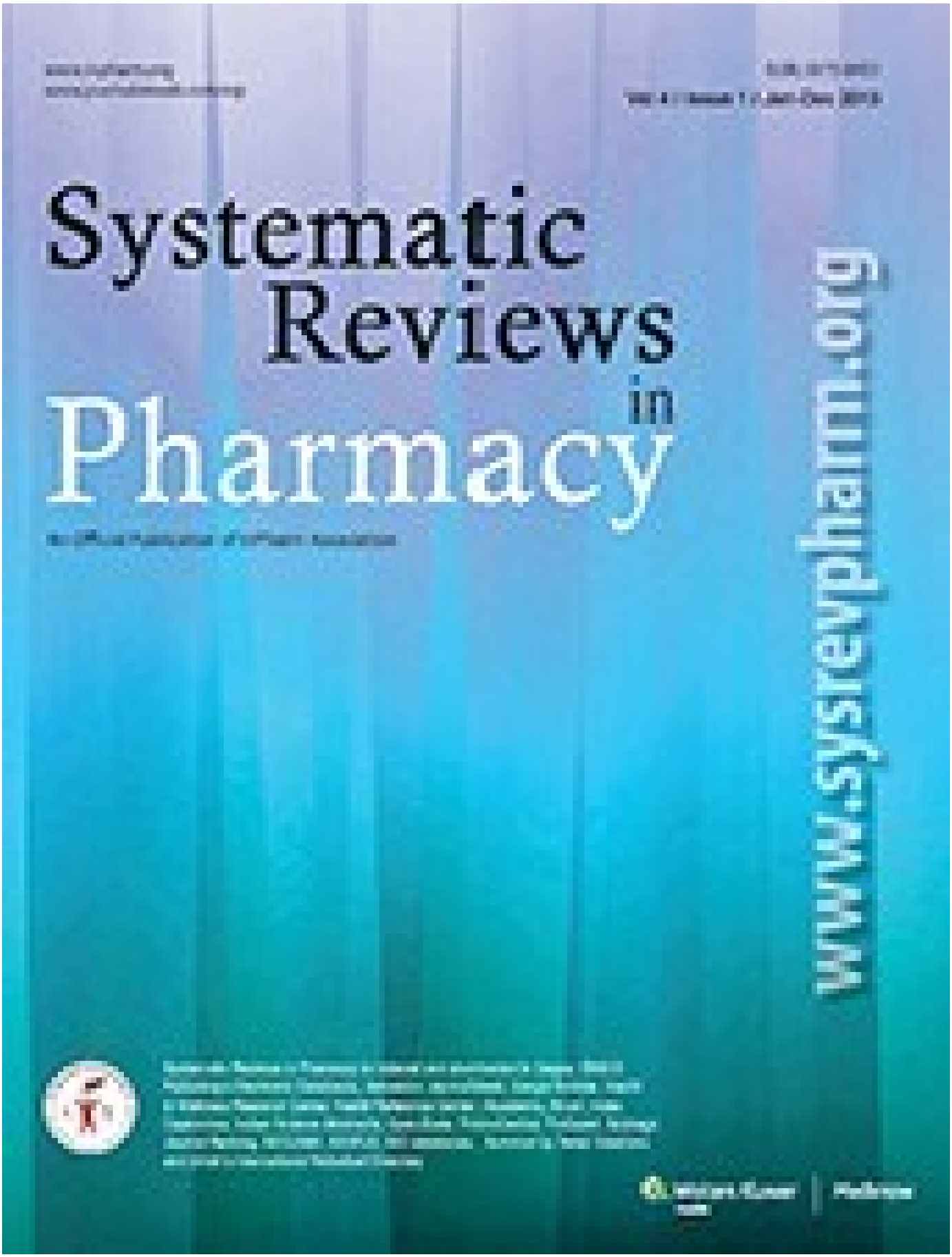
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Review Article

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SRP. 2020; 11(8): 21-32

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doi: 10.31838/srp.2020.8.4 (http://dx.doi.org/10.31838/srp.2020.8.4)

5. **The Influence of Palatine Rugae Duplication on Speech Quality of Complete Denture Wearers**

