LEADERSHIP THEORIES
IN DISEASE OUTBREAK MANAGEMENT

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ABSTRACT

Background: Leadership is crucial in disease outbreak management to ensure successfulness of control and prevention programme. Leadership theories explain the rational of management action during an outbreak. This paper aims to examine various applications in diseases outbreak management.

Materials and Methods: Adopting a scoping review method, articles were identified using four databases namely *Scopus*, *Google Scholar*, *PubMed* and *Science Direct* through the keywords "leadership" and "outbreak management". Only articles written and published in English within the last 15 years were included. 20 articles were reviewed after the filtering process.

Result: Four Participative Leadership Theory themes with various examples were identified. These include "Encouragement to the staff" by hospital administration to control SARS outbreak in Taiwan, "Partnership" between international agency in managing polio outbreak in Africans, "Communication with external factor" between health authorities and external general practitioners in controlling meningococcal outbreak in England and "Collaboration between government agencies" between local hospital and clinic in conducting tuberculosis screening. Three Contingency Theory themes that emerged include "Positional power" "Leader-member relation", "Task-structure" in various outbreak management scenario comprising of various leadership skills. For Transformational Theory, three themes recognised include "Inspirational Motivation" involving a hospital CEO in Taiwan managing the SARS crisis, "Idealized Influence" among the health leaders in Papua New Guinea during a Cholera outbreak and "Individualized Consideration" seen through the management of Ebola outbreak in Liberia.

Conclusion: The participative leadership theory, contingency theory and transformational leadership theory is identified as equally prominent leadership theories in effective management of diseases outbreak.

Keywords: Leadership theories, disease outbreak, management

1.0 Introduction

In public health, leadership is essential particularly in disease control and human resources management. In the event of an outbreak, any wrong decision made by inefficient leadership may lead to potentially fatal consequences in the community.

Leadership can be seen as an attempt at influencing the activities of followers through effective communication process and towards the attainment of a common goal. It also acts as an encouragement to the staff to do what needs to be done (Crribin, 1982).

Leaders have an important role during disease outbreaks. It is to provide objective and goal-oriented perspectives and to ensure that plans guide the momentum of the solution in outbreak management. Leaders' capabilities are often tested during disease outbreaks. Although leaders can be directly involved, maintaining their sense of leadership are the qualities that will help continue the sustainability of organizations and achieve the desired outcomes.

1.1 Outbreak Management

Outbreak can be defined as the increase in occurrence of cases or diseases that are higher than that normally occurring in small communities. The epidemic can occur in a limited geographical area or may spread over one country. It can happen for several days or weeks, or for several years (WHO, 2017). Examples of international outbreaks that have occurred, which required good leadership and good outbreak management were the SARS outbreak in 2009 and Ebola outbreak in 2015 (Nyenswah, Engineer, & Peters, 2016; Wu, Yang, & Wu, 2004).

The purpose of outbreak management is to prevent the worsening of disease occurrence. To ensure the significance of outbreak management, it is necessary to primarily recognize that there is a potential for outbreak. Subsequently sources of infection must be eliminated to stop further spread and to prevent recurrence. It is also important to communicate effectively with all parties involved and to spread the lessons learned when the outbreak has resolved (Queensland Health, 2017).

The leadership criteria required during outbreak management are effective decision-making, having available and involved leaders who can motivate good partnership with stakeholders, good communication with stakeholders and external parties, ability to assure the public, active advocacy, effective delegation and effective coordination of resources and response.

1.2 Leadership Theories

Most leadership theories see leadership from various perspectives. It may be seen as a relationship process or a combination of traits and personality of the leader. It may also be seen as the leaders' behaviour or unique trait. Some of the historically well-known leadership theories are the Great Man Theory, Trait Theory, Situational Theory, Participative Theory, Transformational Theory, Contingency Theory, and Skills Theory (Avolio, Walumbwa, & Weber, 2009).

