

# **To assess the percentage impact of using borrowed theories and mid range health theories to reduce and eliminate cardiovascular disease prevalence in the city of San Bernardino, California**

**Paulchris Okpala<sup>1</sup>**

## **Abstract**

Cardiovascular diseases are one of the leading causes of death in the County of San Bernardino, California. There are various efforts that have been put in place to manage the prevalence of the complications including the incorporation of borrowed theories and mid-range theories. This study used case study based qualitative research design approach to evaluate the impact of borrowed theories and mid-range theories on the prevalence of cardiovascular disease in San Bernardino County. The findings of the study indicated that the adoption of the aspects of borrowed theories such as positive attitudes towards prevention of cardiovascular diseases, positive subjective norms such as keeping blood pressure within normal range and positive perceived behavioral control features leads to the reduced disease prevalence. The study also indicated that lower prevalence of cardiovascular diseases is associated with adoption of various aspects of mid-range theories such as self-efficacy, adherence to preventive screening and disease awareness.

**Keywords:** Cardiovascular diseases, Borrowed theories, Mid-range theories, Disease Prevalence.

## **1 Introduction**

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<sup>1</sup> California State University, San Bernardino, Department of Health Science and Human Ecology, USA

The number of deaths due to cardiovascular complication in San Bernardino County, California is high [1]. The cardiovascular diseases are mainly attributed to the people's lifestyle and are often referred to as lifestyle diseases [2]. The intervention plans being put in place employ different approaches including early detection, self-management, and screening for possible predisposing factors [3]. However, the central theme in major cardiovascular disease control strategies is the focus on individual and community lifestyle and related issues [4]. The incorporation of the lifestyle and social factors into the different strategies is based on certain theories such as the borrowed theories and mid-range theories [5]. The borrowed theories are the concepts developed in other disciplines and are associated with the alteration in the societal issues. Borrowed theories have been used in health care to control and prevent certain diseases such as the societal issues incorporated into the Healthy People 2010 United State of America strategic plan [3].

Mid range theories, focus on specific aspects of change such as education and empowerment in controlling diseases [5]. The mid-range theory highlights the importance of healthy diet [7], enhanced treatment and adherence [8], promotion of resilience, social support and education [9]. Different cardiovascular disease prevention plans such as "California's Master Plan for Heart Disease and Stroke Prevention and Treatment 2007-2015" and "Community Transformation Plan 2015-2020" for San Bernardino County have adopted various aspects of borrowed theories and mid-range theories. Various studies have indicated that mid-range theories and borrowed theories are important in the prevention of diseases such as human immunodeficiency virus [10], birth complication [11] and chronic diseases [12]. However, the impact of the theories on the prevalence of cardiovascular disease especially in high-risk places such as San Bernardino County, California is not well researched.

This study, therefore, sought to evaluate the impact of borrowed theories and mid-range theories on the prevalence of cardiovascular disease in San Bernardino County by answering three main questions. The study sought to determine the trend in cardiovascular disease prevalence in San Bernardino County between the year 2005 and 2014. Secondly, the study sought to evaluate the impact of the identified aspects of borrowed theories on the prevalence of cardiovascular disease. Finally, the study examined the impact of the identified aspects of mid-range theories on the prevalence of cardiovascular disease in San Bernardino County. The output of the study provides a basis on which decisions can be made regarding the appropriate adjustments of the cardiovascular disease prevention strategies in San Bernardino County and the entire country.

## **2 Research Design**

A qualitative research design based on case study approach was used to evaluate the study's research questions. The reason for carrying out the study based on the qualitative approach was informed by the type of data that was used in the study that was obtained from existing data document rather than obtaining it directly from primary respondents [13]. The use of case study approach in this research was informed by the need to evaluate the impact of the existing strategies used in the control of cardiovascular disease. Case study design is indicated to enable the researcher to analyze the different aspects of various study results and draw appropriate conclusion. In this study, the different data from various websites and hospitals were assessed as individual case studies to determine the impact of the mid-range and borrowed theories on the disease prevalence. The study treated the prevalence of the cardiovascular disease as the dependent variable while the different aspects of the borrowed and mid-range theories were treated as the independent variable. The study involved the use of secondary data, documents, and records that already have a one-off consent and therefore do not require a repeated request to be sent to the participants [14]. The study, however, committed to using the data and document provided in an ethical manner with attention to protecting the identity of the participants where possible.