   Ike Damayanti Habar, Eri Hendra Jubhari, Irfan Dammar, Meriyam Muchtar

   SRP. 2020; 11(8): 33-36

   » Abstract (?mno=127026) » PDF (index.php?fulltxt=127026&fulltxtj=196&fulltxtp=196-1597916628.pdf) »

   doi: 10.31838/srp.2020.8.5 (http://dx.doi.org/10.31838/srp.2020.8.5)

6. **COMPRESSIVE STRENGTH OF ACRYLIC RESIN PLATE AFTER IMMERSING IN DENTURE CLEANSHER ALGA CHOCOLATE**

   Mohammad Dharma Utama, Fuad Husain Akbar, Andi Kartika

   SRP. 2020; 11(8): 37-42

   » Abstract (?mno=127829) » PDF (index.php?fulltxt=127829&fulltxtj=196&fulltxtp=196-1598155133.pdf) »

   doi: 10.31838/srp.2020.8.6 (http://dx.doi.org/10.31838/srp.2020.8.6)

7. **The Effect of Locus of Control on Employees' Job Satisfaction**

   Heni Yuwono, Anis Eliyana, Agung Dharmawan Buchdadi, Hamidah, Tuty Sariwulan, Rizki Johan Handicapilano

   SRP. 2020; 11(8): 43-50

   » Abstract (?mno=129463) » PDF (index.php?fulltxt=129463&fulltxtj=196&fulltxtp=196-1598613702.pdf) »

   doi: 10.31838/srp.2020.8.7 (http://dx.doi.org/10.31838/srp.2020.8.7)

8. **A Review of Vibriosis in Fisheries: Public Health Importance**

   Azhar Muhammad Helmi, Akhmad Taufiq Mukti, Agoes Soegianto and Mustofa Helmi Effendi

   SRP. 2020; 11(8): 51-58

   » Abstract (?mno=129466) » PDF (index.php?fulltxt=129466&fulltxtj=196&fulltxtp=196-1598615328.pdf) »

   doi: 10.31838/srp.2020.8.8 (http://dx.doi.org/10.31838/srp.2020.8.8)

9. **A Review of Methicillin-Resistant Staphylococcus aureus (MRSA) on Milk and Milk Products: Public Health Importance**

   Aswin Rafif Khairullah, Sri Agus Sudjarwo, Mustofa Helmi Effendi, Nenny Harijani, Wiwiek Tyasningsih, Jola Rahmahani, Dian Ayu Permatasari, Sancaka Cashyer Ramandinianto, Agus Widodo, Katty Hendriana Priscilia Riwu

   SRP. 2020; 11(8): 59-69

   » Abstract (?mno=129529) » PDF (index.php?fulltxt=129529&fulltxtj=196&fulltxtp=196-1598622077.pdf) »

   doi: 10.31838/srp.2020.8.9 (http://dx.doi.org/10.31838/srp.2020.8.9)

10. **The Effect of Accounting Training on Accounting Information in Small and Medium Micro Enterprises**

    Meiryani, ASL Lindawati, Tommy Andrian, Ning Alya Cindani

    SRP. 2020; 11(8): 70-75

    » Abstract (?mno=129665) » PDF (index.php?fulltxt=129665&fulltxtj=196&fulltxtp=196-1598670093.pdf) »

    doi: 10.31838/srp.2020.8.10 (http://dx.doi.org/10.31838/srp.2020.8.10)

11. **The Effect of System User Support on Accounting Information Systems**

    Meiryani, Yen Sun, Sani Muhammad Isa, Verren Livia Candra

    SRP. 2020; 11(8): 76-82

    » Abstract (?mno=129666) » PDF (index.php?fulltxt=129666&fulltxtj=196&fulltxtp=196-1598670177.pdf) »

    doi: 10.31838/srp.2020.8.11 (http://dx.doi.org/10.31838/srp.2020.8.11)

