Int. Journal of Management and Development Studies 6(1): 15-21 (2017)
ISSN (Online): 2320-0685. ISSN (Print): 2321-1423
Impact Factor: 0.715

Public Health Expenditure and Health Outcomes: A Review

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Abstract: *The role of government is well recognised in the healthcare sector. Governments alter the delivery of healthcare services via their expenditures to improve the health conditions of the people. This study reviewed literature on the impact of public health expenditure on health outcomes. The study finds that the effect of public health expenditure on health outcomes is inconclusive, even in the last four years. In some developing countries, public health expenditure have led to improvement in health conditions while other countries did record little or no beneficial impact of public health spending. Estimation techniques and control variables have differed as there is no standard methodology for estimating the effectiveness of public health expenditure. Therefore, this study recommends the development of a standardised methodological framework in studying the impact of public health spending on health outcomes. Similarly, research focusing on single country will be of great utility to policymakers.*

Keywords: Public health expenditure, health outcomes, mortality, life expectancy

Introduction

The recognition of the contribution of human capital in economic development caused a massive shift of development policy towards human development. Human capital, particularly health, education, and experience, have been shown to impact positively on economic growth and development. In view of this, development economics and policy debates have laid emphasis on investment in social sectors to improve human resources. For instance, the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) were adopted in 2000 and 2015 respectively to, among other things, improve health conditions; governments have a key role to play in improving health.

Indeed, the 1993 World Development Report assigned a key role to government in health sector investment. Similarly, the adoption of MGDs and SDGs required governments to devise means to improve welfare such as ensuring a healthy population. Globally, increases in public healthcare expenditure continue to attract the attention of policymakers, especially for developing countries. This is because, government alter the delivery of healthcare services via its expenditure (Berger and Messer, 2002). Government healthcare spending also enhances healthcare accessibility for the poor while reducing catastrophic healthcare expenditures among households. Since healthcare services have enormous positive externalities, government financing is needed to ensure optimal production and consumption of healthcare services in the society. This will help achieve socially desirable outcomes or optimal levels in the sector.

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However, healthcare policy that will achieve several objectives remains a major challenge. Social planners or governments aim at improving health outcomes but escalating healthcare expenditure puts severe pressure on health sector budgets. The factors causing the growth of health expenditure, especially public component, have received great attention in many countries over the past decades. There is a growing body of literature on the determinants of health expenditure, particularly public health expenditure; ageing, advances in medical technology, and environmental factors are usually cited as prime suspects for healthcare expenditure growth (e.g., Boachie and Ramu, 2016a; Boachie et al., 2014). The rising healthcare cost compel policymakers to take cost-containment measures in their healthcare provision, and this sometimes affect government health spending. Governments spend on healthcare on grounds that such expenditures improve health conditions, and also improve other welfare measures. Public health spending is also expected to mitigate the impact of diseases on productivity.

Over the years, however, there is continuing debate as to whether government expenditure on healthcare services necessarily improve outcomes of the health sector. The debate is a longstanding one in economic literature and continues to intensify as academicians and policymakers continue to employ advanced [econometric] methods to find the effectiveness of public health expenditure in improving health outcomes. This is because of the importance that academics and policymakers place on cost effectiveness or efficiency of expenditure. That is, ensuring efficient use of resources are as important as achieving the developmental goals themselves. In the last two decades, the relationship between public health spending and health has been extensively studied. Most of the studies have analysed this relationship within the framework of the health production function. Thus, public health expenditure has been considered one of the inputs for the production of good health in any given society. The ultimate aim in these studies has been to unravel the efficacy of government intervention in the health market via its spending. In this case, the studies set health outcome variable as dependent variable and regress public health expenditure on it while controlling for some other factors such as income, pollution, education, and inequality.

The first study that explicitly analysed the effect of government health spending on health found that government health spending has no impact on childhood mortality. Santerre et al. (1991) found the elasticity for public health expenditure for 20 OECD countries to be between 0.127 and 0.166 without any statistical significance at conventional levels. That is, public spending on health was positively related to infant mortality in the 20 OECD countries in the sample. Subsequent studies also continued the cross-country analysis and produced mixed results (see e.g., Anand and Ravallion, 1993; Bidani and Ravallion, 1995; Carrin and Politi, 1995; Musgrove, 1996). Annand and Ravallion (1993) and Bidani and Ravallion (1995) found from OLS and random coefficient models that public health expenditure is an important input for health improvements. On the contrary, the findings from Carrin and Politi (1995) and Musgrove (1996) proofed otherwise.