Review of the articles, as will be elaborated further in the methodology section, identified three prominent theories in outbreak management, which are the Participative Theory, the Transformational Theory and the Contingency Theory. Participative Theory states that a good leadership style is the one who accepts advice from people around to increase commitment and enhance cooperation, leading to better results and a more successful leadership (Avolio et al., 2009). Transformational Theory describes the transformational leader role in assessing the potential of each follower in terms of their ability to fulfil responsibilities, and the opportunity to improve their accountability in the future. (Dvir, Eden, Avolio, & Shamir, 2002). Contingency Theory gives insight on the ability of the leader to change depending on the situation, using the right skills for the right conditions. The leaders must adjust their leadership style depending on the ability of the followers. The capacity of the followers is dependent on their "ability" and "willingness" to do the job in accordance with the leadership direction (Anderson Paul, 2016).

Hence, the aim of this article following identification of the prominent theories in outbreak management is to further discuss the role and the importance of leadership in an outbreak. This will be discussed according to the leadership styles or skills practised by previous outbreak management and will then be mapped to the three existing leadership theories identified.

2.0 Materials and Methods

For this paper, a scoping systematic review was done. Based on the research question, relevant articles were identified using four databases, Scopus, Science Direct, Google Scholar and PubMed. The keywords used were "leadership" and "outbreak management". Only articles written in English, original articles, articles related to leadership in outbreak management and articles published within the last 15 years were included.

The initial search yielded 102 articles. After checking for duplicates, three articles were excluded and after reading the abstracts, another 60 articles were excluded. Subsequently, after reading the full texts of the remaining 39 articles, only 20 articles were included in this review. The following figure shows the PRISMA diagram of the review;
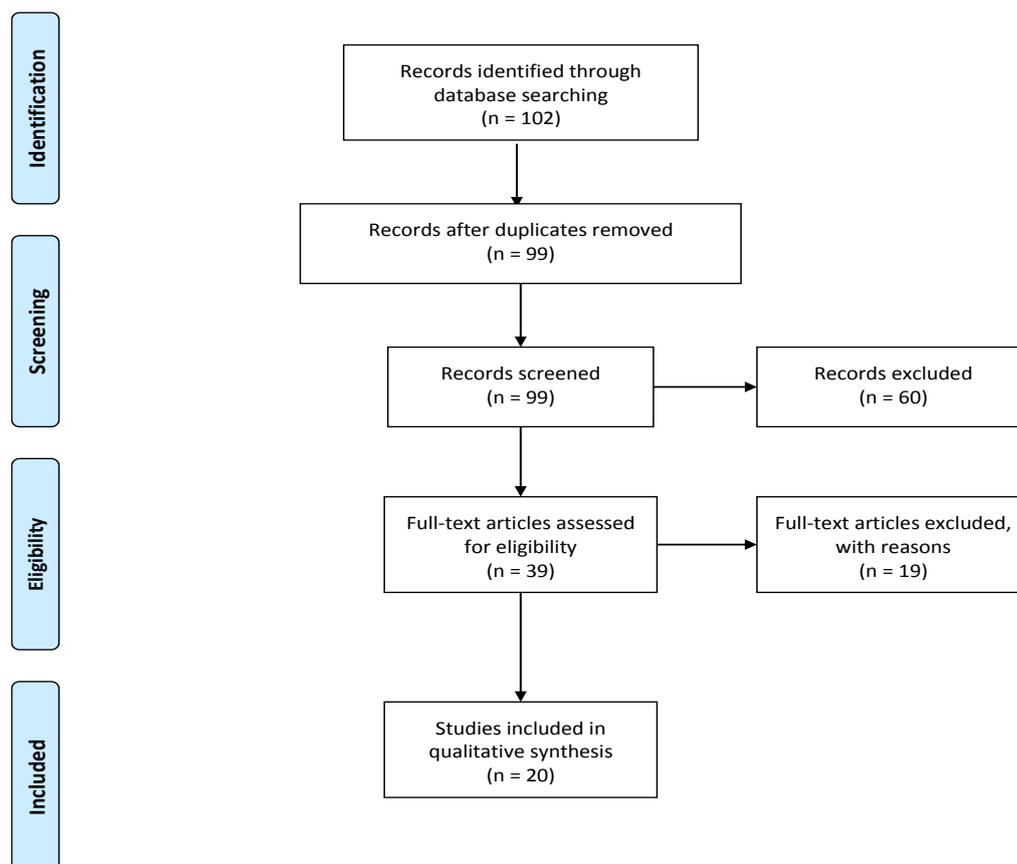
PRISMA Diagram of the Scoping Review