12. **Accounting Information Systems Evaluation of Medicines Management**
    Meiryani, Dezie Leonarda Warganegara, Kevin Deniswara, Kartika Dewi
    SRP. 2020; 11(8): 83-87
    » Abstract (?mno=129667) » PDF (index.php?fulltxt=129667&fulltxtj=196&fulltxtp=196-1598670286.pdf) »
    doi: 10.31838/srp.2020.8.12 (http://dx.doi.org/10.31838/srp.2020.8.12)

13. **ANTIDIABETIC POTENTIAL OF MATOA BARK EXTRACT (Pometia pinnata) IN ALLOXAN-INDUCED DIABETIC MALE RAT STRAIN WISTAR (Rattus norvegicus)**
    Gita Sekar Prihanti, Raden Mochammad Kelvin Katjasungkana, Bella Ruli Novitasari, Shania Rizky
    SRP. 2020; 11(8): 88-97
    » Abstract (?mno=129920) » PDF (index.php?fulltxt=129920&fulltxtj=196&fulltxtp=196-1598715256.pdf) »
    doi: 10.31838/srp.2020.8.13 (http://dx.doi.org/10.31838/srp.2020.8.13)

Short Communication

14. **A Guide for Estimating the Maximum Safe Starting Dose and Conversion it between Animals and Humans**
    Mohamed J. Saadh, Mansour Haddad, Moeen F. Dababneh, Mohammad F. Bayan, Bilal A. Al-Jaidi
    SRP. 2020; 11(8): 98-101
    » Abstract (?mno=130357) » PDF (index.php?fulltxt=130357&fulltxtj=196&fulltxtp=196-1598870098.pdf) »
    doi: 10.31838/srp.2020.8.14 (http://dx.doi.org/10.31838/srp.2020.8.14)

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A Review of Vibriosis in Fisheries: Public Health Importance

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ABSTRACT

Spp vibrio. This is a gram-negative battery which causes human and animal vibriosis. In public health, vibriosis is classified as an essential zoonotic disease. In humans, vibriosis is broken down into two groups of cholera and non-cholera infections. Cholera is a gippy tummy complaint that causes substantial mortality and dying in all the world. Vibrio spp noncholera. Occupy moderate to big salinity environments and can be seen in sea water and fish. These germs are the very vital pathogens in humans from the environment that come from aquatic and marine habitats. Efforts to control vibriosis in fish farming activities still rely on the use of drugs or antibiotics. Some of the antibiotics commonly used in aquaculture in Indonesia are oxytetracycline, chloramphenicol, erytromycin, streptomycin, neomycin, and enrofloxacin. These types of germicidal are generally used to treat germs illness in fish and shrimp through oral or immersion. However, the use of antibiotics for a certain period of time can cause the fish's body to develop resistance to pathogenic bacteria, polluting the environment and eventually killing the non-target organisms. High antibiotic use can lead to increased germicidal resistance. Awareness raising is critical to limiting inappropriate germicidal use. The goal of this analysis is to reduce the rising and emergence of antibiotic hospitality in V. cholerae, the ecology of germicidal hospitality genes, the antibiotic resistance mechanisms and the genomic parts involved in the spread of antibiotic hospitality.

Keywords: Public health, Antibiotic resistance, Vibrio spp, Vibriosis

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INTRODUCTION

Spp vibrio. is a gram-negative bacterium causing human and animal vibriosis [1]? In humans, vibriosis is broken down into two groups of cholera and non-cholera infections. [2] The illness is an inner disease produce by the Vibrio cholerae germs. Cholera transmission through food, drink contaminated by the bacteria Vibrio cholerae. Or contact with a cholera carrier. In the small intestine, the Vibrio cholerae bacteria will act by removing the toxin in the intestinal tract, resulting in diarrhea accompanied by acute and severe vomiting [3]. Non-cholera, such as V. non-sporeforming and V. Vulnificus, can cause vibriosis that is an infection with various clinical expression layingg on the pathogenic species, infection mechanism and susceptibility to the host. Non-cholera bacteria may cause mild gastroenteritis or primary septicemia such as septicemia following ingestion of contaminated raw or undercooked food, while exposure to contaminated water to skin wounds may cause wound infection that may lead to secondary septicemia. Vibrio spp noncholera. Occupy moderate to high salinity environments, and can be found in sea water and fish. These bacteria are biologically significant human pathogens.

