

Policy Report 2017-03

Analysis of the Pregnancy- and Childbirth-Related Medical Expense Subsidization Program in South Korea



Lee So-young

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Childbirth-Related Medical Expense
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Lee So-young, Research Fellow

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Korea Institute for Health and Social Affairs
Building D, 370 Sicheong-daero, Sejong city
30147 KOREA

<http://www.kihasa.re.kr>

ISBN: 978-89-6827-426-8 93330

Contents

I. Introduction	1
1. Research Background	3
2. Conceptual Models	6
II. Literature Review	11
III. Research Method	19
1. Overview of the PCMESP	21
2. Research Method	23
IV. Results	29
1. Cost of Care	31
2. Birth Outcomes	34
V. Conclusion	41
1. Summary	43
2. Policy Implications	44
Bibliography	49

List of Tables

〈Table 2-1〉 Previous Studies on the PCMESP (“Goun-Mom Cards”) …	15
〈Table 2-2〉 Studies on Government Subsidization of Prenatal Care in US …	16
〈Table 2-3〉 Studies on Prenatal Care Voucher Programs in Asia ……	17
〈Table 3-1〉 Analysis Samples ……	26
〈Table 4-1〉 Birth Outcomes of the PCMESP ……	35
〈Table 4-2〉 Binominal Logistic Regression Analysis of Low Birth Weight ……	37
〈Table 4-3〉 Binominal Logistic Regression Analysis of Preterm Birth	39

List of Figures

[Figure 1-1] Conceptual Model 1: Birth Rate Change Process ……	8
[Figure 1-2] Conceptual Model 2: Tackling the Low Fertility by Improving Quality of Care ……	9

I

Introduction



1. Research Background

The rapid decline in birth rate poses the gravest threat to the future of South Korean society. The total fertility rate—the average number of children each childbearing-age woman (aged 15 to 49) is expected to bear in her lifetime—has been plummeting in a drastic and rapid manner over a considerable period of time in Korea. At a population replacement level of 2.1 as late as 1983, the total fertility rate has been dropping steadily since then, and at a particularly accelerated pace since the late 1990s. Having reached a record low of 1.08 in 2005, the total fertility rate in Korea consistently remains at a low level. The rate ranged between 1.3 and 1.24 between 2001 and 2015, giving Korea one of the lowest birth rates in the world for over 15 years.

Childbirth is becoming less of a personal choice and more of a social responsibility in Korea. The chronically low and declining birth rate is emerging as a social problem warranting policy intervention by the state. National and local governments in Korea have sought to tackle this problem by introducing a wide range of pregnancy and childbirth support programs. The National Assembly, for example, legislated the Framework Act on Low Fertility and Population Aging in 2005,

and assembled a Commission on Low Birth Rate in an Aging Society, signifying the start of policy intervention on the national level. Pursuant to the law, the Korean government has been establishing and updating its Basic Plan for Low Fertility and Population Aging every five years since 2006. The third and latest Basic Plan was introduced in 2015, and covers 2016 through 2020. It is in line with these master plans that the national and local governments in Korea have devised their policy programs encouraging women to have children.

Despite the breadth and diversity of government support programs, the birth rate in Korea remains staggeringly low. Numerous policy programs have been created, merged together, and abolished in the meantime. The sporadic and haphazard manner in which these programs are introduced and abolished reflects the absence of a systemic, in-depth analysis of the effects of government support for childbirth. The Framework Act on Low Fertility and Population Aging Society does provide for an annual evaluation of policy programs supporting pregnancy and childbirth care provided under the national government's master plans. Nevertheless, evaluation of these programs has focused solely on the outward signs of growth (measured in terms of the number of benefitting women and the amount of funds assigned to developing and expanding policy infrastructure), without truly analyzing the quality and effectiveness of the policy programs themselves.

The Pregnancy- and Childbirth-Related Medical Expense Subsidization Program (PCMESP), which is by far the most developed, the most financially extensive, and the most universal of all pregnancy support programs introduced by the Korean government so far, merits detailed analysis and assessment. Introduced in December 2008 under the first Basic Plan for Low Fertility and Population Aging, PCMESP was one of the first policy programs adopted with the explicit intent of addressing the declining birth rate, and was widely supported as part of enhancing the National Health Insurance (NHI)'s coverage of medical costs that began in 2005. Now almost a decade into implementation, there has been no such analysis attempted on the PCMESP so far. The majority of studies that have been done on government programs supporting pregnancy and childbirth merely provide overall assessments of policies in general or focus on several similar policies without providing detailed analysis of any single policy program.