Figure 1: PRISMA Diagram of the 'Leadership Theories in Disease Outbreak Management' Scoping Review, as adapted from Moher, Tetzlaff & Altman, The PRISMA Group (2009)

3.0 Result

The information obtained from the 20 articles were tabulated and summarized in Table 1, forming the basis of this report.

Table 1: Results of review on leadership theories in diseases outbreak management

No	Author(Year)	Title
1	Wu, D., Yang, L. C., & Wu, S. S. (2004)	Crisis management of SARS in a hospital
2	Rosewell, A., Bieb, S., Clark, G., Miller, G., MacIntyre, R., & Zwi, A. (2013)	Human resources for health: lessons from the cholera outbreak in Papua New Guinea
3	Stewart, A., Coetzee, N., Knapper, E., Rajnaidu, S., Iqbal, Z., Duggal, H. (2013)	Public health action and mass chemoprophylaxis in response to a small meningococcal infection outbreak at a nursery in the West Midlands, England
4	Nyenswah, T.(2017)	Reflections on Leadership and Governance from the Incident Manager of Liberia's Ebola Response
5	Stern, A. M., Koreck, M. T., & Markel, H. (2011)	Assessing Argentina's Response to H1N1 in Austral Winter 2009: From Presidential Lethargy to Local Ingenuity
6	Okeibunor, J., Nsubuga, P., Salla, M., Mihigo, R., & Mkanda, P. (2016)	Coordination as a best practice from the polio eradication initiative: Experiences from five-member states in the African region of the World Health Organization
7	Scott, V., Crawford-Browne, S. & Sanders, D. (2016)	Critiquing the response to the Ebola epidemic through a Primary Health Care Approach
8	Koteyko, N. & Carter, R. (2008)	Discourse of 'transformational leadership' in infection control
9	Davies, S. C., Akksilp, S., Takemi, K., Matsoso, P. & Silva, J. B. (2016)	The future leadership of WHO
10	Baker, E., Dorrell, S., Downie, G., Riner, M. B., & Rios, P. (2002)	Mid- America Regional Public Health Leadership Case Study
11	Lurie, N., Waaserman, J., & Nelson, C. D. (2006)	Public Health Preparedness: Evolution or Revolution?
12	Pardo, T., Gil-Garcia, J. R. & Burke, G.B. (2014)	Informal Leadership and Networks: Lessons from the Response to the West Nile Virus Outbreak
13	World Health Organization, (2016)	Strengthening Leadership and Management Capacity of District Health Management Teams
14	Wenham, C. (2007)	What we have Learnt about the World Health Organization from the Ebola Outbreak
15	Shih, F., Turale, S., Lin, Y. L., Kao, C., Yang, C. & Liao, Y. (2008)	Surviving a life-threatening crisis: Taiwan Nurse Leaders' Reflections and Difficulties fighting the SARS epidemic
16	Gostin, L. O., Friedman, E. A. (2017)	Reimagining WHO: leadership and action for a new Director-General
17	Gould, D.J. (2016)	Leadership and management for infection prevention and control: what do we have and what do we need?
18	Abrampah, N.M, Montgomery, M., Baller, A., Ndivo, F., Gasarira, A., Cooper, C., Frescas, R., Gordon, B. & Syed, S. B. (2017)	Improving water, sanitation and hygiene in health-care facilities, Liberia
19	Nyenswah, T., Engineer, C. Y. & Peters D.H (2016)	Leadership in Times of Crisis: The Example of Ebola Virus Disease in Liberia
20	Htway, Z. & Casteel C. (2015) (Htway & Casteel, 2015)	Public Health Leadership in a Crisis: Themes from the Literature

The scoping systematic review shows that in the management of disease outbreaks, a combination of leadership skills and theories are employed. After synthesizing all the relevant articles, it was noted that leadership in outbreak management generally follows three prominent leadership theories namely the participative theory, contingency theory and transformational theory. Hence, the discussion of this article will be guided by the above-mentioned theories.