Wild fishing is important for food security in developing countries [5], particularly in African countries where aquaculture is still neglected and fish provide a large proportion of food based on animals [6]. In 2009, the region ranked second only to Asia in a ratio of 18.5 vs. 23 per cent of total animal protein provided by fish [7]. Besides their vital role in giving big quality power, fish also provide difference big fatty acids and inner micronutrients-including victuals B and D, phosphorus, power that rise the overall health [8]. Micronutrients are highly bioavailable in fish and easily accessible from other sources of food, in particular for the poor [9]. Alternatively, fish consumption increases micronutrient absorption from plant foods [8]. As a outcome, the use of fish in food-based nutrition initiatives to counter malnutrition is increasing [10–13].

Fishery is an important field in a country's food security, where the fisheries system plays a major role in spreading cholera to humans[14]. Cholera disease is a major public health threat, causing 2,9 million deaths and 98,000 deaths worldwide from 2008 to 2012[15]. Vibrio cholerae is found in various freshwater fish that are commonly consumed. Besides that V. cholerae is also resistant to heavy metals. Efforts to control vibriosis in fish farming activities still rely on the use of drugs or antibiotics. Some of the 2 antibiotics commonly used in aquaculture in Indonesia are oxytetracycline, chloramphenicol, erytromycin, streptomycin, neomycin, and enrofloxacin. These types of antibiotics are generally used to treat bacterial diseases in fish and shrimp through oral or immersion. The use of antibiotics for a certain period of time can cause problems with pathogenic bacteria resistance to these antibiotics in the fish body, polluting the environment which can eventually kill non-target organisms [16].

The emergence of antibiotic resistance is a good important several parts and several methods may affect the frequency of its occurrence, including the environment, density of microbial communities in some habitats, patterns of antibiotic use in health, livestock, food, and agriculture [17]. A variety of processes such as

transformation, conjugation, transduction, and outer membrane vesicle fusion (OMV) mediating horizontal gene transfer (HGT) are the key ways for the rapid emergence of antimicrobial reisistance (AMR) pathogenic isolates [18]. Environmental factors, particularly compounds that induce germs responses that modulate HGT, are very important for the exchange of genetic material like AMR genes between bacteria in different species [19,20]. The prevalence of V. cholerae, which is AMR in nature, has maked steadily in recent decades and has spread throughout the world as a outcome of overuse and misuse of antibiotics in different industries [21, 22]. The rapid spread of resistance among pathogenic bacteria, including V. cholerae, is now a major challenge to both public health and the production of new antimicrobials by pharmaceutical companies. The aim of this analysis is to investigate the emergence and spread of germicide hostility in V.

OVERVIEW OF VIBRIO

Several species of vibrio have been claimed to infect infection in humans and aquatic animals, while a little count of other species have been used in cultivation as probiotics[23,24]. The Vibrio genus consisted of 14 different classes based on multilocus sequence analysis (MLSA): Clade has recently proved to be quite distinct and members have been amused into a fresh genus Aliivibrio[26].

The Harveyi class consisted originally of eight beings. In the Harveyi clade two more species have recently been identified, namely Vibrio communis and V. owensii [27,28]. Some of the species in the clade, however, show more than 99 percent similarity of 16S rRNA gene sequence [29,30, 31]. Harveyi Clade members occupy different ecological niches in the marine environment [32,33]. V. Cholerae V. Parahaemolyticus are pathogenic in humans. V. Vibrio vulnificus is a modern human-made pathogen. Such bacteria cause wound inflammation, gastroenteritis, or primary septicemia[34] syndrome.

The V. parahaemolyticus strain is highly used in studies of molecular and environmental evolution and may be useful in identifying the food products involved during epidemiological research. There are many techniques available for subtypes. Serotyping is the main and ancient method of isolate differentiation. Since many isolates (especially for K antigens) could not be eliminated, however, serotype alone did not provide a high discriminatory capacity. Several studies have employed multiple typing methods on a collection of specific isolates to assess the ability of these methods to differentiate between essentially the same or very different isolate groups. While there are several accurate and selective subtype methods available for V. parahaemolyticus, many methods may need to be used together to better understand the genetic interaction between isolates and to distinguish specific strains[35,36].