The quality and reliability of the data contained in the five selected websites were determined based on mode of data collection and the site reviews. The websites considered were mainly the government websites. The study considered nine case study reports from the websites that documented the cardiovascular disease prevalence in San Bernardino County as suggested by the guidelines provided by [15]. The hospitals considered in the study were the government-registered hospital found in San Bernardino County. The inclusion of above-mentioned hospital as data source was based on whether the hospital receives and processes the cardiovascular cases. Any hospital that was not willing to share its data was excluded from the study. The study, therefore, considered seven hospitals as guided by the inclusion and exclusion criteria mentioned above. The documented information of a total of 112 cardiovascular diseases patient cases was obtained from the selected hospitals based on case study approach. The information on each case was retrieved based on the study's research questions.

## **3 Data Collection**

The data on the effect of a different aspect of borrowed theories and mid-range theories on the prevalence of the cardiovascular disease was collected purposively. The study obtained data records and documents detailing the number of cardiovascular patients and their history from the hospital in San Bernardino

County, California. The website sources from which the data was obtained included the government databases that contained elaborate data on the prevalence of cardiovascular diseases and the strategies used to reduce the disease prevalence. The following websites were used as a source of information for the study: The Center for Disease Control and Prevention website have summary of data on the annual prevalence and trend of disease occurrence; American Heart Association website that contains review information on the healthy living, education healthcare research and statistics provided information on examples of the theories used in cardiovascular disease prevention; California department of public health website that contains information on the state of the master plan against cardiovascular diseases and statistics on the cardiovascular disease; Healthy San Bernardino County Website that contains data on cardiovascular disease in the area at different time periods it also contains the strategies used in controlling the disease. The fifth website considered was world health organization website that contains data and strategic priorities against cardiovascular diseases.

### **3.1 Data Analysis**

Data was processed by sorting and assigning a specific code to the different types of data collected. The coded data was then grouped in a manner to reflect the different research questions. The data on the prevalence of cardiovascular disease across different was analyzed using descriptive statistics such as percentages and means. The impact of the theories on disease prevalence was evaluated using ANOVA test and the difference between percentage disease prevalence was assessed using Turkey test at  $P < 0.05$  using SPSS ver. 22.0.

## **4 Results**

The data obtained from the selected hospitals in San Bernardino County indicated that the patient demographics varied based on age. The highest number of recorded cardiovascular patient cases (53.9%) was found in the age group of 85 and more years. The cardiovascular patient cases in the age group of 65-84 years accounted for 28.5% of the total cases while the cases in the age group of 45-64 years accounted for 11.2% of the total cases. The recorded cases of patients aged between 20-24 years and 25-44 years accounted for 3.3% and 3.1% respectively. The recorded cases also varied based on race with the highest number of the recorded hospitals cases being registered among the African Americans with a percentage of 49.5%. The Whites were the second largest group accounting for 21.9% of the recorded cases. The Hispanics accounted for 18.4% of the cases while the Pacific Islanders accounted for 10.1% of the cases. The number of female cases was higher (55.2%) compared to the number of male cases (44.8%).

### ***The trend in cardiovascular diseases prevalence between 2004 and 2014***

The assessment cardiovascular disease prevalence trend was done by evaluating the data obtained from the selected website sources and hospitals. The data revealed that the various types of cardiovascular diseases varied based on the hospitalization and mortality reports. It was observed that the hospitalized cases of coronary heart disease were significantly higher (34%,  $p=0.043$ ) compared to other types of cardiovascular disease. The hospitalized cases of ischemic heart (24.3%) and that of hypertension (21.8%) were not significantly different. The recorded hospitalized cases of stroke were indicated to account for 14.9% of the cases. The hospitalized cases of Heart failure during the period 2005 and 2014 considered in the study was significantly lower (4.9%,  $p=0.002$ ) compared to other types of hospitalized cases of cardiovascular diseases as indicated in Table 2. The results also revealed that the number of mortality cases associated cardiovascular diseases varied based on the type of condition with coronary heart disease (29.5%) and heart failure (25.2%) registering a significantly high mortality cases ( $p=0.026$ ). Ischemic heart disease and hypertension each accounted for 19.8% and 14.3% respectively. However, the data revealed that stroke accounted for a significantly lower mortality cases (11.2%,  $p=0.039$ ) as indicated in Table 1 below.

Table 1: The reported cases of the various cardiovascular diseases

Disease type	Mean percentage (%)	
	Hospitalized cases	Mortality
Coronary Heart Disease	34a	29.5a
Heart Failure	4.9d	25.2a
Hypertension	21.8b	14.3b
Stroke	14.9c	11.2b
Ischemic Heart Disease	24.3b	19.8b
	100	100

The results also indicated that there has been a reduction in the prevalence of cardiovascular disease between 2005 and 2014 in San Bernardino County. The results revealed a decline in the number of hospitalized and mortality cases. A steady decline in hospitalized cases was observed from the period 2004-2006 to

2008-2010. A significant decline in the hospitalized cases was then observed in period 2010-2012 ( $p=0.044$ ). A similar trend was observed in the mortality reports with a steady decline being observed between the periods 2004-2006 and 2008-2010 then followed by a significant decline in the period 2010-2012 ( $p=0.019$ ) as indicated in Figure 1 below.