4.0 Discussion

The results of the review were grouped into themes that emerged independently from three leadership theories discussed below;

4.1 Participative Theory

Participative leadership theory is one of the leadership management style commonly used in organization and business companies. The goal of this theory is to have better functional organization through better participation among involved party. It also has synonyms as shared by the terms leadership, employee empowerment and involvement, participative decision-making (PDM), or industrial democracy (Steinheider, Wuestewald, & Bayerl, 2006). The main characteristics of this theory are shown in Table 2.

Table 2: Themes related to Participative Theory

No	Themes	Author/Year	Type of Outbreak (Optional)	Country
1	Encouragement to staff	Wu, Yang, & Wu, 2004	Airborne (SARS)	Taiwan
2	Partnership	Rosewell et al., 2013	FWB (Cholera)	Papua New Guinea
		Okeibunor et al., 2016	Faecal oral (Polio (PEI))	Angola, Cote D'lvoire, Chad, Nigeria, Democratic of Republic Congo
3	Communication/ Liaison with external sectors	Stewart et al., 2013	Airborne (Meningococcal)	England
		Stern, Alexandra Minna Koreck, Maria Teresa Markel, Howard, 2011	Airborne (SARS)	Argentina
4	Collaboration between government agencies	Nyenswah, 2017	Direct contact (body fluid) Ebola	Liberia
		Baker, 2002	Airborne (Tuberculosis)	Mid-America

Participative leadership theory is one of the subtypes of participatory decision-making (PDM). Other subtypes are collective, autocratic, and consensus theory. Participative theory enhance participation of all members, however, final decision remains upon the leaders' authority. In contrast, collective decision-making is different. It is a form of leadership where all decisions are taken by the group, and accountability of the decisions is shared by the group. Autocratic participative decision making implies that the responsibility of deciding the final decision is on the leader alone, but the leader allows the organization to benefit from the

input provided by the employees. Consensus decision making is a leadership style where the leader gives up control and responsibility of decision making and leave it entirely to the group. The principle is that the majority needs to approve such decisions while the minority who does not agree initially will have to get along.

Based on the search of the articles, four themes, as shown in Table 2, were selected as representing the usage of participative theory in disease outbreak management. The themes selected are 'encouragement to staff', 'partnership', 'communication/liaison with external agencies' and 'collaboration between government agencies'.

Seven articles were identified to have applied the concept of participative leadership theory in disease outbreak management based on the themes used in the articles. Two articles are from the American and African continent and one article each from the European, Asian, and Oceania continent. Four out of seven articles discuss about airborne transmitted diseases outbreak, which consist of SARS, Meningococcal and Tuberculosis. One article each for food water born disease (Cholera), faecal oral (Polio) and direct contact (Ebola) types of transmission were identified.

The first theme identified through the review of the articles was the encouragement to staff. It was described by Wu, Yang and Wu (2004) in the paper about crisis management of SARS in a Taiwanese hospital. The Chief Executive Officer (CEO) of the hospital came to the ground to encourage the staff. Earlier, the hospital was stricken with SARS outbreak and caused the resignation of 128 staff due to the crisis. No fatalities among healthcare workers were recorded. The act of encouragement to staff was made after the CEO decided to bring a team of experts from the headquarters to participate in the handling of the crisis in the hospital. Participation by all the staff demonstrated the participative leadership theory exercised by the CEO in the disease outbreak (Wu et al., 2004).