V. This vaccine in the world, with mortality rates reported in most countries at 50 percent or greater. This is of particular concern in places where shells are consumed raw or undercooked, although there is significantly increased incidence of fishing-related wound infections. This contain main areas which had not previously reported V 's presence. Vulnificus or its contamination, likely due to higher surface sea water temperatures and lower salinity. Many people with primary septicemia have a chronic underlying condition that leads to an immunocompromised status. Nevertheless, in fact , people with a potentially lethal wound infection usually do not have the underlying illness[34].

VIBRIOSIS

Cholera is considered as one of the oldest diseases and is still main burden in developing countries[37, 38]. A 12-year Florida study found that V. Vulnificus was the most common cause of primary septicemia among all species of Vibrio, accounting for 75 (64 per cent) of 118 cases, with a mortality rate of 56 per cent[39-42]. In another, wider epidemiological study of V. 23 countries confirmed to CDC vulnificus infection[43-47], a total of 422 V. vulnificus infections acquired between 1988 and 1996. Eighty-six per cent of all study patients were males [50,51,52]. The emergence of antibiotic resistance is a good important several parts and several methods may affect the frequency of its occurrence, including the environment, density of microbial communities in some habitats, patterns of antibiotic use in health, livestock, food, and agriculture. All V-caused were wound infection (45 per cent), primary septicemia (43 per cent), gastroenteritis (5 per cent) and undetermined infection (7 per cent). Vulnibus [54,55,56]. Primary septicemia patients usually have underlying liver disease, and 96 percent acquire infection after eating raw oysters harvested from the Gulf of Mexico [57-61]. When septicemia happened, 61 per cent of cases resulted in the death of the patient [62,63].

VIBRIO TRANSMISSION FROM FISHERIES

Fish also indirectly promotes being food caring and well-shaped, with revenue from the selling of fish used to buy food or to give permission to education services and health [64,65]. Most rural households are interested in fishing as section of ahigh strategy for diversification of their livelihoods, mixing diverse economic activities to mitigate risks and cope with shocks [66]. Employment and fishing income will improve household economic resilience and prevent increased deprivation, with the position of this safety net arguing that it is a significant contribution to small-scale fisheries [67].

Food contamination remains a problem around the world. New hazards have been created by recent developments in food production and processing techniques as well as by recent changes in food consumption trends. Consumption of untreated water and raw seafood in summer is another epidemiological evidence of V. cholerae transmission [68]. The research was performed to isolate, classify and evaluate the sensitivity of V. cholerae to antibiotics in different species of fish. In 1883 Robert Koch first identified V. cholerae, the causative agent for cholera. The widely distributed free-living organism Vibrio with highly motile Gram-negative curves or stems with one polar flagellum, and most oxidase positive species [69]. When an affected person's human waste flows into water supplies to the community [70]. In different studies, V. cholerae incidence sampling was carried out from different sites to provide good opportunities for isolation of different bacteria and to determine the greater incidence of different foodstuffs, in sampling was carried out in local target markets. Different types of marine fish that exist, study the types of fish selected showed the presence of target bacteria, this indicates the presence of water pollution related with the prevalence of V. cholerae. The biochemical tests that were carried out revealed the phenotypic similarities of the two species observed in the results of the oxidase test, TSI, catalase, and Voges-Proskauer methyl red [71] confirmed that the tests that had been applied in this study were able to efficiently

