TECANA AMERICAN UNIVERSITY

POST-DOCTORATE PROGRAM IN PUBLIC HEALTH WITH AN EMPHASIS IN

EPIDEMIOLOGY AND RESEARCH.

HEALTH AND DEMOGRAPHY RESEARCH REPORT 1

"I hereby swear and bear witness that I am the sole author of this report and that its content is the

fruit of my work, experience and academic research"

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Abstract

Demography's role to informing health policies and in public health practice is achieved through the studying various population dynamics which associate with immigration, mortality, and fertility. The report hereby stresses how significant a precise understanding of the dynamics of a population is formulating health policy and strategic planning. Chapter 1 consists of, the Introduction, objectives, definition and history of health and demography, research background and scope. Chapter 2 encompasses a theoretical framework, the description of the fusion between Health and Demography, demographic evolution, lifespan discussion, and demographic approaches/theories/models. Chapter 3 gives an account of the philosophy, data sources and methodology, data collection tools, other sources of data, data analysis, recent trends, and conclusion.

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Introduction

The main objective of the research paper is to emphasize how important a precise cognizance of

the dynamics of a population is particularly on planning and health policy. Although associated

disciplines like security studies pride in successful assimilation of demographic tools in their

literature and studies, the practical and theoretical link between demographic techniques and the

exercise of emergency preparedness in public health are feeble. This article presents some

fundamental contributions that have been made by demographers in health and in informing

health policies. It also highlights information on data sources, the demographic techniques and

population change about public health.

General Objective

To discuss the information about data sources, the demographic techniques and population

change about public health

Specific Objectives

1. To discuss some fundamental contributions made by demographers in health and towards

   informing health policies.

2. To discuss how significant a precise cognizance of the dynamics of a population is,

   particularly on planning and health policy.

3. To discuss the composite inter-relationship between social health and population.

Justification

The essence of embarking on the agenda of highlighting the notable contributions of demography on the public health and formulation of health policies and bringing then to light for cognizance and planning has been an overdue health professional's concern. Therefore, I believe that scholars and specialists will identify with the research, appreciating it as it supplements their understanding. Physicians of diverse disciplines are also anticipated to find the research work expedient towards learning what is specially theirs and what has been copied via association. It is all in a bid to redefine the various disciplines as well as their relations. Determining whether the objectives have been successfully met or not is open for posterity to determine.

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1.0.   **CHAPTER 1: The History, Background and Scope of Health and Demography**

The wellbeing and health care demand of a population can only be met or determined when there is enough information about its characteristics and scope. Essentially, demography and public health are closely linked since the former involves establishing people population with a comprehensive knowledge of population dynamics – the proportional shifting in populations due to interactions between immigration, mortality, and fertility (Kreager, 2015). The relationship between demography and health is intricate. According to Rowe et al. (2017), demography is principally under the discipline of science, whereas health can be understood as typically oriented on activities such as research, industry, and services. Considering the population's health draws us closer to the idea of public health, usually described as a structured effort to enhance and safeguard a community's health.

Demographers have played a positive role towards achieving this collective effort, by, for example, campaigns against maternal and infant mortality in the 21stcentury besides analyzing and understanding the variations in the bases of death will declining mortality, defined as an epidemiological transition (Rowe et al., 2017). Health practitioners and specialists, epidemiologists, and demographers share common topics and terms such as infant and maternal mortality, contraception, low birthweight, and suicide and many others. Furthermore, demographers highly invest in population survey programs involving the aged, gender, and the disabled, which are implemented locally and globally. Of such surveys and studies, health is usually a fundamental element, and monitoring access to health services and health systems are frequently applied to determine inequalities between the affluent and the socially disadvantaged. Additional demographic impetuses including an aging populace, the advent of exceptionally old individuals, and life lengthening also encourage the demographers to become more interested in

the health of a population (Grundy and Murphy, 2015). When health is introduced in life tables, with the life expectancy and years lived being decomposed in different kind of years as per the available health data, such as an illustration of the new interest.

Consequently, life expectancy calculations are done in most countries through calculating the life expectancy of the disability-free (completely healthy) or calculating life expectancy only of the perceived good health. As Payne (2015) states, such surveys enhance calculation of the active life- and disability-free expectancy, and the incidence of functional reliance of the oldest age cohort to be determined. Through such methods, health expectation as a population measure has been broad subject in demography. Such knowledge is fundamental in the prediction of future structure and size of a population and therefore strengthening health care planning. When the future and the present are analyzed, an evaluation of the past is obliged as well. Moreover, the methods and tools of a populace sciences are particularly pertinent in the discipline of emergency and rescue mission in public health: safeguarding and protecting the health of a population necessitates the availability of data of the population thereof.

1.1 Understanding Demography

According to Grundy and Murphy (2015), demography stems from the discipline of social sciences and is centered on the study and analysis of human population, primarily on their size/scope, change, structure (via the means of deaths, births, and immigration), in addition to their interaction with the natural habitat. Demographic pointers could comprise; the crude rate of death, crude birth rate, size of the population, population growth, rate, aggregate fertility rate, infant mortality, and life expectancy (Grundy and Murphy, 2015). Furthermore, demography incorporates projected and expected age and gender distributions corresponding to low, constant, medium, and high fertility deviations.

Demographic variations influence all areas of activities in a population whether political, economic, cultural, or social. As experts, demographers are knowledgeable, and they understand historical population trends and employ such data to prepare for any viable future policies and developments that may affect people in one way or another. The comprehension of these demographic developments affords important elucidations of pragmatic social and economic trends. Subsequently, demography turns out to be a vital component in the development and analysis of public policies.

1.1.1   John Graunt (April 24th, 1620 – April 18th1674)

Demography, as a science and statistical study and analysis of a population, is considered to have been established by Graunt as ascribed by most historians (Pongou, 2015). In 1662, the Statistician published the pioneering book … Bills of Mortality (Ezenwa, 2014). It outlined vital statistics of the London citizens which had been gathered for more than 70 years (Kreager, 2015). Graunt, in the book denoted, Observations, clarified that these accounts had been kept with the escalating death rate due to a plague, which rapidly spread via parasitic fleas that were carried along by rats. A quarter of entire England's population died just in 1625, mostly due to the plague (Rommes, 2015).

His analysis on the significant statistics of the London residents led to his writing the book based on those figures, which highly impacted the demographers then and even in the centuries afterward. The book is usually accredited as the first of such kind to be published. As a result, as Ezenwa (2014) indicates, Graunt received an honor for his exceptional work by earned England's Royal Society membership which comprised the renowned scientists.

According to Ezenwa (2014), as a clergy, Graunt invested more on statistics on the deaths, sicknesses, marriages, and births of all his congregants, and he applied the data to monitor the rate of growth of the church. Essentially, he aimed to identify how important events in people's

lives (demographic variables) influenced diminution and population growth. Whereas marriages portend population growth due to more births, ailments signify a decrease in population due to increased deaths. Thu, for the church to expand and grow, he had to encourage childbearing within legal marriages, be aware of the age and sex distribution of all congregants, their jobs and income levels, besides educating them on the ways to lessen deaths and ailments by embracing healthy lifestyles.