This study thus marks the first instance of such a needed and detailed analysis. More specifically, it assesses the efficacy of the PCMESP in terms of public awareness of and satisfaction with the program, women's willingness to have more children, changes in pregnancy- and childbirth-related medical costs, and changes in the types of prenatal care institutions women use. The existing literature fails to analyze the specific objectives of the medical expense subsidization policy and their

impact on the patterns and quality of prenatal and childbirth medical care as well as on the outcomes to women's health. Moreover, no study prior to this one has ever effectively assessed the effects of changing the amounts subsidized.

In recognition of these shortcomings in the existing literature, this study provides an in-depth analysis of the PCMESP, now known more commonly as the Citizens' Happiness Card Program (formerly the "Goun-Mom Card") to the public. Although the PCMESP forms a major part of the Korean government's plans to stem the decline in the birth rate, this study also considers the effectiveness of the program as a supplement to the benefits and coverage of the NHI for mothers and fetuses, and assesses program outcomes accordingly in both quantitative and qualitative terms.

2. Conceptual Models

Previous studies provide a variety of conceptual models to explain the concept of the birth rate. Philipov et al, (2011), in particular, advanced the theory of planned behavior and the theory of reasoned action to explain factors that influence the birth rate. Namboodiri (1972) also provided an important application of Becker's theory from the 1960s to explain changing birth rates in given societies.

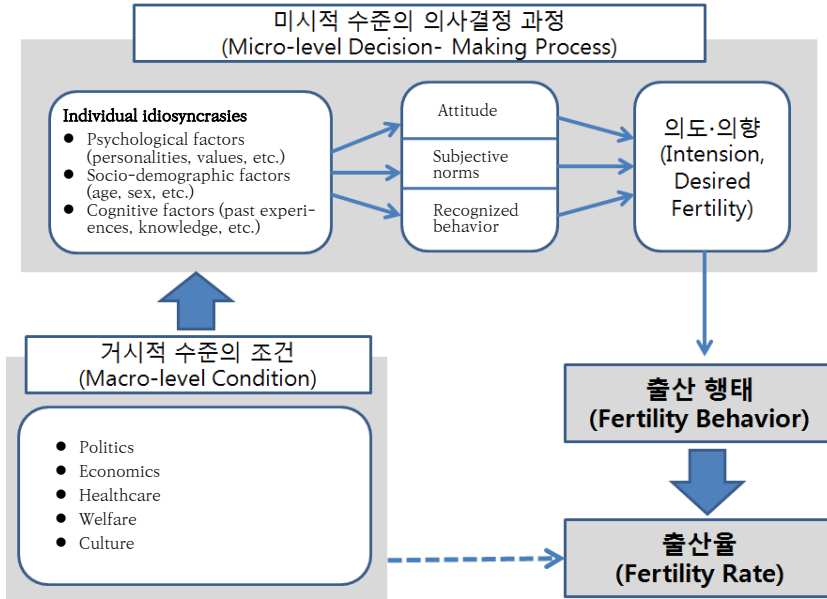
This study borrows from the conceptual models of the

Philipov and Namboodiri studies and presents its own models encompassing diverse factors that influence policies designed to tackle low fertility. Given the fact that such policies strive to both increase the absolute number (quantity) of births and improve the quality of births (and the resulting populations), this study uses its conceptual models to assess policy performance in both quantitative and qualitative terms.

The first conceptual model used herein focuses on how macro-level societal factors (political, economic, cultural, and policy factors) affect individual decision-making at the micro-level, leading people to develop the intent to bear and give birth to children. More specifically, this study examines the process by which the PCMESP motivates individuals to develop this intent as part of assessing policy program effectiveness. The model confirms that the factors of macro-level healthcare settings, such as the PCMESP, do directly influence individual decision-making on pregnancy and childbirth. Policy changes like the PCMESP also directly affect the birth rate, albeit on a weaker scale. Policies supporting the healthcare of pregnant women and new mothers, like the PCMESP, thus serve as main influencers in motivating people to have children.

