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Fertility and Contributions of Global Fertility to the Ageing of the World Population

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Abstract — The elderly population is increasing around the world. The increase in the elderly population is referred to as population ageing. Although not all countries in the world have a large number of elderly populations, eventually all countries will experience a process, called population ageing. This paper aims to discuss: (1) the meaning of fertility, (2) the areas of high and low fertility settings, (3) the reasons for the fertility transition, and (4) the contribution of fertility to population ageing. To achieve this objective, a research using a secondary analysis design was conducted. Secondary materials for this research are collected and analyzed from materials that have been previously published by various authors from various sources. The results show that (1) fertility is a demographic term that refers to the live birth experienced by a woman, (2) fertility rate depends on the level of economic development of a country, (3) many factors behind this level of fertility, all factors from within the woman herself, or other factors outside the woman, and (4) declining fertility is a major contributor to the increasing proportion of elderly worldwide. The unusually rapid increase in the elderly now requires all countries to pay serious attention to this issue in their respective countries.

Keywords— Fertility; Fertility transition; Population ageing; Elderly population; Stillbirth

I. INTRODUCTION

Following the 1982 World Assembly on Aging held in Vienna, the issue of population ageing has become an international issue [1]. Analyzing the ageing of the population can be done from various aspects. We can analyze it from demographic aspects, from economic aspects, psychosocial aspects, from health care and health-related aspects, the family, social support, and from various other aspects as well. Consequently, aspects such as distribution and migration, mortality and morbidity, employment and retirement, health-related problems, the family, support and care of the elderly population, have become the attracted issues of population ageing, scholars as well as students of population ageing.

The important conclusion can be drawn from the available data is that, the ageing of the population is no longer a national, but it has become an international and interrelated issue that requires all countries and all parties to pay immediate attention to the ageing of the population. In developed countries, for example, even though the issue of population ageing has long been a major issue in academics, social and economic, including politics and policy, this issue remains fresh and relevant to be an important policy agenda and the academic issue.

In developing countries, of course, there are more questions need to be resolved. Government needs to start preparing appropriate plans to deal with the ageing population to ensure the development process is not disrupted. "The window of opportunity to reform is closing fast as the pace of population ageing accelerates" [**2**]. More research needs to be done. To enable more effective research to be conducted, scholars of the population ageing in developing countries, certainly need more information, both primary and secondary. One question that is trying to be addressed in this paper, is that, what is the contribution of fertility in the world population ageing?

Many of us have become accustomed to the fact that, the ageing of the population is influenced by a variety of factors, where one of the factors, is that the fertility rate of its population. Therefore, it is the aim of this paper to describe what is the contribution of the fertility factor in the process of the ageing of the population. This paper aims: (1) to describe the global level of fertility, (2) to show the areas of high and low fertility settings, (3) to

describe the causes of fertility transition, and (4) to explain the contribution of fertility to the ageing of the population.

II. RELATED WORK

The population is an asset of a nation [3]. The world population is ageing. Policy makers, scholars and students who work in the field of population ageing are well aware that the main problem of all countries in the world today, developed or developing ones, is population ageing, that is the increase in the elderly population. The category of population is increasing in every corner of the world. Although not all countries in the world have a large number of elderly populations, eventually all countries will experience a process of population ageing. Based on the report released by World Population Ageing [4], in 1950, the world has only 205 million elderly people aged 60 and over, and at that time the report highlighted only three countries with the elderly population exceeded 10 million in their population, namely China (42 million), India (20 million), and the United States (20 million).

The world is shocked by the remarkable increase in the number of elderly people aged 60 and over in the population structure in many countries in the world. By 2000, the elderly population aged 60 and over had nearly tripled, from 205 million in 1950 to 606 million in 2000 [**4**]. In 2000, the number of countries with an elderly population increased to 12 countries, including five countries with an elderly population of more than 20 million, namely China (129 million), India (77 million), the United States (46 million), Japan (30 million), and the Russian Federation (27 million).

This number continues to climb; and in the 2015, it was recorded that the world has about 901 million people aged 60 and over [**5**]. Even more amazing is that, most of this increase is happening in developing countries, not in developed countries, even though the population ageing begins in developed countries. Based on this scenario, the developing nations, particularly Asia, are considered home to the majority world's elderly population [**5**].

In 2000, only 38% of the world's elderly population lived in developed countries, while 68% were in developing countries. In 2015, the number of elderly populations in developed countries decreased to 33%, while in developing countries, it increased to 67%. The projection of this differences continues to widen, reaching 20-80% by 2050 [**5**].

Recognizing this, the World Assembly on Ageing, held by the United Nations in Vienna [**1**], [**6**], has "brought the attention of public and policy makers alike the fundamental fact that all nations in the world are growing older" and, has called on all member countries to also pay serious attention to issue of the population ageing in their respective countries. Policy makers at the assembly also gave a warning that right now the "world's population is not only ageing" but ageing at an incredible speed.