The second theme, 'partnership', was described in two articles by Rosewall et al. (2013) and Okeibunoor et al. (2016) on Cholera and Polio respectively. Rosewall et al. (2013) in the article titled "Human resources for health: lessons from the cholera outbreak in Papua New Guinea" described the use of collaborations between the National Cholera Task Force and Provincial Cholera Task Forces with the non-governmental organisations (NGOs) and international bodies to curb the issues relating to the cholera outbreak. It was highlighted that the partnership with such organizations will improve effectiveness and yield better outcomes in cholera disease outbreak management (Rosewell et al., 2013). Okeibunoor et al. (2016) in their article have described the partnership between organizations in improving the polio disease outbreak in African countries. The Inter-Agency Coordinating Committee (ICC) establishes the Polio Eradication Initiative (PEI) via partnerships with multiple agencies including the Ministry of Health, the WHO and the United Nations Children Fund (UNICEF) representatives, Red Cross and multiple group (NGO) directors, the United States of America (US) Agency for International Development (USAID) country representative, delegates from the Angola Paediatric Society, public health authorities, technicians and others. These multiple level management of agencies demonstrated the use of participative theory in managing polio disease in the African countries (Okeibunor, Nsubuga, Salla, Mihigo, & Mkanda, 2016).

The third theme is communication with external factors. Stewart et al. (2013) have described participative leadership theory in outbreak like meningococcal infection at a nursery in the West Midlands, England. This is done through communications with general practitioners (GPs) to obtain their participation in outbreak management by doing early assessments and notifications to health authorities. Similar actions in Argentina were described by Stern et al. (2011) regarding H1N1 outbreak in the country. Stern has demonstrated the application of participative leadership theory by the local health authorities in managing the outbreak by communicating with multiple external non-health organizations such as schools in implementing education on personal hygiene among school students. Collaboration with schools in health education improves the outcome of disease outbreaks (Stern, Koreck, & Markel, 2011).

The last theme used is 'collaboration between government agencies'. Nyenswah (2017) have clearly explained the participative leadership theory demonstrated by the inter-governmental collaboration with other agencies. Multiple agencies were involved, such as administrative, finance, operations, logistics and medical planning and operation divisions during Ebola Virus Pandemic in 2014-2015 in Liberia (Nyenswah, 2017). Baker et al. (2002) have described the participative leadership theory in terms of collaboration activities between health authority, hospitals and clinics in treating the Tuberculosis outbreak in Tuburque County in 2002. Collaborative partnerships with local hospitals and clinics were developed to serve the uninsured which resulted in well-coordinated action of expanding the community contact screening (Baker, Dorrell, Downie, Riner, & Rios, 2002).

Participative theory has been shown to be among one of the essential theories applied within the complexity of outbreak management practice. Horizontal use of this theory, involving collaboration and involvement with other agencies shall generally improve the outcome of controlling disease outbreak. Meanwhile, vertical use of this theory, such as participatory activities between top management with lower executive worker will specifically improve the quality of work of the involved workers. This two-dimensional usage of participative theory will yield better leadership skills and subsequently better outcomes in managing disease outbreak.

4.2 Contingency Theory

Fiedler's Contingency Theory describes how the interaction of leadership styles and the situation to be managed will have effect on how effective leadership is. This model shows the dynamics of interaction that occurs between the leader who has distinct personal characteristics and motivation with the group of workers or followers in facing explicit situations (Verkerk & Verkerk, 1990). Hence, this theory moves away from attributing leadership effectiveness to personality alone.

Based on the contingency theory, there are three factors that can define situations and affect the effectiveness of a particular leadership (Preferred & Scale, 2010). The discussion on contingency theory will be based on three factors (i.e. themes) as shown in Table 3. The three factors that will be discussed are firstly, 'positional power', which measures the impact the leader has in influencing the followers' productivity by giving recognition to them or rebuffing them, secondly, 'leader-member relation', which measures within the organisation itself how much leadership is accepted between different management or working levels and

thirdly, 'task structure', which measures how clear guidelines are to be followed in order to achieve the aim of the organisation, and how simply can progress be tracked in accordance to the goal. It is good to note that 'leader-member relation' is positive if trust, confidence and motivation is given by superiors and adequately felt by subordinates.