8 Analysis of the Pregnancy- and Childbirth-Related Medical Expense Subsidization Program in South Korea

[Figure 1-1] Conceptual Model 1: Birth Rate Change Process

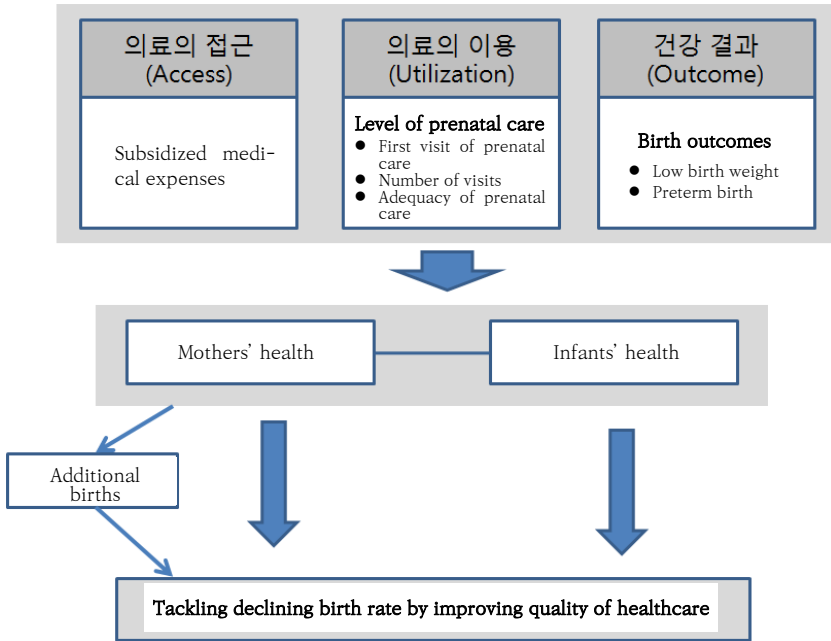


Sources: Philipov et al. (2011) and Namboodiri (1972).

The second conceptual model addresses how policies tackling low fertility also improve the quality of population. Effective policy responses to low fertility aim not only to increase the size, but also to improve the quality, of a given population. The PCMESP enhances women’s access to health and prenatal care and thereby improves the health of child-bearing women and their newborn children. By protecting mothers and their health, the program enables women to give birth to additional children in the future and consequently strengthens the health, and thus the quality, of the population. Based on this assumption, this study analyzes how effective the

PCMESP has been in positively influencing women’s use of health and prenatal care and improving their health outcomes.

[Figure 1-2] Conceptual Model 2: Tackling the Low Fertility by Improving Quality of Care



II

Literature Review

II

Literature Review <<

This chapter reviews the existing literature, published both in and outside Korea, on government policies supporting pregnancy and childbirth. There is only a limited number of studies that analyze the PCMESP, the main subject of this study. Among these few studies is Kim et al. (2012), which, using National Health Insurance Service (NHIS) claims data, analyzes the patterns of women's use of prenatal and childbirth healthcare and the changing costs of such healthcare. The study concludes that the cost of prenatal and childbirth care as a percentage of income is highest and the use of these care services at general hospitals lowest among the lowest income group. Studies like this support universal programs subsidizing the medical costs of pregnancy and childbirth that still differentiate the amount provided in benefits for different income groups.

Table 2-1 lists previous studies that specifically assess the PCMESP in Korea. Kang et al. (2012) analyzed the efficacy of the program on the basis of interviews with 24 women who benefitted by using the so-called "Goun-Mom" (voucher) Cards regarding their awareness of and satisfaction with the program. Kim et al. (2012) surveyed 219 women who used these Cards on their perception of and satisfaction with the PCMESP and subjected the survey results to a frequency analysis to assess pro-