1.1 The History of Demography

1.1.1 Thomas R. Malthus (Feb 13th, 1766 – Dec 23rd, 1834)

Malthus, as a political economist, proposed a systematic population theory, pioneering in it. In his book …*The principle of Population*, his proposed principle is that population grows exponentially, as food production increases in an arithmetic progression mannerism (Ezenwa, 2014). Therefore, though food output was possible to expand marginal upsurge in a twenty-five-year interludes, (which is arithmetic progression), there was a possibility of the population doubling (that is, geometric progression) in the same span of time. This scenario was an instrumental prediction of a future whereby people will lack resources for survival, due to limited food supplying resources. Henceforth, he recommended a deliberate population control and checks mechanisms, either as "positive" or "preventive" (Ezenwa, 2014).

His main preventive check was for men to observe a moral restraint by marrying later in life when they can competently support a family. He, however, never supported family planning in marriages. He suggested that failure to observe the moral restraint, then nature, via positive checks, would control the population growth rate. With this, all factors are known to shorten people's lifespan such as poor working and living conditions as they contribute to lessened

disease resistance and other factors like high morbidity that weakens men's capacity to procreate, famine and war, all leading to increased mortality.

His perspective faced criticism as it failed to observe that technological advancements could increase the rate of food production, thus supplying more than the projected arithmetic progression, hence easily supporting population escalation. The Malthusian theory modeled a huge dilemma with the advent of public health and epidemiology (Ezenwa, 2014). The mission of the latter is to comprehend and promote a population's health, which according to Malthusian view is wrong as it would contribute to unplanned adverse repercussions because there is an interference in the way nature naturally operates. The Malthus' influence was quite profound such that the pioneers of public health and epidemiology felt obliged to substantiate their mission by disproving, or generally modifying Malthus' perspective.

1.1 Understanding Health and Public Health

Since mortality and morbidity are antagonistic to the growth and wellbeing of a population, proactive and well-measured attempts were thus established by various population consultants to inhibit the separate incidences from happening beyond proportion. The practice is currently referred to as public health; described as the essence to thwart sickness (morbidity) as well as increased death (mortality) rate. Generally, its main concern is to safeguard the health of populations in entirety, whether as minor as in a remote village, or as large as a country. Public health can be described as a political and social model designed to extend life, enhance health, and improved living standards in the entire populations via disease control and prevention, health campaigns, and other health mediation mechanisms.

Health, experts (not particularly the medical practitioners), try to avert disease-related problems from occurring or re-arising by executing educational programs, overseeing services, making

policies, and steering research. Clinical health and public health professions can be broadly distinguished. For instance, public health consists of various professional disciplines including nutrition, medicine, optometry, dentistry, social work, nursing, environmental sciences, behavioral sciences, and health education among others; the activities mainly focus on the populations entirely instead of individual patients. Doctors treat patients concerning their injuries or diseases, while public health experts diagnose and monitor the whole communities' health concerns, promoting healthy behavior and practices, assuring that the populations remain healthy.

1.1.1   The History of Public Health Practice

1.1.2   John Snow (1813 -1858)

As Ezenwa (2014) records, Snow is respected as the founder of public health as a discipline of practice. He is remembered as the practitioner who pioneered in demonstrating the effect of anesthesia on human physiology. Snow is also celebrated for designing inhalers and chloroform administering to Queen Victoria in two of her deliveries besides being accredited as the initiator of modern scientific epidemiology (Ezenwa, 2014). Between 1848-49, and 1853-54 in London, as cholera became pandemic, he came up with a theory that the disease was due to ingestion of a substance and not airborne, which was indeed established that the malady primarily spread through drinking of contaminated sewage water (Ezenwa, 2014). These health-related activities are still applicable today in safeguarding the health of populations in entirety.

1.2 The advent of the Health Demography Discipline

The merging of these two fields (Demography and Health) led to the formation of another disciplinary field, Health Demography. The essence of developing the understanding of statistically defining the structures and size of a population, methodically diagnosing the health

problems and recommending for the most effective strategies and intervention programs to easing these issues.

As a discipline, Health Demography studies the link between demography and public health. As a field, Health Demography bases its studies on the connection between the people's demographic characteristics and their health conditions. Principally, health demography functions to understand how a population's health conditions are influenced by the population's health characteristics and its policy effect as well. Health demography is conceivably best described as the submission of the demographic methods and contents to studying the health behavior and health status of those people in a given community. Therefore, health demography focuses on the way factors such as income, marital status, and age impacts health behavior and health status of a population, and consequently, the way associated health phenomena influences the demographic aspects.

1.2 **Background of the Research**

The research report is based on some demographic settings that are of essential in understanding public health and the associated links thereof. Examples of the considered scenarios include demographic development in a collision with the variations in the civil status, socioeconomic distribution, level of education, and family formation. The outlook on time changes although covering the recent past. The contextual factors applicable in describing the dissimilarities in health between various population clusters are age and gender, education, ethnic and racial background, civil status, and socio-economic association. However, the structure, composition, and size of these population clusters varies with time, and hence not fully analogous in all the stages. As a result, there are obvious difficulties in interpreting the health advancement processes and analyze social-demographic modifications in health consistently.

1.2 **The scope of the Research**

Since demography encompasses studies on human populations regarding their distribution, growth, size, and density as well statistics on death, birth, diseases, and marriage, the study will function to establish how these can be implemented in health policy formulation. Naturally, demography is a complex discipline that underscores arduous data analysis by use of specific approaches in conjunction with a theory which is usually affiliated with public health, anthropology, sociology, economics, and statistics amongst others. Indisputably, the major contribution of demography to the discipline of public health is due to studies on population dynamics in correspondence to the bases of migration, mortality, and fertility. The research will illustrate in the assessment the family subtleties, child growth, and kinship effects. Thereby, the report will emphasize how a precise awareness of the population dynamics is important for planning and health policy design.

2.0 Chapter 2: Literature Review

This chapter reviews the theoretical grounds which deliberate and illustrate the link between health and demography. Moreover, the review of past studies which best relate to the study objectives have also been introduced and discussed. The study's theoretical framework, the relationship between demography and health, and the role of demography in informing health policy as well as the challenges faced when implementing policies have also been discussed in the chapter.

2.1 The Varied Approaches to Demographic Health

The population's health status can be pronounced variously by healthcare practitioners, individual subjects, administrators, researchers or even proxies. The primary data utilized in assessing a person's health status can be alleged, determined or diagnosed by numerous individuals, from being recounted by the sick individual (self-report), a professional (practitioners), family members (caregiver, proxy), or the managerial clerk (Zinsstag et al., 2015). The self-reported morbidity highly parallels with the recorded morbidity via the health interview studies. The detected morbidity aligns with the morbidity realized by the health practitioners, thus attesting to their routines.