Table 3: Themes related to Contingency Theory

No	Themes	Author/Year	Disease Outbreak	Country
1	Positional power	(Wu et al., 2004)	Airborne (SARS)	Taiwan
		(Rosewell et al., 2013)	Food-water borne (Cholera)	Papua New Guinea
		(Stewart et al., 2013)	Airborne (Meningococcal)	United Kingdom
		(Nyenswah, 2017)	Body fluid contact (Ebola)	Liberia
		(Wenham, 2017)	Body fluid contact (Ebola)	West African Countries
		(DJ Gould)	General outbreak control	No specific country mentioned
		(Tolbert Nyenswah, Cyrus Y. Engineer and David H. Peters)	Body fluid contact (Ebola)	Liberia
2	Leader-member relation	(Rosewell et al., 2013)	Food-water borne (Cholera)	Papua New Guinea
		(Stewart et al., 2013)	Airborne (Meningococcal)	United Kingdom
		(Nyenswah, 2017)	Body fluid contact (Ebola)	Liberia
		(DJ Gould)	General outbreak Control	No specific country mentioned
3	Task structure	(Wu et al., 2004)	Airborne (SARS)	Taiwan
		(Rosewell et al., 2013)	Food-water borne (Cholera)	Papua New Guinea
		(Stewart et al., 2013)	Airborne (Meningococcal)	United Kingdom
		(Tolbert Nyenswah, Cyrus Y. Engineer and David H. Peters)	Body fluid contact (Ebola)	Liberia

Seven articles have been identified that represent the application of the contingency theory based on the three factors explained above. Three articles are on the management of the Ebola outbreak epidemic from 2014 to 2016, two articles on airborne diseases outbreak management (SARS and Meningococcal), one on FWB disease outbreak management and one article on general outbreak management control.

The first factor, 'positional power', focuses on how leadership style and capabilities affect the outcome of a situation. In the management of the SARS outbreak in Taiwan, the CEO of the hospital chain was noted to have shown quick decision-making skills and was also visible throughout the ordeal (Wu et al., 2004). A clear system of leadership was reported in the management of Cholera outbreak in Papua New Guinea (Rosewell et al., 2013). In the Meningococcal outbreak in UK (Stewart et al., 2013), the outbreak control team effectively managed the situation by providing good leadership and ensuring proper delegation of tasks.

The management of the Ebola epidemic from the year 2014 to 2016 that were discussed in three articles (Nyenswah, 2017, Wenham, 2017, Nyenswah, Engineer, & Peters, 2016) explained the 'positional power' factor in terms of the overall steering of epidemic response, the driving coherent strategy and also the ability to persuade and innovate. The description of leadership in a general outbreak management control (Gould, Gallagher, & Allen, 2016) elaborates on the ability of the individual leader to inspire, demonstrate charisma and provide a strong role model.

The second factor is the 'leader-member relation', which explains the qualities and behaviour of the followers. Rosewell et al. (2013) have noted that a good working relationship between different health management levels and different health facilities ensured a positive direction of how the Cholera outbreak was managed in Papua New Guinea. In the Meningococcal outbreak management (Stewart et al., 2013), good working relationships and good communications with external sectors where urgent outbreak reporting was done by General Practitioners and hospital consultants resulted in the outbreak being controlled within only four weeks. Meanwhile, in the Ebola epidemic management, a good teamwork with specified roles and collaborations between government and international partners or stakeholders was a big factor in ensuring that the outbreak was eventually controlled (Nyenswah, 2017). In addition, ability of organizations and employees to work compliantly in response to change where employees are accountable for their own performance and actively contribute their own expert knowledge also explains the 'leader-member relation' factor (Gould et al., 2016).