gram effectiveness. The study shows that the program was relatively well advertised, with 42.2 percent of the women rating it quite favorably. The study also reveals that the women were generally dissatisfied with the total amount of cash assistance the government provided for each pregnant woman and with the daily limit set on their voucher cards. The study notes a significant correlation between how satisfied women are with the PCMESP, on the one hand, and their willingness to have additional children, on the other. Oh et al. (2012) analyzed how introduction of the PCMESP has changed pregnant women's preferences for the types of prenatal care institutions, the costs of outpatient services and hospitalization, and women's satisfaction with the program. The study shows that 43.1 percent of women who used the Goun-Mom Cards were satisfied with the program, while 50.6 percent of women rated the program as effective in encouraging pregnancy and childbirth. The study also demonstrates that the PCMESP has increased women's use of prenatal care services at general hospitals, smaller hospitals, and clinics, while the use of public healthcare centers for prenatal care rose from 2007 to 2010 before dropping in 2011.

〈Table 2-1〉 Previous Studies on the PCMESP (“Goun-Mom Cards”)

Authors	Title	Research Methods	Indicators of Evaluation
Kang et al. (2011)	Women’s Experience with Using the PCMESP (Goun-Mom Cards) During Pregnancy	* A qualitative study based on interviews with 24 women who used <i>Goun-Mom Cards</i>	Awareness, assessment of experience, causes of dissatisfaction
Kim et al. (2012)	Assessment of Policies Against Low Birth Rates in Major Countries and Implications for South Korea	* International policy survey * Theoretical consideration * Clustering analysis based on results of an opinion poll	Awareness, satisfaction, willingness to give birth to additional children
Oh et al. (2012)	Study on Improvement of the PCMESP	* Statistical analysis using the Korean Medical Panel Survey, NHIS surveys on medical costs, and NHIS claims data * Also analyzes the results of a focus group interview with 12 pregnant women and an opinion poll on 190 women	Amounts of pregnancy- and childbirth-related medical expenses (outpatient and hospitalization costs), changes in preferences for types of prenatal care institutions, satisfaction rate

Most government programs subsidizing prenatal and childbirth care in other developed countries aim primarily at improving the equity of such care for the poor and vulnerable rather than raising birth rates. The existing literature in the United States, for example, mostly focuses on effectiveness of the enhanced coverage of Medicaid—imposing little co-payment burden on beneficiaries—on prenatal and childbirth care. Rittenhouse et al. (2003) examine the expansion of Medi-Cal, California’s “Medicaid”, and its effect on the timing of first pre-

natal care visit and the quality of prenatal care. Their analysis shows that expanding Medi-Cal to include prenatal care and services has indeed improved access to prenatal care. The authors thus conclude by urging continued investment in similar programs as a way to encourage women to seek and receive appropriate prenatal care. Using national natality files on all but a few US states, Dubay et al. (2001) assessed the effectiveness of expanding Medicaid on the provision of prenatal care for pregnant women in low-income households. The authors found that, while expanding Medicaid coverage did increase the use of prenatal care (first prenatal care visits) for such women, it did not significantly reduce the number of underweight newborns.

<Table 2-2> Studies on Government Subsidization of Prenatal Care in US

Authors	Title	Research Method	Indicators of Assessment
Dubay et al. (2001)	Changes in prenatal care timing and low birth weight by race and socioeconomic status. Implications for the medicaid expansions for pregnant women	* A statistical (cross) analysis of the National Natality Files from 1980, 1986 and 1993	Timing of first prenatal care visit, rate of low birth weight
Rittenhouse et al. (@003)	Improvements on prenatal insurance coverage and utilization of care in California: an unsung public health victory	* A statistical (regression) analysis of the birth statistics of California (1980-1999)	Timing of first prenatal care visit, number of prenatal examinations sought

A growing number of developing countries have implemented prenatal care vouchers as part of universal health-care for pregnant women. Ir et al. (2010) reported that the Cambodian government’s prenatal care vouchers for pregnant women in low-income households has effectively increased those women’s use of the healthcare system and services by lightening their financial burden. Similarly, Ahmed et al. (2011) showed that Bangladesh’s prenatal voucher policy has also increased women’s use of prenatal care as well as the rate of babies being delivered by qualified health professionals at health facilities.