Following the call, "the process of population ageing are international concerns as fundamental as children and national development" and thus, research and attention of all countries on the issue of population ageing has become more vigorous. Recognizing and reaffirming "what demographers and many others have known for decades that our global population is ageing, and ageing at an unprecedented rate" the "United Nations has designated 1999" as "The Year of the Older Person" [**7**].

III. METHODOLOGY

The original idea to write this article originated when the author was collecting secondary materials related to population aging to write an article entitled "why developed countries have higher proportion of elderly people in their population structure?" to be submitted to the *World Academics Journal of Management*. Before this too, I have written many other articles related to the ageing of the population, which have already been successfully published in various other journals elsewhere.

From the information successfully collected to write those articles, as well as other information collected and kept in my personal data bank, were also used to complete this article. In other words, this research paper was written using secondary data collected from various printed materials from various authors collected through various sources (Figure 1).

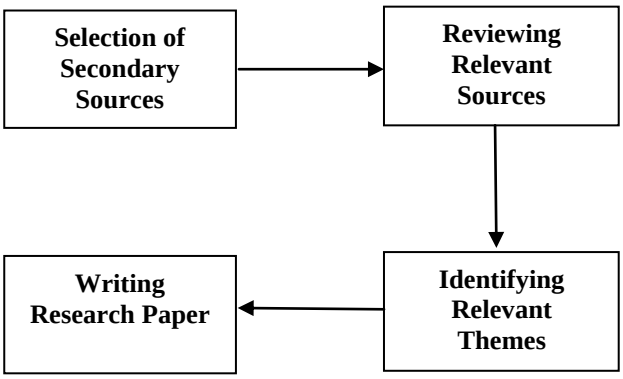

Figure 1: Flow Chart of Research Process

Not all research requires the collection of primary data in the field, as many research questions can be elaborated using only secondary data collected by others [**8**], such as the approach used in this research. An approach that reanalyzing and using existing information collected and processed by one researcher and is reanalyzed by another is referred to as a secondary analysis [**9**]. In short, secondary analysis is "a research method in which a researcher uses data collected by others [**10**].

Information written by others published as research reports, textbooks, journal articles, as well as newspaper articles carries a very valuable information for this article. Analysis "involves a careful examination of human communication in such vehicles" is called content analysis

[**8**], or secondary analysis. We use this approach because questions the focus to be unraveled, are questions related to secondary data. Now more and more secondary information can be easily obtained through the internet.

All the information collected from the above sources was adapted and analyzed through a thematic approach based on the previously set research questions.

IV. RESULTS AND DISCUSSION

Following the four objectives of this article stated above, the focus of this section is (1) the global levels of fertility, (2) the settings of high and low fertility, (3) the causes of fertility transition, and (4) the contribution of fertility to the population ageing.

The Global Levels of Fertility

Fertility is a demographic term that refers to the live birth experienced by a woman. Birth can also occur what is called stillbirth, which is a child born that has died since the baby was still in the woman's womb. Such births are not considered to be included in the fertility category.

Various definitions have been proposed by demographers of what is termed as fertility. Generally, people say that fertility is a live birth that brings with it the signs that the baby is still alive at the time of birth. If a baby is born carrying with it the signs of life, but dies soon after the birth, then the birth is categorized as a live birth; and live births are included in the calculation of fertility.

If a woman is pregnant, and gives birth without carrying along the signs of life, such as crying, or the presence of a pulse, the birth is considered a stillbirth, and such a birth is not included in the calculation of fertility.

Robertson [11] defines fertility as "the actual number of births to the average woman of childbearing age in a given society, in contrast to fecundity, the potential number of births", Horton and Hunt [12] define fertility as "actual rate of reproduction", while Macionis [10] defines fertility as "the incidence of childbearing in a country's population". Fertility is also defined as "the childbearing performance of individuals, couples, or population" [13].

Historically, the fertility level everywhere is high. Every woman has many children in a family. As the level of development in all countries continue, the world is now witnessing a decline in the level of fertility globally. Although the fertility level already much declining, it is still high in most countries, however. As global fertility levels have begun to decline, world population growth has declined. Today the population of the world as a whole is growing at a rate of 1.10% per annum with certain differences by region, and annual growth in Africa is at a rate of 2.6% per annum. "More than half of the global population increase until 2050 occurs in Africa" because Africa still has high fertility levels [14], [15]. In fact, the patterns of growth of the global population in the future will be dependent on the patterns of this global fertility. Countries such as "Bulgaria, Croatia, Latvia, Lithuania, Poland, the Republic of Moldova, Romania, Serbia, Ukraine and the United States Virgin Islands are expected to experience the decline in their populations by more than 15% by 2050" because of this decline in fertility [15].