Lastly is the 'task structure' factor that describes aspects of the situation involved. This can be seen in the SARS outbreak in Taiwan (Wu et al., 2004), which showed that outbreak crisis comprises of rapid spread of disease that requires rapid action and guidelines to manage all levels of alert. Hence, messages and materials for community behavioural change needs standardization at the central level (Rosewell et al., 2013). Outbreak management likewise requires engaged and coordinated fast responses to local epidemics with regular and planned engagements between stakeholders (Stewart et al., 2013, Nyenswah, Engineer, & Peters, 2016).

It can be concluded that for leadership to be effective in the management of an outbreak, it is important that the interaction between the leader, the followers or workers and the working environment be at a state where it is optimal to achieve success as described by the Contingency Theory. What is appealing about this theory is how it provides flexibility for the management by creating an effective working group that has clear defined tasks, hence, increasing the capacity of the leader to motivate subordinates to become more cooperative during execution.

The Contingency Theory gives hope and supports the notion that given the right situation, almost anyone can become a good leader to manage the problem at hand. In the case of disease outbreaks, leaders must work to find a position for themselves and work with their team to lead them towards success in managing outbreaks.

4.3 Transformational Theory

Transformational leadership theory describes the creation of valuable and positive change in the followers with the aim of producing leaders from the followers whereby both leaders and

followers help each other to advance to a higher level of morale and motivation (Burns, 2003). Expanding on the Transformational Leadership Theory by Burns Bernard M. Bass (Bass, 1985), Mccall (1986) has describes four major factors comprising the transformational leadership.

The first factor is 'inspirational motivation' whereby the leader heightens their followers' motivation through the leader's own emotional qualities. Next is 'idealized influence'. This refers to the notion that leaders act as role models for the followers, thus building the needs, hopes and values of their followers through persuasive words and actions. 'Individualized consideration', the third factor, indicates that the leaders pay individualized attention to their subordinates through sharing of their concerns and needs, and understanding their strengths and weaknesses. The fourth factor, which is 'intellectual stimulation', means that the leaders focus on stimulating their followers intellectually especially in terms of problem awareness and problem solving (Bass, 1985; McCall, 1986).

Five articles have been identified with reference to the application of the Transformational Leadership Theory in healthcare, particularly in outbreak management. The articles comprise of one article each about the SARS outbreak in Taiwan, the Cholera outbreak in Papua New Guinea, the Ebola response in Liberia, and general infection control in the wards. The articles have been grouped according the following themes of transformational leadership as follows:

Table 4: Themes related to Transformational Theory

No	Themes	Author/Year	Disease Outbreak	Country
1	Inspirational motivation	Wu et al., 2004	SARs outbreak	Taiwan
		Koteyko & Carter, 2008	Infection control	United Kingdom
2	Idealized influence	Wu et al., 2004	SARs outbreak	Taiwan
		Rosewell et al., 2013	Cholera outbreak	Papua New Guinea
		Nyenswah, 2017	Ebola	Liberia
3	Individualized consideration	Nyenswah, 2017	Ebola	Liberia

The first theme, inspirational motivation, emphasizes on increasing the motivation of the followers through the inspiring emotional qualities of the leader. Wu, Yang & Wu (2004) have written about how the CEO of a network of hospitals in Taiwan gave encouragement to the staff to stimulate morale as part of the successful crisis management seen during the outbreak of SARS. In an article describing the differences between the roles of modern and traditional matrons in infection control, the author suggests that one of the factors leading to the success of the matron being an agent of change is good interpersonal skills and giving adequate respect and responsibility to subordinates (Koteyka & Carter, 2008).

Charisma and idealized influence is another theme that can be identified through the articles whereby leaders are regarded as role models for inspiring their followers. Rosewell et al. (2013) have mentioned in his paper about the lessons learnt from the cholera outbreak in Papua New Guinea that the health leaders repeatedly visited the community themselves to ensure and encourage behavioural change. Leaders being visible and available at all times are part of the charisma needed to exert influence on others. An example of this was seen during Liberia's Ebola response where the incident manager reflected on his own leadership

(Nyenswah, 2017). The CEO of the hospital network in Taiwan as mentioned above has also been described as making himself visible to others.