〈Table 2-3〉 Studies on Prenatal Care Voucher Programs in Asia

Authors	Title	Research Method	Indicators of Assessment
Ir et al. (2010)	Using targeted Vouchers and health equity funds to improve access to skilled birth attendants for poor women: a case study in three rural health districts in Cambodia	* Presents technical statistics based on nationally-amassed data	Rate of babies delivered in proper care facilities
Ahmed et al. (2011)	Is demand-side financing equity enhancing? Lessons from a maternal health voucher scheme in Bangladesh	* A statistical (regression) analysis based on household surveys	Whether each woman received at least three prenatal examinations, rate of babies delivered in proper care facilities, rate of women seeking postnatal care

In sum, Korean studies attempt to assess the effectiveness of the government subsidization program using various indicators, including women's awareness of and satisfaction with the program, their willingness to give birth to (additional) children, the cost of prenatal and childbirth care, and preferences for different types of prenatal care institutions. American studies, on the other hand, assess their policies by linking prenatal care and birth outcomes, while studies in Asian low-income countries use the accessibility of prenatal care and the rate of babies delivered at proper care facilities as the main measures for assessing their policy programs. There was no study focusing on how effectively these government subsidization programs satisfied their stated goals and how they affected the health of women and their babies. Moreover, the studies surveyed analyzed the quality of prenatal and childbirth care by examining women's changing preferences for types of prenatal care institutions and changes in the number of times they sought prenatal care, neglecting the appropriateness of prenatal care provided. This study fills in these gaps and provides a more comprehensive assessment of the Korean government subsidization program.



Research Method

1. Overview of the PCMESP
2. Research Method



1. Overview of the PCMESP

The stated objectives of the PCMESP are to encourage women to bear and give birth to children by reducing the financial burden of prenatal care and also to help women give birth to healthy children by enabling them to receive prenatal care on a regular basis. All women NHI participants—those who pay into the NHI scheme and those who are classified as dependent beneficiaries alike—who are able to confirm their pregnancy with written confirmations from their doctors are eligible for the program. However, women who are on other special medical benefits already receive prenatal care free of charge or at considerably reduced cost, and are therefore not eligible for the PCMESP.

The amount of subsidy provided by the PCMESP for each eligible woman has steadily increased, from KRW 200,000 when the program was first introduced in December 2008, to KRW 300,000 in April 2010, to KRW 400,000 in April 2011, and to KRW 500,000 in April 2012. As of July 2012 for women carrying two or more children simultaneously and as of July 2016 for women living in regions where shortages of prenatal care resources exist, each receive KRW 700,000. (The subsidies for women carrying two or more babies simultaneously have since increased to KRW 900,000.) The ceiling on the subsidized

amount that can be spent per day was also raised from KRW 40,000 to KRW 60,000 in 2011. The ceiling was removed for medical costs generated by hospitalization due to delivery, and all daily spending ceilings were removed entirely in 2013.

The types of medical institutions covered by the PCMESP have also increased over time. The program initially paid subsidies only for services provided by medical institutions with OB/GYNs present on a full-time basis. In 2012, however, the program was extended to midwifery centers. The following year, the program was further extended to traditional herbal medicine clinics. Eligible women were at first allowed to use their subsidies for up to 15 days after the scheduled birth of their babies. The timeline has since been extended to 60 days, increasing the public health care coverage. Pregnant women can now use their voucher cards from the time they pick them up until 60 days after the scheduled birth of their babies. Any amounts remaining unused expire automatically after this deadline. The funds can be used to pay for all types of prenatal care services women receive from government-approved institutions (including the costs of delivery and prenatal/postnatal care for the mother), the amounts women pay or co-pay for specific services (e.g., ultrasound scans at clinics or hospitals and delivery-related stays at midwifery centers), and the amounts they pay or co-pay for prenatal/postnatal care and services at traditional herbal medicine clinics and hospitals.

2. Research Method

One way to measure the effectiveness of a policy program is by analyzing to what extent it has achieved its stated objectives. As the PCMESP strives to encourage pregnancy and childbirth by reducing the financial burden for related medical expenses, and ensure the health of babies born by ensuring quality prenatal care for women on a regular basis, we can analyze program effectiveness by examining, first, whether the program has indeed reduced the financial burden of pregnancy- and childbirth-related medical expenses for women, and second, whether women indeed gave birth to healthy babies as a result of the program.