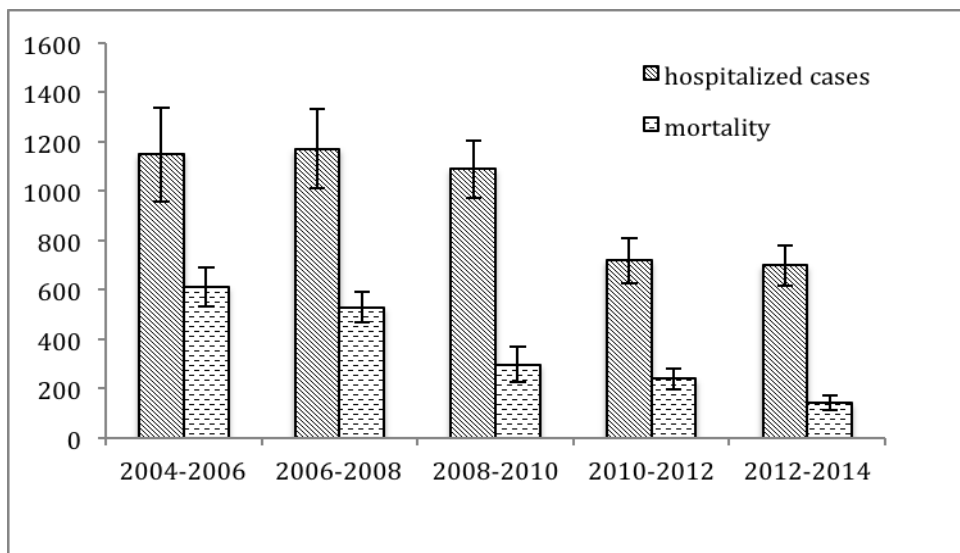


Figure 1: The trend of cardiovascular diseases between 2005 and 2014

### *Impact of borrowed theories prevalence of cardiovascular diseases*

The impact of borrowed theories on cardiovascular diseases was evaluated based on three aspects that included the attitudes, subjective norms and perceived behavioral control. The results indicated that the attitudes influence the prevalence rate of cardiovascular diseases with the recorded data indicating that the prevalence of cardiovascular diseases is significantly high (33%,  $p=0.038$ ) in a population that does not consider the prevention of cardiovascular disease to be important. However, the results indicated that the positive attitudes towards the prevention of cardiovascular disease are associated with lowered prevalence of the diseases (12.3%). The study also showed that the borrowed theories aspect of subjective norms such as the need to keep the blood pressure within normal range also impacts on the prevalence rate of cardiovascular diseases with results indicating a significantly high prevalence of cardiovascular diseases in cases that do not consider keeping the blood pressure within normal range as important

(41%,  $p=0.047$ ) compared to the cases that do consider keeping blood pressure within normal range as vital (16%). The study also indicated that perceived behavioral control features, such as consideration on how people regard the cardiovascular preventive approaches, impacts on the prevalence of cardiovascular diseases with results indicating a significantly high prevalence of cardiovascular diseases in cases that do not consider cardiovascular preventive approaches to possible to achieve (43.9%,  $p=0.031$ ) compared to the cases that consider the approaches to achievable (24.3%) as shown in Figure 2 below.