The measured morbidity agrees with the respective measurement population sample studied via the health inspection surveys for instance. The individual-perceived morbidity is in most cases aligns to the notion of the necessity being felt by a population. About the three archetypal levels, the social morbidity is usually cited – a conception described by models such as medication or the alternative to medical attention or absenteeism (Zinsstag et al., 2015). Subjective morbidity usually qualifies perceived morbidity, while real or objective morbidity qualifies the measured

morbidity, though it is evident that a report at all levels, measurement, diagnosis, or perception, may have a subjective element.

Since the 20th century, the epidemiological framework is different: from the acute and communicable ailments to enduring chronic illnesses (Zinsstag et al., 2015). The observable epidemiological tendency has impacted the methodology to health and diseases. Yonder from the absence or presence of an ailment, the conventional bio-medical approach, individual or population health status can be evaluated via adaptive, functional, or perceptual methods. Under the practical methodology, good health associates to perceptions such as a happy attitude to life, well-being, or rather a creative, fruitful, and full life (Zinsstag et al., 2015). For the adaptive approach, good adaptation affirms to a consistent correlation with one's background. The common concept of health has been altered from mere surviving, through liberation from sicknesses, and a person's capacity to carry out daily routines, to the prevailing idea of health as mere happiness or rather well-being.

2.1.1 Bio-Medical Model.

The bio-medical health approach was developed around the late 18th century with the growth of scientific medicine, and people had developed complete faith in the power behind the medicinal healing (Zinsstag et al., 2015). The methodology received favor as there was evident progress in immunology, pharmacology, surgery, bacteriology, and diagnostics. The analytic-evocative strategic approach to illnesses played a vital contribution: maladies were perceived as distinct items, and proficiency became tremendously specialized and stemmed from meeting all the necessities of ailments. The approach faced criticism due to its oversimplification and compartmentalization.

Hereby, the body is the central factor that determines illness or health. Social and psychological issues are seldom recognized. Mental disease is an example of a grey area between illness and physical health. The model describes health basically as the being free of disease, and the illness occurs along a defined cause-effect track, and thus health recovery or healing relies on treatment of the disease. The treatment process is centered only on the disease, whereas physiological, emotional, and mental states are independent. Moreover, the approach gives credit only to the health practitioners to classifying and healing illnesses (diagnoses) as per their treatment, and patients ought to just submissively follow the recommendations given by the physician. Nonetheless, determining good health by the absence of illness and vice versa, was viable when the commonest ailments were the dangerous ones and had known healing mechanisms.

2.1.1.1 The Functional Model

The initial conceptual interpretation of terms regarding the impacts of illness was suggested by Nagi in 1965 and was revised in 1976 and 1991 where he differentiates between four distinct phenomena with the first one being disease or pathology (Badley, 2017). Impairments described either an emotional, physiological, anatomical or intellectual losses or abnormalities. He realized that if all illnesses indicate impairment, most impairments do not denote an ailment regarding an active pathology. The functional limitations are the restrictions in the level of performance of a whole individual or organism and are three dimensional – mental, emotional, and physical (Badley, 2017). The focus currently is towards detecting health challenges in a population early in life before the development of deeper catastrophic incapacity to self-care.

Functional restrictions heralded activity limitation in the impairment process, and thus the two can be employed as a pre-clinical infirmity level, forecasting future functioning limitations in everyday life. Adaptive strategies are available to complement action thus inhibiting the

development of functional restriction into activity restriction. Another approach to determine health challenges early in life is using the challenge with an activity instead of the necessary aid, particularly when a large proportion of the elderly population do not have readily available help as they stay alone. An additional approach is utilizing task modification, extending the period needed to complete a task or limiting the frequency of task performance. All these may offer early pointers of deteriorating function.

2.1.1 Perpetual Model

The essence to prompt one's health assessment has been identified in the idea of self-alleged health. Apparently, in some situations, what is felt or perceived by a person vary considerably with what is reported, due to the influence of gender, age, and culture. For instance, there is a tendency of different gender response because of the accepted cultural role for women, and it is assumed normal for the complaints regarding their health, but the vice versa is expected for men (Badley, 2017). As per the bio-medical model, the perceived health is due to a resulting state that reflects the universal health status demographically. It seems like a subjective judgment entirely, accounting for activity limitation, functional restriction, and disease. Perceived health in entirety, is not only stimulated by activity restriction or the functional limitation, but it is also by the symptomatic and sub-clinical states to provide a holistic approach upon the health concept. The application of these self-perceived tools is anchored by other opinions: individual feelings and experiences are not considered by the functional tools; the magnitude of functional restrictions is innately negative while the self-perceived health encompasses the measures to additional affirmative magnitudes of wellbeing. Essentially, that self-perceived health is not a reflection of functioning and health; it is the capability to envisage survival, service use, and functional status. The demographic features of each society govern its current and impending

health demands, and hence, for an effective and strategic public health planning, the society's population distribution, sex, and age must be comprehensively understood. The sex/gender ratio and age structure impact the various forms of health challenges faced. Essentially, every population has its distinct health needs as they vary substantially by sex and age. Therefore, the death and birth rates of a population influence the age characteristics making it easily predictable.
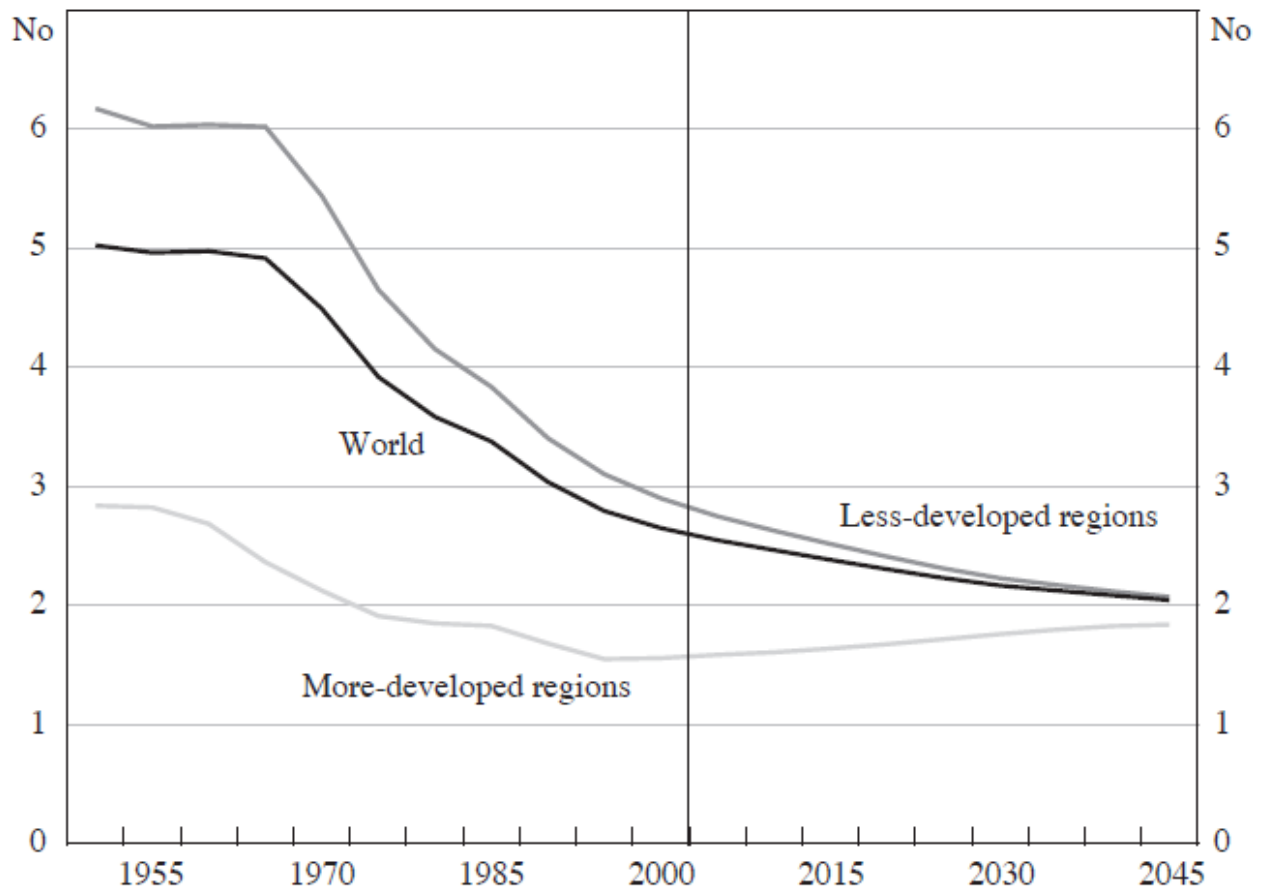
Notes: The dates denote to the start of a 5-year window. (Data from 2005 are founded on projections.