Existing literature (Oh et al., 2012; Kim et al., 2015) provides information on whether the PCMESP has effectively reduced this financial burden. Oh et al. (2012) analyzed this by drawing upon the Korean Medical Panel Survey and NHI claims data. The authors compared the costs of pregnancy and childbirth before and after introduction of the PCMESP, and counted the costs of outpatient services based on the days of women's visits to their respective clinics or hospitals and the costs of hospitalization as of the last days of their hospitalization. The medical costs analyzed consisted of the amounts women paid or co-paid upon visiting their doctors and the last days of their hospitalization, and did not include the cost of prescriptions.

Birth outcomes were measured by counting the number of low

weight (under 2,500 grams) and preterm (occurring prior to the 37th week of gestation) births. Data from the National Survey of Fertility and Family Health and Welfare of 2006, 2009, 2012, and 2015 were used in this analysis. SPSS 20.0 was used to determine the existence of any differences in the level of prenatal care and birth outcomes for PCMESP-eligible women before and after introduction of the program. A binominal logistic regression model was then used to determine whether the PCMESP exerted independent effects on the level of prenatal care and the birth outcomes even when other factors were controlled.

The samples subjected to analysis were divided into two groups. The control group included women who experienced pregnancy during the four years preceding introduction of the PCMESP in December 2008. The experiment group included women who experienced pregnancy during the four years following introduction of the program. As the amount of subsidies provided under the program increased regularly, women who were pregnant one month prior to these increases (i.e., November 2008, March 2010, March 2011, and March 2012) were excluded from analysis in order to clarify the effects of the increased amounts. The final samples for the control group were thus made up of women who were pregnant (as confirmed by qualified medical professionals) between March 2004 and February 2008, i.e., women who gave birth between December 2004 and November 2008. The experiment group include wom-

en who were pregnant between December 2008 and February 2010 and thus received KRW 200,000 in subsidies each (i.e., women who gave birth between September 2009 and November 2010); women who were pregnant between April 2010 and February 2011 and received KRW 300,000 in subsidies each (i.e., women who gave birth between January 2011 and November 2011); women who were pregnant between April 2011 and February 2012 and received KRW 400,000 in subsidies each (i.e., women who gave birth between January 2012 and November 2012); and women who were pregnant between April 2012 and February 2013 and received KRW 500,000 in subsidies each (i.e., women who gave birth between January 2013 and November 2013). Of the 5,129 married women who answered in the natality survey that they had given birth over the preceding three years, the 12 women aged 18 or younger and women whose answered questionnaires included major missing values were excluded from the final samples. The total number of samples subjected to analysis was thus 2,852.

〈Table 3-1〉 Analysis Samples

Sample Type		Birth-giving Period	N (proportion)	
Non-PCMESP recipients		December 2004 to November 2008	1,087	(38.0)
PCMESP recipients	1 (KRW 200,000 in subsidy)	September 2009 to November 2010	421	(14.8)
	2 (KRW 300,000 in subsidy)	January 2011 to November 2011	358	(12.6)
	3 (KRW 400,000 in subsidy)	January 2012 to November 2012	186	(6.5)
	4 (KRW 500,000 in subsidy)	January 2013 to November 2013	800	(28.1)
	Total	September 2009 to November 2013	1,765	(62.0)

In order to determine whether the PCMESP and the different amounts of subsidy it provides had any independent effects on the level of prenatal care and birth outcomes when all other factors were controlled, a binominal logistic regression analysis was additionally performed. The function at the basis of this analysis posits the possibility of low birth weight and preterm birth as the dependent variable, and the PCMESP-recipient groups (1, 2, 3, and 4 receiving KRW 200,000, 300,000, 400,000, and 500,000 in subsidies each, respectively) as the independent variables. The socio-demographic factors, such as age, marital status, education and monthly average household income of the mothers, and other factors such as childbirth history, number of babies conceived (single or multiple pregnancy), method of deliv-

ery, and adequacy of prenatal care (measured using the Kessner Index)¹⁾ were treated as control variables.