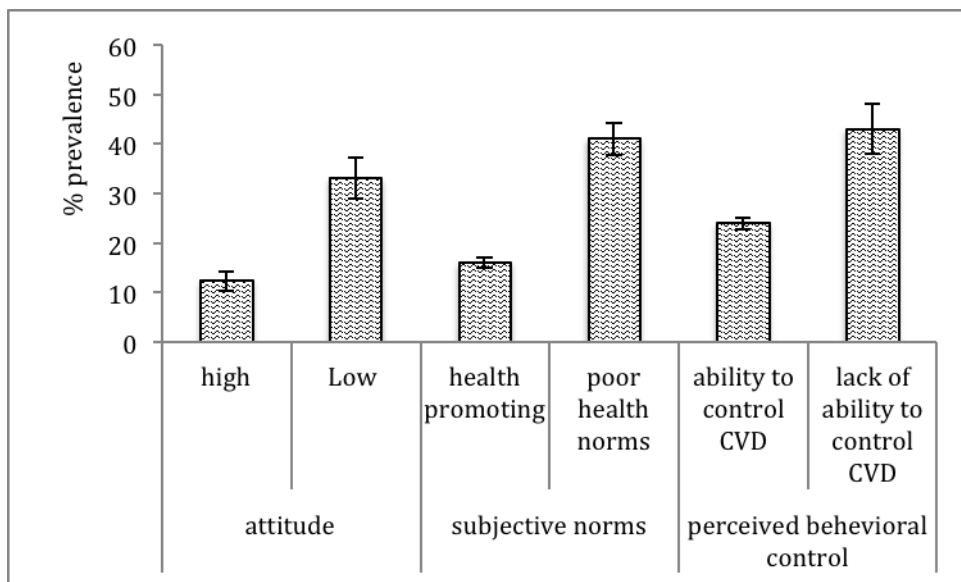


Figure 2: The impact of borrowed theories on the prevalence of cardiovascular diseases

Pearson's analysis indicated a positive correlation between the reduction in the prevalence of cardiovascular disease with positive attitudes ( $r=0.12$ ,  $p=0.019$ ), health promoting subjective norms ( $r=0.27$ ,  $p=0.041$ ) and positive behavioral control ( $r=0.11$ ,  $p=0.44$ ).

### ***Impact of mid-range theories on the prevalence of cardiovascular diseases***

The impact of mid-range theories on cardiovascular diseases was also evaluated based on three aspects that include self-efficacy, adherence and disease awareness. The aspect of self-efficacy was based on reported cases where individuals pursue practices that promote the prevention of cardiovascular disease such as healthy diet, physical activity and cessation of smoking. It was observed that the cases that adhere self-efficacy practices have a significantly lower

cardiovascular disease prevalence (31.3%,  $p=0.041$ ) compared to the cases that do not practice self-care (47.5%). The study also indicated that the mid-range theories aspect of adherence such as adherence to preventive screening also impacts on the prevalence rate of cardiovascular diseases with results indicating a significantly high prevalence of cardiovascular diseases in cases that do not consider preventive screening important (63.1%,  $p=0.003$ ) compared to the cases that adhere to preventive screening (29.3%). The study also indicated that the mid-range theories aspect of awareness of the risks associated with cardiovascular diseases and associated preventive measures impacts on the prevalence rate of cardiovascular diseases with results indicating a significantly high prevalence of cardiovascular diseases in cases that are not well informed (53.9%  $p=0.009$ ) compared to the cases that have good disease awareness (22%) as indicated in Figure 3 below.

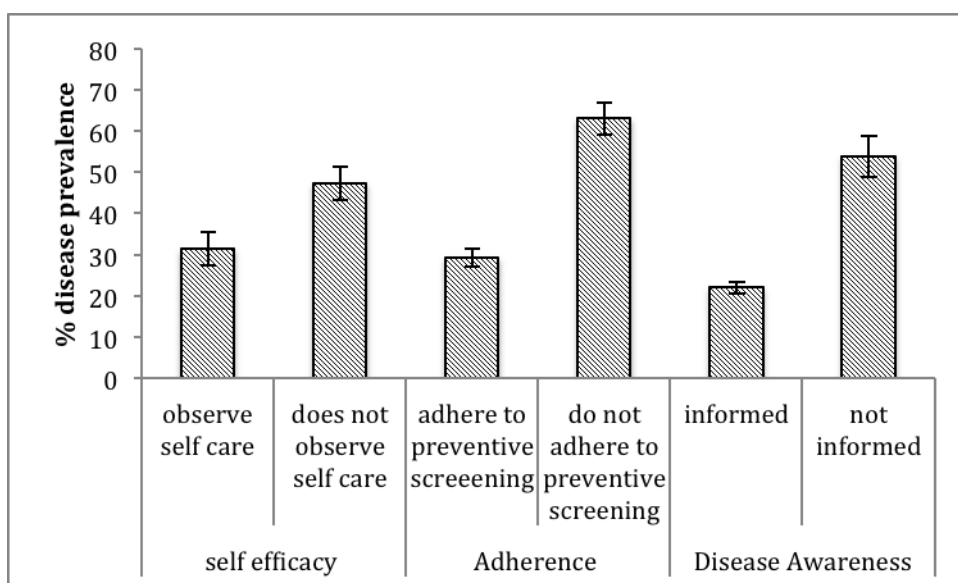


Figure 3: The impact of Mid Range Theories on the prevalence of cardiovascular diseases

Pearson's analysis indicated a positive correlation between the reduction in the prevalence of cardiovascular disease with the score on self-efficacy (observe self-care) ( $r=0.33$ ,  $p=0.04$ ), adherence to preventive screening ( $r=0.41$ ,  $p=0.037$ ) and Disease awareness (informed) ( $r=0.31$ ,  $p=0.42$ ).