Figure 1: Total Fertility Rate (Retrieved from UN Population Division (2005)).

A decline in the fertility of a population generally minimizes children's proportion in the population, whereas a drop in the rate of deaths escalates life expectancy as well as the

corresponding elderly population. In most of the developing nations, they experience a tremendous population explosion with the age structure comprising mainly of the young since birth rate is exponentially high. Health care policy fundamentally stresses on the maternal, prenatal, and postnatal care. However, child health and maternal needs receive more priority since the young-age population is remarkably high. It is worth noting that the sex ratio significantly influences the health care needs of a population. In many age groups, the ration between the sexes is almost equal, although men generally depict more death rates compared to women. Consequently, in old-age cohorts, the sex ratios show clear differences, with men being far much less than their female counterparts. The rate of population growth impacts the future prerequisites for effective healthcare provision.

Precisely, to provide health services to a population which is rapidly expanding proves far much difficult compared to a less rapid growing population. In case of substantial refugee or immigrant populations either due to protracted civil unrest, famine, or an epidemic outbreak, the unplanned for population increase may be disadvantageous to the original federal plans for a population in such a society. Aspects associated with accommodation, security, educational, health, and sanitary services may be jeopardized. Pure or formal demography is broadly concerned with understanding the changing population dynamics alongside measuring the apparent changes. In a healthy population, there is a proportional increase in life expectancy while for an ailing/weak population, the demography is negatively affected, therefore a degenerated life expectancy. Public health and emergency preparedness (PHEP) field are founded on the important principle of public health which states that the health of a person is dependent on the entire population's health (Horney et al., 2017). Despite demographic data and techniques being able to help evaluate and describe the health physiognomies of a population, demography is yet to be utilized

by physicians in the PHEP field, even with the deep wealth of pertinent data and proficiency. For effective preparedness plans to be made, central approaches in demography must be scientifically assimilated into the PHEP field. Undoubtedly, public health emergency can emerge due to war, political instability, as well as the changing population dynamics.

As Horney et al., (2017) collaborates, few research materials exist about demography and emergency preparedness probably because PHEP is relatively an emerging field, and this demonstrates deficient formal data integration and population science mechanisms in the PHEP policy. Research indicates that the level of preparedness is associated with the characteristics of demography including age, immigration, and population size. Since efficient preparedness procedures demand that the population characteristics be well understood, the demographic data and methods ought to motivate the preparedness planning. The related fields depict extensive, systematic, and comprehensive exploration of the relationship between the demographic implements and their corresponding fields (Horney et al., 2017): few PHEP and incidences exist whereby demography seems to be employed systematically in informing health policies.

2.1 The Connections between Demography and Public Health

In the same manner that demographic characteristics influence health care planning, the interventions of public health also sway the demographic characteristics (Abel-Smith, 2016). The impact on people due to public health also affects their demography. It is a fundamental requirement that before launching public health utilities within a community that the respective demographic characteristics be understood (Abel-Smith, 2016). Public health as a discipline concentrates on safeguarding the population from the mortality and morbidity influences, revolving in every aspect of peoples' lives by supporting good health campaign programs (Case and Deaton, 2017).

Nevertheless, for implementation of these programs, the extent of the existing problems must be determined first to understand the core of the problem, analyzing how each population layer within the community is affected, as well as the overall number of people impacted. The valuation demands that the demographic characteristics be understood alongside the lifestyle and culture of the people. In simple terms, a public health practitioner and a demographer must be in consensus for them to co-work, and for an effective public health initiative to be a success. Both of their skills and expertise must be merged and employed in the respective program. This, therefore, implies that the demographic skills and knowledge are fundamental for strategic public health governance and planning.

2.1 **Health and Demographers**

The development and implementation of health policy is a three-phase process: ascertaining the main ailment challenges, conniving health care structures, and outlining what the respective government should do employing the entire array of policy mechanisms (Houngbo et al., 2017). Lucid health policies must be resilient in the three stages. Because population variations are a fundamental element of transforming health requirements, demographers show remarkable consideration in the first phase. The demographic assessment examines the behavioral deviations in a population and the way these can alter the population's composition (race, gender, and so on), and structure (age) on a temporary and long-term basis.

Moreover, demographers have played a significant role in initiating public health structures and designing monitoring instruments and analyzing the lasting objectives of the programs especially the ones targeted at the infant and elderly population (Streatfield et al., 2014). Besides, demographers have been on the frontline in discussing the dissimilarities in mortality by socio-economic and sex status. Although biology is an instrumental factor, behavioral and social

components are vital as well. For instance, according to Streatfield et al. (2014), life-course

demography is essential in copious understanding the implications of paternal behaviors and

choices on child growth and development, whereas panel and longitudinal readings have been

significant in elaborating lone parenthood impacts on the health of a child and evaluating the

effect of HIV/AIDS-related mortalities on household kinship, composition, and unsanctioned

care.

Demographic data is very fundamental in the determination of the health of a population. For

instance, in the setting where the majority population comprises of the elderly or aged, there are

some health concerns associated with such a community thereof. For instance, cases of dementia,

arthritis, blood pressure, cardiovascular and heart-related ailments, among many others (Gupta

and Prakash, 2015). For a population that is majorly made of the younger population, a different

type of health issues and diseases such as malnutrition and infectious diseases among others

become apparent.

The demographic characteristics of a population are vital indicators of health. For instance, when

they indicate high mortality rates, and thus fewer life expediencies usually reflect an unhealthy

population, unless if caused by calamities or disease outbreaks. In such a population, thus, it

becomes critical that both demographers and health practitioners co-work to determine the

causes and implement the necessary public health measures to improve the deteriorating health.