1) Institute of Medicine, National Academy of Sciences: Infant Deaths, An Analysis by Maternal Risk and Health Care. In: Contrasts in Health Status, Vol. I, 1974. Based on: The American College of Obstetricians and Gynecologists: Standards for Obstetric-Gynecologic Services. Chicago, 1973

IV

Results

1. Cost of Care
2. Birth Outcomes

1. Cost of Care

Oh et al. (2012) analyzed the financial burden of pregnancy and childbirth on women using the Korean Medical Panel Survey and NHI claims data. The authors compared the changes in the costs of care caused by introduction of the PCMESP, counting the costs generated on every outpatient visit and on the final day of each woman's hospitalization. This present study also draws upon the cost data provided by Oh et al. (2012), and analyzes the PCMESP's effect on the amounts women paid and co-paid for prenatal and childbirth care, excluding the costs of prescriptions.

This analysis revealed that introduction of the PCMESP increased the amount to be paid directly by women for outpatient services (including amounts paid and co-paid for services not covered by NHI) by KRW 16,290 from 2008 to 2009. This is a dramatic increase, considering that the amount payable by patients for hospital care unrelated to pregnancy or childbirth rose by KRW 1,075 on average during the same period. Yet the difference was not statistically significant. The amounts payable by women for hospitalization care also grew by KRW 17,951 from 2008 to 2009 after introduction of the

PCMESP. However, this increase pales in comparison to the KRW 47,491 increase in hospitalization costs unrelated to pregnancy and childbirth payable by patients. While the overall increases in the cost of pregnancy and childcare-related care payable by women are not statistically significant, the cost of hospitalization per day increased significantly at smaller hospitals, and not so significantly at clinics and general hospitals. Regression analysis reveals that, even after other factors including maternal age and income were controlled, the overall cost of care, the NHI-covered cost of care, and the cost of care payable by women all increased in statistically significant amounts after the PCMESP was introduced.

Analysis of the Korean Medical Panel Survey data shows that the overall cost of care, the amount of NHI-covered costs, and the co-payment amount all increased from 2008 to 2009 after the PCMESP was introduced. While these costs remained larger in 2010 than what they were in 2008, they decreased somewhat from 2009 to 2010. The same pattern was noted in the costs of hospitalization care not related to pregnancy or childbirth.

The PCMESP significantly increased the overall, NHI-, and patient-payable costs of inpatient care, particularly at hospitals and higher-level medical institutions. On the contrary, the NHI-covered costs of hospitalization at clinics significantly dropped, while the other types of hospitalization costs did not change with statistical significance.

Although the costs did not increase noticeably between 2009 and 2010 as shown by analysis of the Korean Medical Panel Survey and NHI claims data, introduction of the PCMESP increased all types of pregnancy- and childbirth-related medical costs after 2008.

Using data from the NHI's public database, Kim et al. (2015) compared the medical costs of pregnancy and childbirth care for women over the years 2011 through 2014, well after the PCMESP was introduced. The authors show that all types of costs increased steadily during those years. Specifically, the total costs per woman increased by KRW 376,313, while the co-payment amount per woman also increased by KRW 74,223. The cost of hospitalization per woman, in particular, showed the greatest margin of growth at KRW 340,772. Hospitalization still imposed the greatest financial burden on pregnant women in terms of co-payment, followed by the cost of birth-related care and the cost of outpatient care, in descending order. The co-payment amount of total medical costs remained more or less the same year in and year out, at around 17 percent. Yet it, too, continued increasing slightly from 17.0 percent in 2011 to 17.1 percent in 2012, to 17.4 percent in 2013 and to 17.5 percent in 2014.

Kim et al. (2015) did not provide a comparison of the medical costs for pregnancy and childbirth before and after introduction of the PCMESP. Neither did they analyze how the

medical costs of other types of care unrelated to pregnancy or childbirth changed over the same period of time. It is thus impossible to conclude from this study alone whether the PCMESP has significantly increased or decreased the medical costs of pregnancy and childbirth. Nevertheless, pregnant women in Korea feel that the financial burden of pregnancy and childbirth are growing despite the PCMESP as the absolute costs of care have increased, as have the co-payment amounts.