Fertility in all European countries is now below the replacement level (below than 2.1 births per woman [14], [15]. Statistic shows that fertility has not only declined in all European countries, but also declined rapidly all over the world, including in a majority of developing countries. The United Nations [14] has estimated that the total fertility rate of developing countries has dropped from 6.0 births per woman in the 1960s to 2.9 in 2000-2005, and interestingly these declines have been more rapid in Asia, North Africa, and Latin America [15]. As fertility declines, there is a general consequence that the proportion of the elderly population will increase.

High and Low Fertility Settings

As fertility rate is dependent "on the level of economic development" of a country, where countries with "less and least developed levels of economic development, have higher levels of female fertility", and "countries with higher levels of economic development, have lower levels of female fertility". In traditional societies, the woman's fertility rate is higher, and as the level of economic development improves, it is likely to contribute to the fertility decline [16]. This is very straightforward to understand because the stage of development affects many other variables in a woman's life.

Based on this division, the countries in the developing and less developed world have much higher levels of female fertility. Countries like Liberia, Malawi, Kenya, Egypt, Zimbabwe, or Morocco in Africa, are countries that are settings or places where high fertility levels still exist. In these countries, infant mortality rates are often still high, and women or families need a higher number of children born to ensure the number of surviving children meets the family's wishes. In these countries, too, children are important as economic assets that will later be useful to help families supplement family income, or become important assets for financial security in their parents 'old age. Countries like India, Indonesia, Colombia, Argentina, Costa Rica, Uruguay, which are more developed countries than the above countries, have lower fertility levels. On the other hand, all countries in Western Europe, Eastern Europe, as well as other "industrialized countries such as Australia, Canada, Japan, New Zealand and the United States", are all settings or places where fertility is low, even very low.

The Fertility Transition: The Causes Behind

Fertility is a form of variable; that is, its degree varies between one woman and another. The global fertility also differs greatly between countries. Demographic students were taught why a woman's fertility level varied. Within the discipline of demography, fertility differentials, is a

topic of interest to all students. There are many factors behind it. It has to do with various factors either from within the woman herself, or other factors that are outside the woman. Among the factors that are often associated with the level of fertility, among other things, are, natural environment, including culture and place of residence, as well as the level of economic development of a place [17].

Culture and place of residence, influence the woman's desire for children. In a traditional society, for example, all members of the community wish women to have many children when they started to set up a new household. Pressure from parents as well as community members who want women to give birth immediately after marriage, makes the period between marriage and the birth of the first child short. In such a society, many children in a family are considered ideal. Children are useful for the labor force when they grow up. They are trained to work for family income since childhood. In a study in Yoruba, Caldwell [18] has drawn a conclusion that children are productive labors that are indeed important to the family, and these children as early as five years old are already trained to work to supplement the family income. Children are also needed as a source of care in old age.

The level of economic development of an area is a very important factor; it is negatively correlated with the level of female fertility. The more developed the area there will be the lower the fertility level of the area. Countries with more developed in terms of economic development, will have lower fertility levels. Similarly, the more developed areas in a country, will have lower fertility levels. This is because, the level of development will affect many other aspects of a woman's life. Women's level of education, formal employment opportunities outside home, information and exposure to contraceptive, nuptiality as well as health and mortality, factors that related to the level of economic development, both directly and indirectly affect women's fertility.

The level of education, for example, influences formal employment opportunities outside the traditional agricultural sector, and of course, it effects occupational choices [19]. The low level of women's education certainly limits women's involvement in many aspects outside the home [20], such as in economic activities, including in employment outside the home. Today, higher education opportunities in many countries have increased [21] which gives women the opportunity to help improve their level of education as well as to help improve the level of economic development of a country [22]. The decline in fertility in many developed countries before this, is a result of women's involvement in employment outside the home [23], [24]. Women who work in formal sectors have shorter time for childcare which can eventually affect her desire to downsize the number of children they have. Educated women also, because they work in the formal sector, have their own income which makes them have the power to determine their choices in the family. There are a number of researches indicated the involvement of women in the formal labor force reduces the fertility level, due to the fact that childbearing is largely incompatible with labor force participation [25]. Similarly, the level of health will often get better in line with the increasing level of women's education, also has its role in their fertility levels.

Education can certainly affect a woman's nuptiality, particularly on women's age at the first marriage, divorce as well as remarriage, which is also an important variable in influencing their fertility levels. Higher educated women will often start their first marriage later, which, of course, has a negative effect on their fertility levels. Demographic researchers unanimously confirm that women who marry early tend to have more children because they are exposed to a longer pregnancy process [16]. Education attainment also affects women's level of knowledge about contraceptive use.