It is in such scenarios that biostatistics comes into place. Since some diseases show more

prevalence in certain environments or age groups, it is thus a viable idea for prevention health to

be targeted basically at clusters and regions with higher risks of vulnerability rather than to hit

those areas which would not be affected at all.

2.1 Demographic Evolution

Demographic transition theory is the first input of demographic rational to broader discussions on changes in population. It has an in-depth influence on the roles of international and national agencies in the developing and the developed nations as well in the last few decades (Frejka, 2016). The theory categorizes various phases of demographic alteration according to mortality and fertility levels, vacillating from the first stage when mortality and fertility show coherence at elevated levels. In the second stage, where there is the evidence of decreasing mortality and subsequent decline of fertility; to the third phase, in which population growth rate is almost zero, due to low death and birth rates (Frejka, 2016). The pattern is consistent in the developed countries and has proved important in studying the association between mortality and fertility. These studies have contributed to the awareness that a decline in fertility in these developed nations is unnecessarily reliant on the growing modernization or industrialization since these countries are already developed.

2.1 The Lifespan Discussion

The role of demographers in the past and current discussions on whether people's lifespan has been fixed remains important. Over the last century, life expectancy has steadily increased in many nations, with many arguing that there is a fixed 'extreme' or maximum lifespan of a human being (Saito, Robine, and Crimmins, 2014), with Figure 1 giving a clearer picture.
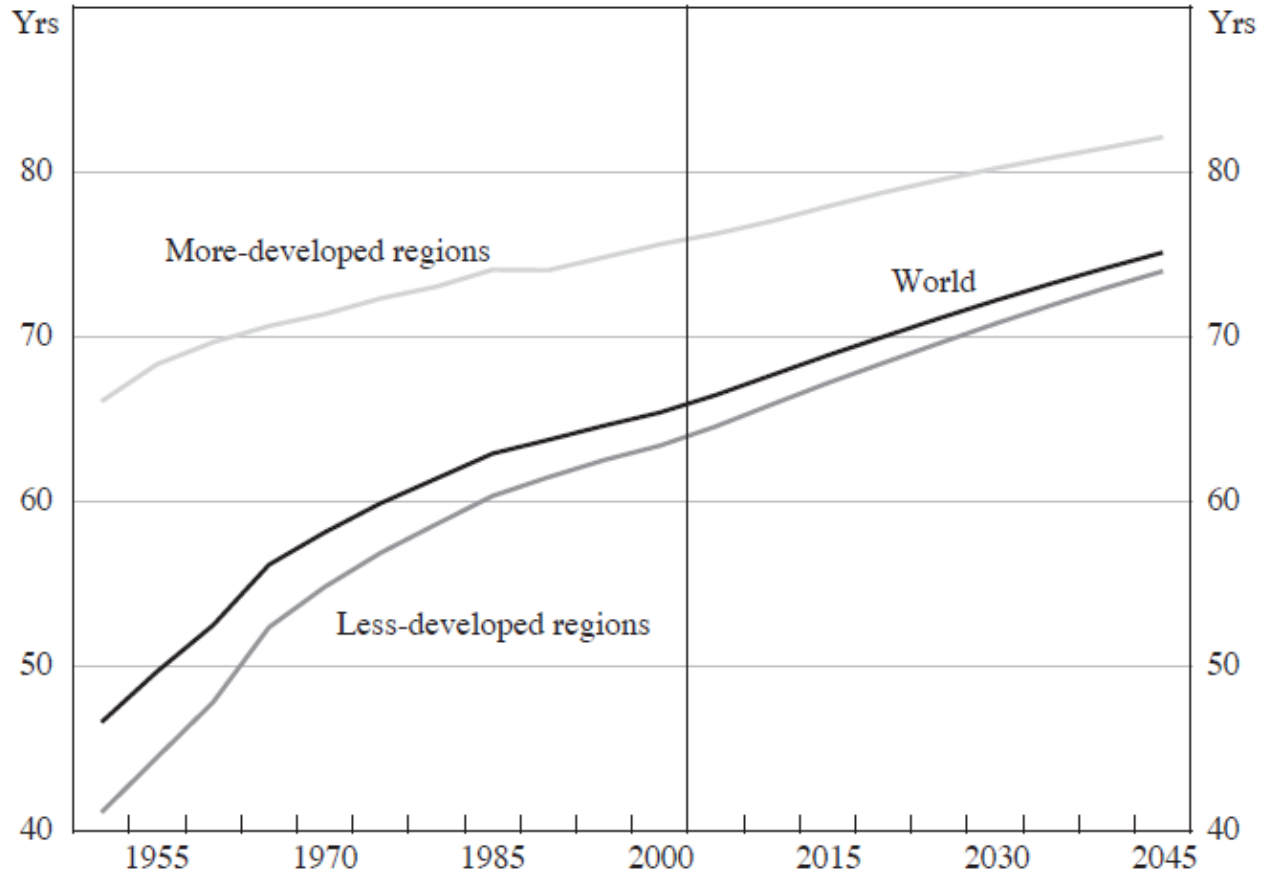
Notes: the dates describe the commencement of 5-year window, with the data from 2005 established from projections.

Figure 2: Life Expectancy (Retrieved from UN Population Division (2005).

Nevertheless, the premise founded on biological debates shows little scientific inferences. It is also clear that consistent life expectancy advancement is still on the rise, and life expectancy is yet to touch its maximum threshold. Therefore, because it does not prove feasible in this phase to determine the 'maximum' in accordance to past believes, health planners must allow for constant proliferation in the proportions and numbers of the elderly population in future.

2.2 Health Data

Contrary to mortality, concepts like morbidity and health are not easily defined. According to the World Health Organization (2014), health is described as a state of total social, mental, and

physical well-being, rather than the mere absence of infirmity or disease. The multi-dimensional health nature is empirically determined by the array of descriptions, with some being broadly perpetual whereas others are widely functional as well. The disease is not a change in the health status of an individual, but rather a new aspect of life (Saito, Robine, and Crimmins, 2014). Being healthy implies that there is the provision of a degree of forbearance against various ecological challenges, thus able to get sick and recover. A population may be described as healthy by not having active ailments; embracing conventional health practices; being able to handle everyday stress; easily performing the daily activities; enjoying very good and excellent health; and becoming sick and recovering.

2.2 **Demography and Health Policy/Health Practice**

Skills and knowledge of health demography application are essential in designing a pre-intervention evaluation. Each community has its problems and constraints which limit realization of the best achievements that they desire. With some of these constraints being difficult to assess and determine, community assessment therefore intervenes. When health demographic skills and knowledge are applied, problems can be identified, prioritized, via cost-effective strategies implemented, and recommendations are made towards alleviating future related challenges (Saito, Robine, and Crimmins, 2014). The deaths and births' history of a population offers an idea about the variations in age structure and composition, which makes it easy to predict the population in the future. This capability is essential for the informing health policy and planning. Being knowledgeable and aware of the demographic structures of a population aids in the designation of public health medications for the prevailing conditions. It facilitates an easy public health intervention because all health problems have patterns and structures in the populace (Saito, Robine, and Crimmins, 2014). A health demographer untangles these patterns

and structures, therefore making decision making and strategic planning easy. On a relational ground, health demographers establish the agenda and plans, while physicians or medical doctors build on them. Health practitioners identify with the relationship when they ensure that they undertake a baseline assessment of the situation within the community before conduction of any intervention in the population. As a result, project managers understand the population structure, regarding sex distribution, age distribution, social orientation, and population density. The community assessment proves the fact that health demography discipline is relevant to the public health field.