differentiate these species. Thus, for the detection of isolate species, conventional biochemical tests show low efficiency. Molecular recognition is a important method in clinical diagnosis; PCR-based detection targets different areas of DNA, for bacterial strain recognition. In addition, PCR allowed the identification of viable but non-cultivable strains [72] in the sample, amplified the 16S rRNA gene and showed good results. It is less labor intensive and much faster than conventional methods, and that is the reason its application is increasing among researchers [73]. Antibiogram profile revealed that all isolates showed multi-drug resistance to amoxicillin and nitrofurantoin. And they are susceptible to residual antibiotics used in this study that are commonly used to treat cholera infections. Mukhopadhyay et al. [74] reported the ineffectiveness of cotrimoxazole and furazolidone for treating patients with V. cholerae O1 infection and the emergence of nalidixic acid resistance among O1 strains from Calcutta patients [75], isolated and reported tetracycline resistant strains in Kolkata in 2005. There is agreement among all tested Vibrio strains between the results which demonstrated high individual and multiple antibiotic resistance, and other investigators [76,77]. The main source for ion therapy for microbial infections is antibiotics. Nevertheless, by cultivating antibiotic resistance [78], the high genetic diversity of micro-organisms helps them to easily escape antibiotic behavior. One research showed that all Vibrio strains contained antibiotic-resistant genes [79]. Thungapathra et al . showed that 43 strains contained R-plasmid in a total of 94 V. cholera isolates and had resistance to ampicillin, neomycin, tetracyclines, gentamicin, streptomycin, sulfonamides, furazolidone and chloramphenicol[80]. Given other well-reported cases of Vibrio outbreaks the isolates were not much resistant. Hence, the development of new and innovative antimicrobial drugs is urgently needed to effectively eradicate microorganism-producing disease [81-84] have also recently been isolated from cholera. Shitrit-Laviad et al. Reported high minimum inhibitory concentrations (MIC) of V. cholerae isolates (n = 48) from the fish gut to doxycycline (MIC 90 of 16 µg / mL)[85].

V. cholerae O1 and serogroup O139 produce cholera toxin (CT) that changes the permeability of epithelial cell membranes in the small intestine, resulting in uncontrolled water and electrolyte secretion into the colon and large intestine [86,87]. Virulence is a colonization and adherence factor feature [88,89], which can enhance the CT effect. Generally the onset is abrupt and can be related to vomiting. The American Public Health Association[90] reports that the infection is typically asymptomatic in most cases, or may cause moderate diarrhea. All of which can lead to shock and rapid death [91,92]. In cases of severe dehydration (cholera gravis; associated diarrhea stool equivalent to 1 L / h) [93] [90,92].

ANTIBIOTIC RESISTANCE ON FISHERIES

For more than six decades, antibiotics have been seen as a solution for curing bacterial infections. Microorganisms, however, have developed different ways of combating the new drugs that are being used against them. In recent years, the threat of infection caused by resistance-developing microbes has increased rapidly, with more than 50,000 deaths in Europe and the United States alone annually. In developing and underdeveloped countries the number of deaths from such infection is much higher[94]. The patterns of antimicrobial resistance (AMR) are significantly different globally. In particular, in Europe, most bloodstream-related infections are caused by Staphylococcus aureus. In developing and underdeveloped countries, the emergence of high resistance to tuberculosis (TB), malaria, and HIV has been documented.

The AMR pattern varies from country to country in relation to how much antimicrobial drug was used [95, 96, 97]. Antibiotic consumption has increased globally by 36% from 2000 to 2015 with significant variations across regions [98]. The most common Gram-negative AMR pathogens are the most common treatment for Pseudomonas aeruginosa, Salmonella enterica, Vibrio cholerae, Klebsiella pneumonia, and aminopencillin Escherichia coli [99, 100, 101]. In 2010 , India ranked first in antibiotic use globally with an average of 12.9 • 109 units [102, 103]. Treatment of antimicrobial agents will effectively monitor the occurrence and prevalence of pathogenic microorganisms caused by infectious diseases. The improper use of antimicrobial drugs in society, however, leads to the production of antimicrobial-resistant bacteria and poses a possible threat to human health due to the spread of antimicrobial resistance [103, 104, 105].

The aquatic environment is a reservoir for V. cholerae and can be a major resistant strain source[106]. A variety of earlier studies focused on detecting [107]. The Bhuyan et al. 107 V also stated that. Various levels of resistance to AMP, cotrimoxazole, nalidixic acid, polymyxin-B, streptomycin (STR), ciprofloxacin, and tetracyclines (TET) have been observed in Indian cholerae from various aquatic environments (including water from the river, water from the canal, water from the pond and water from the hand pump)[108]. Antimicrobial-resistant V. cholerae were also reported isolated from animals in aquaculture such as shrimp and shellfish. He and others. Studied 42 V. shrimp cholera isolates collected in Shanghai , China in 2013 and 2014 and found 33.3%, 21.4%, 19.1%, 9.5%, and 9.5% rifampin (RIF), STR, KAN, AMP, and TET isolates. A total of 25 isolates received an MDR.