## 5 Discussion



This study was done to evaluate the impact of mid-range and borrowed theories on the prevalence of cardiovascular disease in San Bernardino County. The study evaluated this aim by analyzing the existing data from selected hospital and website to determine how the various aspects of the theory impact on the prevalence of cardiovascular diseases. The results of the study have shown that the implementation of the various aspects of the two theories impacts on the prevalence of the cardiovascular diseases in the various ways. According to the study, a significantly lower prevalence of cardiovascular diseases is associated with various aspects of borrowed theories such as positive attitudes towards the prevention of cardiovascular disease ( $p=0.038$ ), positive subjective norms such as keeping blood pressure within normal range as vital ( $p=0.047$ ) and positive perceived behavioral control features ( $p=0.031$ ). The study also indicated that a significantly lower prevalence of cardiovascular diseases is associated with self-efficacy (observe self-care) ( $p=0.041$ ), adherence to preventive screening ( $p=0.003$ ) and Disease awareness (informed) ( $p=0.009$ ).

It is, therefore, evident from the study results that the adoption of the different aspects of mid-range and borrowed theories results in lowered prevalence of cardiovascular diseases. The mid-range theories have been indicated to influence the prevalence of various diseases [5]. Studies have indicated that the aspects of the mid-range theories such as adoption of healthy lifestyle and cessation of smoking contribute to a reduction in cases of health-related complications [4]. Creation of disease awareness with a focus on the causes and risks associated with the cardiovascular disease and the preventive measures have been indicated by the study to be the key in the reduction of the prevalence of cardiovascular diseases. These findings supported by various studies indicated that creation of disease awareness among individuals increased the tendencies of people to adopt positive changes that result in reduced disease cases [5].

Other studies have also indicated that the adoption of borrowed theories such as those developed in other disciplines is the key in the reduction of disease occurrence [10]. It is reported that the borrowed theories that impact on societal forces influencing the development of the risk factors for complications is key in the reduction of the cardiovascular diseases [11]. The borrowed theories have been indicated to influence the prevalence of cardiovascular diseases by altering the behavior and attitudes of the individuals in society [12]. It is indicated that increased reduction in the prevalence of cardiovascular disease is evident in cases where the individuals' attitudes and behavior are geared towards the control of cardiovascular disease [11]. The study reported that high prevalence of cardiovascular diseases is evident in a population that regards the disease preventive approaches as impossible to achieve [10]. This study, therefore, suggests that various aspects of mid-range and borrowed theories should be incorporated into a cardiovascular disease prevention strategy such as the approach adopted by US Healthy people 2020 strategy [6].

The result of this study is, however, affected by possible researcher's bias that may have occurred during the retrieval of data from the identified sources. This is because the retrieval was based on the researcher's judgment on the data that was best fit to answer the research questions. It is, therefore, possible that the researcher may have opted for the data that is easy to manipulate and understand rather than the one that was more informative. The use of secondary data also subjects the study of the errors and biases committed in the collection of the primary data. However, it should be noted that the study ensured the quality of the data used considering data obtained through validated data collection method and through the use of officially recognized data repositories.

## 6 Conclusion

It is evident from the study that the adoption of Mid Range and Borrowed theories leads to the low prevalence of cardiovascular disease in San Bernardino County. The study has indicated that the implementation of the various aspects of the two theories impacts on the prevalence of the cardiovascular diseases in the various ways. According to the study, aspects of borrowed theories such as positive attitudes towards the prevention of cardiovascular disease, positive subjective norms, and positive perceived behavioral control features leads to the low prevalence of cardiovascular diseases. The study also indicated that lower prevalence of cardiovascular diseases is associated with aspects of Mid Range Theories such as self-efficacy (observe self-care), adherence to preventive screening and Disease awareness. It is, therefore, evident that the adoption of mid-range theories and borrowed theories results in lowered prevalence of cardiovascular diseases. Based on this study, these theories should be given more consideration in the formulation of strategies geared towards the reduction of cardiovascular diseases in the County of San Bernardino and across the US and global. However, to necessitate the adoption of the theories in the management of other diseases, there is a need to carry out an in-depth of the impact of the theories on specific factors on the target disease. More studies should also be done to evaluate how the population at risk, health care personnel and the government can collaborate to ensure that the identified aspects of the mid-range theories and borrowed theories are adequately embraced.

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