2.3 **Challenges in Policy Formulation**

One main problem is arising from the sheer diversity of functional and health states encountered by the old population. What is reflected is delicate physiological variation which happens with time although they are only slackly related to chronological age (Streatfield et al., 2014). The reality in the population is that both physical and mental capacities of an 80-year-old are almost the same as that of a 20-year-old. Therefore, public policy should be framed in such a way that it maximizes positive aging trajectories by eliminating all barriers to social contributions and participation. The comprehensive public policy must address the needs of the aging populations due to declined capacities. Another challenge that must be addressed for effective health policy formulation is one due to inequity in the population characteristics (Streatfield et al., 2014). Policymakers, therefore, should be aware of the areas of the population that have few resources and those with excess so that they can be balanced. Moreover, public health policies must be made in ways which overcome and not reinforcing the inequalities.

Another challenge that should be addressed is the existing obsolete stereotypes and chauvinism. The older people are usually stereotyped as a dependent, out of touch, frail, or burdensome

despite their huge contribution in the society. These attitudes restrain the way the challenges are abstracted, queries are probed, as well as the ability to grasp innovative prospects (Streatfield et al., 2014). As the beginning point in the policy-making process, they usually contribute to the huge emphasis on containing cost. If policies allow, the blending of good health and greater longevity may allow continuous changes on the old-fashioned groupings of the life course. The shifts can benefit both the individual and the society as well by availing broader chances for the elderly population to contribute by taking part in social activities and workforce. The policies developed should ensure that the older population is financially secured, which is important for their well-being.

2.3 **Research Gaps**

From a critical evaluation of past literature indicated that several contextual and conceptual research gaps exist in the fusion of health demography. According to Horney et al. (2017), few research materials are available that discuss demography and emergency preparedness probably because Public Health Emergency Preparedness (PHEP) is relatively an emerging field, and this demonstrates deficient formal data integration and population science mechanisms in the PHEP policy. Other aspects that should be addressed related to public health policy formulation associated stereotypes such as obsolete stereotypes and chauvinism, inequality due to age associated prejudices according to (Streatfield et al., 2014).

3.0 **Chapter 3: Research Methodology in Health and Demography**

The chapter gives a detailed data on the methods employed in capturing research data. Research stance, data sources and methodology, Data Sources and Methodology, population census and vital registration, deaths and causes, other data sources, data analysis, and recent trends in health demography, have been well-captured.

3.1 **Research Stance**

The report's research philosophy recounts for the basis of knowledge and information from which vital predispositions and conventions of research as founded. It describes a belief regarding how data due to a phenomenon ought to be collected, analyzed, and utilized.

3.1 **Data Source and Methodology**

Demographers are quite active in the collection of nationally representative data as well as in the development of newer methods that are significant to health analysis outcomes. Vital registration and census are the most common tools employed in data collection, especially on mortality and fertility, with the population registers progressively becoming the most prevalent data source. The datasets initially gathered for demographic resolves including the Health Survey, and World Fertility Survey programs mostly in the developing nation as well as the Family and Fertility Survey initiative in Europe, and many others have been broadly applied in understanding the health determinants and trends. For instance, the expansion of approaches needed to evaluate and amend incomplete data have been fundamental in analyzing adult and infant mortality rates in the developing world, with the William Brass' work being very seminal in formulating

methodologies which permit the secondary assessment of mortality by use of census data particularly when complete important statistics are absent.

With the fact that significant statistics in sub-Saharan Africa are incomplete (Marks et al., 2017), there is a deeper necessity to cultivate demographic methods to accommodate the current mortality configurations, like the ones relating to HIV/AIDS. Approximately the total population change estimations in the developing world are founded on the demographic methods applied to modest survey questions, like the number of the elderly population, and whether parents, siblings, and children are still alive. Besides empirical analysis, the demographers have contributed to methodological advancements in analyzing mortality with weakness models, with the medical models being unable to entire explain variations in mortality as time progresses. A significant demographic role has essentially been the usage, and ongoing progression of life tables approaches employed in the sociological and epidemiological analyses.

3.1.1 Population Census

Scandinavia is known to have undertaken the first contemporary censuses in the 18th century (Edvinsson, 2015). Later the censuses stretched throughout Europe in the 19th century, with the world at large embracing the approach in the 20th century. Essentially, the data collected entails very open questions on marital status, sex, place of residence, age, education level, and employment (Hinde, 2014). The UN's recommendation is for censuses to be done in the years that end in 1 or 0, decennially to the least. Censuses have various strengths and are usually the main data source for population subgroups or small geographical areas. Though the census is predominantly data collection tool on the population stock, they have been employed to identify vital events too. Most countries utilize censuses in acquiring data about the contemporary internal migration by use of questions regarding private places within a few years previously

from the time of census as well as the entry date for the ones born in other areas (Hinde, 2014).

Indirect approximation methods established mainly by Brass imply that questions about the rate of births and infant mortality, on orphan-hood, and widow-hood are broadly employed in assessing mortality trends and levels by use of both surveys and censuses in nations with scarce vital registration structures.

However, censuses require heavy budgeting and the challenge of acquiring quality data. Strategies to lessen the cost and improve data quality such as employment of sample censuses, from either the entire census, like in China and case of detailed data inquiry, like the United States (Hinde, 2014). The census process demands both a flexible administrative infrastructure as well as the cooperation of population to be numbered. Some nations no longer take census since the latter is deficient, and now depend on virtual censuses and large-scale surveys due to population registration information. This 21st century is encountering many nations that are embracing other alternatives since the information needed by the governments is becoming highly complex and the challenges of bulk data collection increase.

During the conduction of census, difficulties resulting from the omissions and errors are quite common, not excluding the nations experienced in conducting censuses. The young, infants, geographically mobile citizens, the minority ethnic groups, the very old, and recent immigrants (mainly the unauthorized) have a higher possibility of being under-enumerated. Therefore, they represent some of the groups which health professionals, demographers, and policymakers should take a keen interest. Clusters of individuals such as military personnel, seasonal migrants, temporal home dwellers, and those with different residential homes also cause problems. They not only have a high likelihood of being missed, but decisions must be made on whether they ought to be assigned to their legal or usual residences (if easily determined) or should they be

tallied as fitting to their enumeration residences, with these systems being termed as de jure and de factor respectively.