During this period, the World Bank had published the World Development Report with the title “Investing in Health” calling for public sector investment in health. Indeed, governments were encouraged to raise health sector funding to improve health and overall wellbeing. Several studies emerged, many of which were cross-country in nature (see for instance Berger and Messer, 2002; Bokhari et al., 2007). The findings on the effectiveness of government health spending from these studies are mixed. The debate continues as the literature expands. Studies on the effectiveness of public health expenditure have increased in recent years. Therefore, the

aim of this paper is to review, briefly, empirical literature on the link between public health expenditure and health outcomes in the past four years (i.e., 2013-2016).

Methodology

In conducting this review, a search was carried out following the methodology used in Martin et al. (2011). The main search tool was Google search engine. Other academic databases such as Google Scholar, PubMed, Repec and EconPapers were used. Table 1 provides a summary of inclusion and exclusion criteria for the study.

Table 1: Methodology for reviewing the effectiveness of public healthcare expenditure (2013-2016)

Phases	a) Establishment of the criteria for selection of studies b) Independent Boolean searches combining the following – Public Health expenditures and Health Outcomes – Public Health expenditures and health status – Public Health Expenditure and life expectancy – Public Health Expenditure and infant mortality – Public Health Expenditure and under-five mortality – determinants of health status or outcomes (using a specific health outcome measure) Search for articles in Economics and Economics related Journals and databases.
Selection Criteria	(a) Analyse the effect of public health expenditure on health as the main objective or use public health expenditure as of the independent variables in estimation (b) Use quantitative and econometric methods (c) Use aggregate public healthcare expenditure at state or national level (d) Publication in the period 2013-2016 Publications in peer-reviewed journals/books
Exclusion Criteria	(a) Publication outside the period 2013–2016 (b) Analyses of the impact of total healthcare expenditure on health outcomes (c) Methodological studies (d) Dissertations and working papers

Source: *Adapted from Martin et al. (2011).*

We limited our search to papers that have been published between 2013 and 2016 inclusive using the Boolean search criteria. The Boolean search criteria is a powerful instrument for creating specific searches by permitting complex searches to be created using a combination of Boolean logical operators such as 'OR', 'AND' and 'NOT' (Martin et al., 2011). The search terms were "health expenditure and health outcomes", public health expenditure and health outcomes; public health expenditure and life expectancy; public health expenditure and mortality, and "determinants of health status". These words were typed into the search engine and/or databases so as to get papers on the subject. Articles were included only if they had used public health expenditure as an explanatory variable in a health outcome model. Excluded in the literature were papers published outside the period 2013-2016.

Results and Discussion

After conducting a search in major academic databases, we identified 16 papers or articles that matched our search criteria during 2013-2016. These papers focused on examining the effect of public health spending on health outcomes either as the main objective of the study or as a minor one. Thus, the author(s) included public health expenditure as one of the independent variables in the outcomes models. The studies can basically be grouped into cross-country/developmental level and single country or state-level analysis. Table 2 provides a summary of the studies identified.

Table 2: Studies on Public Health Expenditure and Health Outcomes

	Study Year published	Health Outcome	Sample/ Data	Origin	Key Finding on public health expenditure
10	Homaie et al. (2013)	IMR	1995-2010	Eastern Mediterranean	Reduces mortality
11	Cevik and Tasar (2013)	UMR, IMR		131 countries	Reduces mortality
12	Kim and Lane (2013)	IMR, LE	1973-2000	17 OECD	Reduces mortality
13	Farag et al. (2013)	IMR, UMR	1995, 2000, 2005, 2006	133 Low & middle income countries	Reduces IMR and UMR
14	Terrelonge (2014)	IMR, UMR	1995-2009	138 developing countries	No impact on mortality
15	Odhiambo et al. (2015)	IMR	2000-2009	41 SSA	Reduces mortality
16	Makuta and O'Hare (2015)	UMR, LE	1996-2011	43 ssa	Reduces mortality, increases life expectancy
17	Sirag et al. (2016)	LE, UMR	1995-2012	35 SSA	Reduces mortality, increases life expectancy
18	Mohapatra (2016)	IMR	2011	72 Low & middle income	Reduces IMR
19	Makela et al. (2013)	IMR, UMR	1997-2009	India	Mixed results
20	Muftaudeen and Bello (2014)	IMR, UMR	1970-2011	Nigeria	Reduces mortality
21	Sede and Ohemeng (2015)	LE	1980-2011	Nigeria	Does not increase life expectancy
22	Oluwatoyin et al. (2015)	LE	1979-2012	Nigeria	Reduces life expectancy
23	Compah-Keyeke et al. (2013)	IMR	2000-2010	Ghana	No impact on mortality
24	Boachie and Ramu (2016b)	IMR	1990-2012	Ghana	Reduces mortality