Antibiotic treatment is recommended in patients with cholera after the initial fluid deficit has been recovered and vomiting prevented. Between the 1940s and 1960s, streptomycin [110,111] and chloramphenicol [112,113] were among the earliest effective antibiotics used in the treatment of cholera. In Calcutta in 1962 [114] the use of tetracyclines in the treatment of cholera was shown. Because of comparable results in various clinical trials [115,116], furazolidone is considered an alternative to tetracycline in treating children with cholera [112]. During the 1970s cholera treatment was introduced with Sulphamethoxazole-trimethoprim- (SXT) [117]. In Lima, Peru, both SXT and tetracycline therapeutic regimens performed equally well in patients with cholera [118]. Tetracycline, chloramp henicol, and SXT[119-121] were equally effective for the elimination of V. cholerae from cholera patients [122]. Because of its unnecessary excretion and the emergence of organisms that are resistant to certain drugs used to treat patients, chemoprophylaxis is generally not recommended in cholera control programmes.

An brilliant essential of late germ evolution is the mergence of XDR and MDR V. cholerae. Resistance to one or more antibiotics reported in V. cholerae during the 1960s was largely due to the acquisition of spontaneous mutations in drug targets such as DNA gyrase, topoisomerase, RNA polymerase b-subunit (RpoB) and ribosomal protein 12 subunits [123,124]. Nevertheless,

recent studies have shown that the emergence of MDR and XDR V. cholerae is primarily facilitated by autonomous plasmids including transposable genetic elements [125,126, 127]. Furthermore, V. cholerae 's resistance profile has shifted intensively over the last five decades [128]. Tanzania was documented during 1977-78 mainly through the use of prophylactic drugs [127]. Due to the existence of the unstable mega-plasmid-C incompatibility complex (IncC) [129] this resistance was detected. In 1994, tetracycline-resistant V. cholerae O1 caused the deaths of some 12,000 Rwandan refugees in Goma, East Zaire [130]. Tetracycline and doxycycline are antibiotics used in treating cholera patients in this worst epidemic. Classical biotype isolates from the southern coastal region of Bangladesh were found to be resistant to tetracyclines during 198–89, while the isolated El Tor biotypes from the same area were sensitive [131]. Even V. cholerae serogroup O139 which emerged from Karachi in 1993 was reported to be tetracycline-resistant in Pakistan [132]. From the early 1990s, there began to appear drastic increases in resistance to ampicillin, nalidixic acid, chloramphenicol and tetracyclines [133]. Recent findings suggest that the majority of V. cholerae clinical isolates are immune to almost all antibiotics used routinely [125,134]. The antimicrobial resistance coding role has also been established as being in self-infectious plasmids. First described in 1996 was the emergence of MDR on V. cholerae belonging to the serogroup O139. A 100-Kb ICE called the SXT element that carries several resistance genes against Sulfamethoxazole, Trimethoprim, and Streptomycin has shown to cause resistance. Some of V 's environmental strains were further found. Isolated cholerae also harbored SXT elements in their genomes during 1986 and displayed resistance to ampicillin, SXT, streptomycin and furazolidone [135]. Furthermore, mobile integrons physically connected to conjugative plasmids or transposons also transmit various coding functions worldwide for resistance to V. cholerae isolates in clinical and environmental conditions.

CONCLUSION

Vibrio spp. has always been a public health problem that occurs around the world, which comes from fisheries. The spread of Vibrio is very widespread and persistent in the environment, thus increasing the difficulty in reducing the spread of Vibrio spp. Vibrio spp. it can even cause death in humans and animals. Apart from this, the emergence of antibiotic resistance in Vibrio is a major challenge in terms of effective treatment for the Vibrio infection. One of the most important and effective steps to avoid the spread of antibiotic resistance in the fisheries sector is to restrict the use of antibiotics in fish feed.

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