The concern of allocating individuals according to their typical place of residence is significant since frequently resource allocation is done according to the population characteristics and size. This includes the formulation of health plans and policies that may affect the population of a given region in time. Additionally, it is fundamental to try and warrant that demographic event that has been documented in one system. Also, vital registration is accredited to the population essentially at the risk of encountering them. For the developed and rich nations, for instance, the majority of deaths happen in hospitals or care centers that usually draw their patient population from wide geographical areas. As for such, decedents do not get assigned according to their former localities before being admitted to hospitals; such regions seem to experience escalated mortality rates whereas, in others, the documented mortalities are theatrically low. Enumeration below the normal levels is often evaluated via census validation surveys (the surveys of a sample census discourses whereby rigorous efforts are made, and non-respondents are contacted to review the supplied information as given by respondents with comparisons of population estimates from various sources. Further, from ensuring almost-total enumeration, the quality of submitted data is a huge concern as well. In various populations, demographic information is usually incorrect as many people do not precisely know their certain age. Therefore, some approximations are made or reported by the enumerators. Thus, 'heaping' especially on the ages that end with 5 or 0 is common and is detectable by assessing the age distribution and employing some consistency tests, and the data is harmonized before being published. The most serious challenges occur if the age reported is established on other secondary characteristics like grandparent status, marital status or number of children. An

analysis based on for instance grandparent's status will be biased when a person's report of his/her age is determined by mortality of their grandparent (whether alive or dead).

3.1.1 **Vital Registration**

For an efficient, effective, and informed health policy formulation and planning, comprehensive data on the population characteristics and demographic events is required. In the developed world, such information is documented and accessed through vital registration. In the 19th century, it was compulsory for deaths and births to be registered in most of the European nations, and even in other parts of the world (Hinde, 2014). Parents are legally responsible for registering every birth and should also complete files be recording and giving details in case death happens. Most of these developed nations have invested in efficient registration systems with comprehensive or almost comprehensive coverage. For the underdeveloped countries, vital registration systems, however, are often non-existent or incomplete, with the exceptions of some countries such as China and India which use sample registration mechanisms for areas.

As of 2005, only a third of all the death estimates globally are reported and recorded to World Health Organization, though if these sample registration structures for China and India are to be considered enough archetypal of their respective national populations, the proportion will escalate up to 72% (Hinde, 2014). Data quality given and recorded is very fundamental. However, information about someone's death is given by proxy informants and has a high probability of inaccuracy. The differential reports on marital status, occupation, age or other distinct characteristics during census as well as from other sources like death certificates make it even more challenging. The numerator-denominator differences may trigger serious prejudice into analyzing mortality in the advanced years, or through characteristics like occupationally distinct social status, ethnicity, or marital status. These problems can be avoided by maintaining

efficient register-oriented systems which relate vital registration information to health,

demographic, educational, and professional registers.

3.1 **Deaths and Causes**

The main source of data regarding deaths and their causes is death certificates (Grundy and

Murphy, 2015). Usually, the health status of the deceased is also established. In the developed

nations, the very cause of death is normally certified by a medical practitioner, with the

information coded according to ICD that was authored William Farr's work, a British physician

and statistician, in the 19th century (Grundy and Murphy, 2015). Increasing awareness of

specific conditions can influence the coding practices, which are usually revised and influence

the task given regarding the cause of deaths. In Australia, the United States, and other places, for

instance, the recorded cases of Alzheimer's illness and other forms of dementia on the death

certificates have been on the rise since the year 2000 (Grundy and Murphy, 2015). Partly, these

reflect some changes affiliated with introducing ICD-10, but the effects of rising awareness

besides special campaigns and initiatives to promote the identification of such conditions.

Age	1950-1955	2010-2015	2030-2035	2045-2050
0-14	2.5	0.7	0.1	0.2
15-59	1.4	1.0	0.6	0.2
60+	1.4	3.3	2.4	1.9
65+	1.7	2.8	2.9	1.8
80+	2.4	3.3	4.6	3.2

Figure 3: Population growth Rate by age group (average annual percentage change) (Retrieved

from UN Population Division, 2017).

The elderly, currently the bigger proportion of decedents within the low-mortality populations

have a higher likelihood of suffering manifold pathologies while there has been a rise in the list

of conditions detailed on the death certificates. The preferred choice of one over the other as the actual underlying ground of demise is certain to be partially random.

For instance, in the U.K., for the period ranging from 1984-1992, about 25% fewer deaths were apportioned to the respiratory ailments mainly due to the implemented modifications in the rules applied in selecting the central causes of deaths (Grundy and Murphy, 2015). Numerous coding and analysis of death certificates usually states the overall conditions and is very informative although such information is only available in some countries. The observable changes in death certificate's coding reflect the discrepancies in diagnosis and medical know-how, according to the usage of autopsies in cataloging systems, while the quality of a registration system contributes to the complications in the analysis of trends between countries and over time (Grundy and Murphy, 2015). Another specific problem is created by assigning deaths to poorly-defined conditions like senility, old age, signs, symptoms, or another unclear diagnosis, usually described as garbage codes, and this is very common in very many countries. Few countries can meet the desired high-quality information with the others complicating comparisons regarding time and coverage.

Years back, even in the 20th century, many deaths, especially among the elderly population, were recorded under poorly-defined groupings, and reductions in these magnitudes were allied with a rise in the percentage due to circulatory ailments (Grundy and Murphy, 2015). The scope of the ill-defined bereavements in the group for the most elderly, aged 80 and above, however, was somewhat higher between 2001 and 2010 compared to the previous marginal period, attributing augmented assignment to an elderly group as the cause (Grundy and Murphy, 2015). The cause for this is yet to be realized, although the end of deeper analysis into unclear causes of death can be a minor instrumental factor. The usability of the 'reason for death' has a possibility

of being reversed in relational response to the public investigation, 2000-05, regarding Harold

Shipman's case. Shipman, a British, was a family physician who committed serial murders of

more than 250 aging patients without detection for decades (Grundy and Murphy, 2015).

He illustrates the essence of a survey of deaths for the purposes besides demographics,

policymaking, or epidemiological research. In the countries with low registration and

certification systems and structures, the information on demise by cause is utterly deficient.

Various attempts to cultivate verbal autopsies have been made alongside procedures of data

collection from proxy informants that can be assessed by physicians and applied in assigning the

actual cause of deaths. The strategy has been expedient in a few minor investigations and is

being implemented on a broader scale in countries such as India. In cases there is no routine data

documentation, estimations can be achieved through modeling, and has been applied for the vital

issue of determining deaths by numbers from HIV/AIDS. According to Grundy and Murphy

(2015), Global Burden of Disease program is the most ruthless exercise as it has employed a

broad assortment of methods and sources, including field surveys, expert knowledge, mortuary,

and police data, vital registration, and surveillance to develop estimations of the cause-specific

deaths/mortality by sex and age for over 200 distinct causes for each country globally.