Source: Authors' compilation

As shown in Table 2, public health expenditure-health outcomes nexus has been studied extensively. That is, government intervention in the healthcare market is being analysed as to whether it improves health conditions. However, only 37.5 percent of papers concentrated on analysing the impact of public health expenditure on health for single country. Thus, majority of

the studies focus on cross-country and/or regional level analysis. Again, the findings are yet inconclusive. Some studies have established that health outcomes can be improved if government raises its spending for sector (e.g. Mohapatra, 2016; Boachie and Ramu, 2016b; Muftaudeen and Bello, 2014; Kim and Lane, 2013; Homaie et al., 2013). Other studies, however, produce contrary results (Sede and Ohemeng, 2015; Oluwatoyin et al., 2015; Terrelonge, 2014).

Several factors may explain the inconclusive results obtained in the literature so far. One feature of the studies on examining the impact of public health spending on health is their methodological heterogeneity. The methodology adopted for the impact analysis has differed from study to study. For instance, the cross-country analyses have been characterised by panel data econometric techniques such as fixed effect, random effect, generalised methods of moments (GMM), and panel cointegration (e.g., Bokhari et al., 2007; Odhiambo et al., 2015; Homaie et al., 2013). Other estimations techniques such as the traditional OLS, two-stage least squares have been used (see e.g., Makuta and O'Hare, 2015). Time series estimation techniques such as Vector Auto-regressions (VAR) and [panel] cointegration techniques have also been used in most single country studies (Sede and Ohemeng, 2015; Oluwatoyin et al., 2015). Some single country studies also employed OLS and two-stage least squares to estimate the impact of public health spending on health (e.g., Boachie and Ramu, 2016b; Compah-Keyeke et al., 2013). These differing estimation techniques could account for the differences in results.

Similarly, sample or observations have differed. Studies such as Compah-Keyeke et al. (2013) use small sample. This can be attributed to absence or lack of adequate data on health and expenditure variables in many countries. Geographical focus of studies have also differed. In regional analysis, the number of countries considered have been different, perhaps due to data paucity and study objectives. Different countries have different features which may also affect health conditions.

Another issue in the literature is inclusion of other confounding variables. Undoubtedly, several factors ranging from environment, social, cultural, economic, biological among others do affect health conditions. Control variables included in the various health outcomes model have differed. Factors such as access to improved sanitation and portable drinking water, income, availability of physicians, and education are mostly found in health production functions. While there is no rule on which variables to include in the model, there seems to be consensus among researchers on the importance of income or GDP and education in determining health outcomes, and most studies include these indicators. Another issue in the literature is the measurement of public health expenditure. Indeed, public health expenditure is measured as share of GDP, share in total health spending, per capita spending in US$, and share to total government expenditure, and using any of these measures in regressions produces different estimates. It is, therefore, possible that the measure of expenditure could also explain the differing results.

Conclusion

We have reviewed literature on the effect of public health expenditure on health outcomes. Our review revealed that the effect of public health expenditure on health outcomes is still debatable. This is not surprising as different econometric methodologies have been used. Further, there is no standardisation of independent controlled variables in the models explaining health outcomes. Thus, heterogeneous results from the empirical literature may be attributed to the absence of a standardised econometric methodology in examining the impact of public health expenditure on health outcomes. Because of this methodological heterogeneity, and the heterogeneous nature of variables included in the regressions there is no concrete evidence, empirically, to proof (or

disproof) that public health expenditure improves health outcomes. The differences in methodology and geographical focus of the studies may account for the varied impact of public health expenditure on health outcomes. Therefore, this study suggests the need for not only single country analysis but also a standardised methodology to study the effect of public health expenditure and health outcomes. Thus, a methodological guide that allows a certain standardisation of the econometric models used to analyse the link between public health expenditure and health outcomes would be very useful.

Abbreviation

OLS: Ordinary Least Squares
2SLS: Two-stage Least Squares
3SLS: three stage Least squares
GMM: Generalised Methods of Moments
SSA: Sub-Saharan Africa

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