The third theme refers to 'individualized consideration' where the leader understands the strengths and weaknesses of their followers in order to optimize their performance. In reference to Liberia's Ebola response, Nyenswah (2017) has stated that as the incident manager during Liberia's Ebola response, he has emphasized on the importance of teamwork and each healthcare worker playing specific roles.

With relation to transformational leadership, motivating subordinates, acting as a role model and considering each staff as having their own individual strengths, weaknesses and concerns are three important factors in ensuring successful outbreak management. In times of crises, human factors play an important role and having strongly motivated human resources contribute to the success of any outbreak management process. The only factor under the transformational leadership theory that has not been mentioned in outbreak management is 'intellectual stimulation'. This factor may not be relevant in outbreak management due to the nature of outbreaks that requires rapid responses.

4.4 Leadership challenges and recommendations

The most important leadership challenge would be developing the crucial skills needed to become a wholesome competent public health leader and in the context of this article, skills particularly needed to manage a disease outbreak. However, leadership capabilities can be developed over time with appropriate leadership skills training. Some people may be more talented than others may but with proper training, leadership skills can be attained by those in the leadership post.

Internationally, the World Health Organisation (WHO) has conducted multiple courses on leadership skills for management of epidemics and pandemics through its regional offices to improve leadership in times of global outbreak crisis (World Health Organization, 2016). At the country level, in the United States for example, the importance of developing public health leadership has long been realized by the Centre for Disease Control and Prevention (CDC). With this realisation, CDC establishes the National Public Health Leadership Institute and following that was the establishment of its state and regional institutes (Health, 1988).

Thus, a recommendation here is for governments, ministries and public health organisations in countries worldwide to systematically impart public health leadership skills training into the professional working environment to ensure the making of competent leaders. Training should comprehensively cover all healthcare domains and should ideally be done earlier in the career development in order to ensure optimal training of effective leaders (Sonnino, 2016).

Another challenge is getting the cooperation of staff or subordinates working under one's leadership. The leader of a public health organisation does not work alone. Good leadership would not thrive in situations where there is a lack of cooperation. The situation of poor teamwork has led to the failure of managing outbreak crisis successfully. A study by Leggat (2007) has identified 'commitment to organisation' and 'commitment to working collaboratively' as competencies perceived by public health leaders that would contribute to effective teamwork in a public health organisation. These competencies, which displayed

emphasis on team values and organisation, have led to team success and better public health outcomes (Leggat, 2007).

Hence, another recommendation that is of importance is the development of focused teamwork training initiatives to be carried out inter-organisationally, in addition to leadership skills training, to enhance and support effective leadership especially in times of crisis. This is important because ultimately, a collaborative leader who can guide collaborative public health interventions and inspire cooperation can also be developed through training and education (Umble et al., 2005).

5.0 Conclusion

In conclusion, it is apparent that good leadership is an important factor in successfully managing disease outbreaks or any public health issues. Various leadership theories have been identified historically which are applicable not just to public health organisations but across various fields. However, in the management of outbreaks, the three most relevant and prominent theories identified are the participative theory, the contingency theory and the transformational theory.

In relation to the leadership theories discussed, it is evident that an excellent public health leader will work to develop good leadership skills that can be utilised during the management of any outbreak and in rebuilding the community after the outbreak has resolved. At the same time, organisational teamwork is also crucial in making sure the outbreak is properly contained.

Declaration

Authors declare that this manuscript has never been published in any other journal.

Authors' contribution

Author 1: Information gathering, preparation and editing of manuscript
Author 2: Information gathering, preparation and editing of manuscript
Author 3: Information gathering, preparation and editing of manuscript
Author 4: Information gathering, preparation and editing of manuscript
Author 5: Final review of manuscript and final editing
Author 6: Concept initiation and review of manuscript

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