For women who are uneducated, it is likely they also have a desire to shrink and prolong birth intervals, but because they have no knowledge to control, the birth occurs naturally without any specific effort to control it. Most such women, did not even know that they are pregnant. Educated women, on the other hand, due to access to readings on contraceptives, will have more knowledge about birth spacing, which can ultimately influence them to make better choices over the number of children they have. For such women, the quality of the children is more important than the number of children themselves. The quality of children is an investment, thus, motivated women to make investments. Investment is the application of income for the benefit of their families and the community at large [26].

Contributions of Fertility to the Ageing of Population

The decline in fertility, is said as a major contributor to the increasing proportion of the elderly population in the population structure. Nowadays, the fertility rate of the world population as a whole has declined dramatically, from 5.0 children per woman in 1950, to only 2.5 children per woman in 2015 [5]. Evidence to the contribution of declining fertility to the increasing proportion of the elderly can be seen on the large proportion of the elderly in the population in Western Europe. Countries in Western Europe have been experiencing a process of declining fertility levels since the early 20th century, and now fertility levels in those countries are very low.

When the fertility level is at a low level, then births in the society are practically non-occurring, then the proportion of the young population and children becomes increasingly declining. This situation, when persistent in the long run, coupled with the increasing of "life expectancy of the population", will force the "proportion of the elderly population" to increase. The fertility decline in developing countries is still a new experience, however. There are still countries in developing and less developed countries still have high levels of fertility. In these countries the proportion of the young population is bigger, while the proportion of the elderly population is still low.

Demographers use a demographic transition theory to explain the association between declining in fertility and the increasing proportion of these elderly population in society. In demographic history, demographic transition can be explained through four phases that indicate the level at which a country is based on this level of fertility decline. Developed countries are generally now already in the final stages of the transition in this demographic transition, while many developing, and most least developed countries are still in the second and third stages of the demographic transition process [27], [28].

In stage 1 and stage 2 of demographic transition, fertility rates are still high, and at these stages, because the proportion of the younger population is high, the proportion of the elderly is low. As the country begins to enter stage 3 of demographic transition, fertility levels decline, and the "proportion of the elderly" increases. In stage 4, birth rates and death rates reach equilibrium. "The age structure of the population stabilizes with a high proportion of elderly people". An important implication with a decline in fertility rates is that, the median age of the population, which is an important indicator of the population ageing, begins to increase [29]. This median age will continue to rise in all parts of the world [30]. People now have the opportunity to live longer [31].

The median age of the world's population today varies from as low as 15 years to as high as 50 years. Demographers have divided this median age into three groups, that are (1) a median age of 30 or more, as a country with an aged population, (2) a median age between 20-29, as a country that is now in the intermediate stages of the ageing process, and (3) the median age between 20 and less as a country with a young population [32]. Countries in Africa, such as Niger, Uganda, or Mali, have the lowest median age in the world, which is around 15 or 16 years, while countries such as Germany or Japan, have a median age of 47 or 48 years [33], [34].

Today, we witness developed industrialized countries in Europe and North America, all of which, have a much higher median age of the population. Countries such as, Japan, Italy, Canada, Germany, and the United States, all have a median age over 30 years, while most other countries in developing and less developed countries, all have a median age below 30 years.

All these scenarios occurred because of fertility, that is because of a decline in a woman's fertility coupled with an increase in the life expectancy of the global population [33]. All countries in the world are now experiencing an increase in life expectancy [32], [35], [36], [37], [38], [39].

V. CONCLUSION AND FUTURE SCOPE

The discussion in this paper focuses on several aspects regarding the fertility of the population globally, and how it relates to the global population ageing. In demographic history, in the period of pre-industrial and traditional society, women have generally been observed to have more children in their family. With the improvement of economic development, however, the level of economic development has been observed to be associated with low fertility. This discussion of fertility at the global level is important to get a clear picture related to the ageing of the population at the global level. Fertility is an important factor in determining the growth of the world's elderly population. Nowadays, the fertility levels of most of the countries all over the world are on the decreasing.

All measures of fertility, such as Total Fertility Rate (TFR) in all countries all over the world is declining. Demographers confirmed, based on data from various countries collected by the United Nations, as well as data from various other demographers and gerontologists, that with the fall in the fertility level, the proportion of elderly people increased. In short, with declining in fertility levels globally, not only the number of young generations is declining, it also resulted in increasing in the proportion of elderly people. Demographers use the demographic transition to illustrate how the decline in fertility relates to an increasing proportion of elderly. Developed countries that are already in the final stages of this demographic transition, have a large proportion of the elderly population in their population structure, while the developing countries that are still in the early stages of transition, still have a small proportion of the elderly. These scenarios are discussed in this paper.

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