3.1 **Other Sources of Data**

A range of detailed data collection surveys has been integrated into many nations. This include;

family building approaches, health-related conduct, reasons behind migration, as well as data on

biomarkers which can be difficult to acquire during the census. In countries with scarcer data

sources, especially the developing ones, the surveys are usually the most preferred data sources

regarding basic demographic parameters. Surveys usually lead to quality data collection when

compared with census since there is a high likelihood of using highly-competent interviewers. In

1972, the WFS, a global population research initiative was launched, aimed at determining the levels of fertilities universally, and it was a predecessor to the DHS, which have been of value in the provision of health and demographic data for some developing nations (Grundy and Murphy, 2015). Additional approaches such as multi-round surveys, whereby respondents answer questions up to the last time of contact, and the dual-record systems that encompass two autonomous data collection structures (one usually a multi-round survey), whose overall findings are ultimately combined. The approach, though expensive, allows for some assessment of previously missed events.

Usually, the raw demographic data relates majorly on individuals' personal experiences – reproduction, family formation, reproduction, sexual activity, marital breakdown, birth control, disease, and death. These incidences happen within a social framework attaching value to several the behaviors while stigmatizing others. Unsurprisingly, respondents in surveys and censuses may be unwilling to reveal illegal abortions, non-marital pregnancies, illegal immigration, or AIDS-associated deaths of family members. Some regimes also embrace concealment as a policy, treating health and demographic data as top secret.

Moreover, the huge potential complications due to people being uncertain about their age and other common characteristics such as children that have ever been born; and unclear recollections of previous events and the immense scope of the administrative errors should be considered, which makes health policymakers', planners', and demographers' conventional obsession with quality data plausible. Discrepancies in acuities and health status reports are problematic as well and have bedeviled efforts to compare global health status, even under harmonized questions, people do not respond in an accordingly (Grundy and Murphy, 2015). Comprehensive sources of statistical data such as the United Nations Demographic Yearbooks

base their data on millions, which is mediated by the information gathered from the experiences and events and is filtered further depending on the way recording, analyzing, and processing processes are done. Other organizations that convey international reference databases and works include the World Bank, the WHO, the U.S.C.B n.d., Eurostat, the OECD, as well as the Human Mortality Database. Usually, these data sources offer their collected data freely online.

3.1 **Health and Demographic Data Analysis**

A typical array of measures and techniques is what demographic and health analysis is established upon; with the most common being briefly pronounced in the report hereby. The analysis encompasses not only the use of a given method but also the resolutions on the logical units to implement and the way towards effective grouping them. One main discrepancy is between cohort and period analysis. The latter involves the events of a specific period such as mortality rates within five years, whereas the former follow individual experiences through time. Cohorts are described as people groups experiencing similar important events within the same period. Therefore, birth cohorts are made of people born in a specific year or closely-linked years, while marriage cohorts the one who marry at a given period.

Life-course and cohort methods to mortality analysis alongside other population health indicators show an intuitive plea and their use is on the increase, both driving and being driven by an increasing extent of longitudinal studies (Grundy and Murphy, 2015). The cohort exploration of a time sequence information can be applied in the absence of expressly gathered longitudinal data. Period and cohort are two major dimensions that situate people in time, and age is the third one. Duration effects with the likes of death proximity, marriage duration, or exposure period to a specific pathogen) are also significant. On the other hand, cohort effects are vital, and unless tolerated for, they may disguise relationships between various risks and age. Variations in the

smoking cohort behavior, for instance, have a huge implication on the associations between smoking-associated illness and age as evident at various time periods.

Decisions on whether to employ geographical regions, individuals, households, or families as logical units are usually restrained by the availability of data. It is until the recent past that most census data can now be accessed as aggregate tabulations, although personal-level data is increasingly obtainable. Various other innovations encompass development of samples with the inclusion of vital registration, linked census, and in other situations health service information/data, for example, the longitudinal studies accessible for nations such as the United Kingdom among others. In the data sets, entities' census documentations are interconnected with their respective vital registration records, and thus numerator-denominator partialities in, for instance, the mortality analysis is dodged. In the Nordic world, the entire population is already assigned to individual identification numbers that enhance information linkage from different registers (Grundy and Murphy, 2015). The linkage to employ healthcare amenities and services has been implemented in nations like Finland.

3.1 **Recent Health and Demographic Trends**

Age, size, and growth of a population incorporate the results of changes in the demographic behaviors, and they experience the implications of well-being and health of a population. The aging population almost undoubtedly become the chief demographic challenge of the 21st century in almost all the developed as well as an increasing number of developing nations. The healthy relationship between disability and health impairment risks and age suggest increasing demands for support services, although the disability levels may fall. In such nations that are aging before becoming rich, variations in the family support structures for the elderly may pose numerous challenges. Various strategies to respond to the developing challenges have been

offered. For instance, extended working period/years has been encouraged by reviewing pension and retirement policies, and other strategies such as improved management of long-term and acute health care services, as well as initiatives and campaigns that promote aging in a healthy manner.

Family and marital patterns have experienced significant changes which contribute to various health implications that have driven to some changes. For example, in North West, Europe, and North America, as well as the Caribbean and Latin America, the escalated rates of non-marital childbearing and divorce imply that the increasing proportions of children spend a huge portion of their infancy years in single-parent families. Even if the underlying pathways are tough to expand due to a few collection impacts, there exists enough evidence demonstrating poorer and secondary health conditions for children from lone-parents, and their mothers/fathers, and even among the unmarried, particularly the divorced ones, and these trends indicate negative implications. World Bank Group (2014) notes that there is projected continuous improvement in the adult and infant mortality rates especially for the developing world, according to optimistic conventions regarding the progression of HIV/AIDS endemic.

For the poorest nations, the association of environmental degradation, rapid growth in population, and conflict present relentless health challenges, and the 'incomplete agenda' about health includes offering access to women contraceptives who would wish to limit or space their kids (World Bank Group, 2014). In various low- and middle-income nations, tobacco use patterns have a likelihood of contributing to substantial impacts on the health trends shortly. The concerns about climate change, cultural and economic globalization, and international migration all have major health implications in the 21st century and beyond, as they relate with the demographic processes and patterns (World Bank Group, 2014). Quantifying these prevailing

trends and weighing their impact on health and the need for healthcare necessitates a prior

understanding of population-centered measures and population dynamics, besides apt

demographic data. Therefore, demography is a vital component of health, public health, and of

informing policy.

4.0 **Conclusion**

The general objective of discussing the information associating with the data sources, the

demographic techniques and population change concerning public health was achieved in the

study. This was achieved through analysis of the advent of health demography as a discipline and

the role of health demographers in informing health policy and planning. For the specific

objectives; first, some fundamental contributions achieved by demographers in health towards

informing health polices was accomplished by elaborating on the contributions of John Grauntis

and John Snow who pioneered in the field of demography and public health respectively.

Second, the goal of discussing how significant a precise cognizance of the dynamics of a

population is, especially on health policy and planning was realized through the marriage

between health and demography as a discipline, and an understanding the community's health

demography that makes all health intervention and planning, and health policy formulation easy.

Thirdly, the objective of discussing composite inter-relationship between social health and

population was achieved a combination of works, development of statistical knowledge in the

measurement of the population size and structure. The study identified that with demography

stemming from social science, and being focused on statistical learning on the human

populations, and their association with public health, safeguarding total population health

become paramount.

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