2. Birth Outcomes

An important objective of the PCMESP is to promote the health of babies being born(or birth outcomes). This study analyzes whether the program has met this objective by measuring changes in the number of low birth weight and preterm birth. Preterm birth is the leading cause of perinatal death and morbidity of newborns. As a matter of fact, preterm birth accounts for almost 70 percent of all perinatal deaths, excluding those caused by congenital deformities (Gu et al. 2006). Low birth weight is also the most common cause of neonatal mortality (Lee, 1997). In other words, low birth weight and preterm birth are the most prevalent causes of neonatal and perinatal death, together making up 60 percent of all deaths among newborns. This study therefore analyzes the effectiveness of the PCMESP on improving the health of newborns by examining

the possibility of low birth weight and preterm birth.

Table 4-1 summarizes the results of a cross-analysis on the birth outcomes of women who benefitted from the PCMESP and women who did not. The proportion of non-PCMESP recipients with low birth weight was 3.6 percent, while the proportion of PCMESP recipients giving birth to low birth weight babies was 4.1 percent, representing no statistically significant difference. The pattern was somewhat reversed with respect to preterm birth, with 6.6 percent of non-PCMESP recipients and 5.4 percent of MCMESP recipients having preterm childbirth. Here, too, however, no statistically significant difference emerged.

〈Table 4-1〉 Birth Outcomes of the PCMESP

(Units: number of women, percentage)

Birth Outcome	Non-recipients		Recipients		x2
Low birth weight	39	(3.6)	73	(4.1)	0.536
Preterm birth	72	(6.6)	95	(5.4)	1.880

In order to determine whether the PCMESP and the different amounts of subsidies it provided had any independent effects on birth outcomes when all other factors were controlled, a binominal logistic regression analysis was additionally performed. The function at the basis of this analysis posited the possibility of low birth weight and preterm birth as the dependent variable, and the PCMESP-recipient groups (1, 2, 3, and 4 receiving KRW 200,000, 300,000, 400,000, and 500,000 in

subsidies each, respectively) as the independent variables. The socio-demographic factors, such as age, marital status, education and monthly average household income of the mothers, and other factors such as parity, number of babies conceived (single or multiple pregnancy), and method of delivery, were treated as control variables.

Two models were set up for the binominal logistic regression analysis to examine how the PCMESP and the different amounts of subsidies it provided affected the possibility of low birth weight and premature birth. The first was a restricted model (Model I) that included a limited set of variables pertaining to non-recipients and recipients of PCMESP. The second one (Model II) was an unrestricted model that included the full set of independent variables.

Table 4-2 lists the results of the binominal logistic regression analysis with the possibility of low birth weight as the dependent variable. An omnibus test of model coefficients, conducted to determine fitness of the model, showed Model II to be significant at $p < .001$ in comparison to the null model containing constants only.

(Table 4-2) Binominal Logistic Regression Analysis of Low Birth Weight

	Model I			Model II		
	Regression coefficient	(S.E.)	Exp(B)	Regression coefficient	(S.E.)	Exp(B)
Recipient status (non-recipient)						
Group 1 (KRW 200,000)	0.18	(0.29)	1.20	-0.02	(0.32)	0.98
Group 2 (KRW 300,000)	0.35	(0.29)	1.42	0.16	(0.31)	1.18
Group 3 (KRW 300,000)	0.31	(0.38)	1.37	0.03	(0.42)	1.03
Group 4 (KRW 400,000)	-0.03	(0.25)	0.98	-0.17	(0.28)	0.84
Maternal age (less than 35 years) aged 35 years and older				0.60	(0.23)**	1.83
Marital status (married) Other				0.58	(1.11)	1.78
Education (high school graduate) Vocational college University				-0.62	(0.29)*	0.54
				-0.26	(0.23)	0.77
Avg. monthly household income				0.09	(0.17)	1.10
Parity (first birth) Multipara				-0.10	(0.21)	0.90
Number of babies (single pregnancy) Multiple pregnancy				2.87	(0.39)***	17.54
Delivery method (vaginal) C-section				0.69	(0.21)**	2.00
Adequacy of prenatal care (inadequate) Adequate				0.34	(0.54)	1.40
N	2,852			2,852		
2Log-Likelihood	942.38			854.66		
x ²	2.32			80.43***		
Df	4			13		
Nagelkerke R ²	0.00			0.10		

***p<.001, **p<.01 *p<.05

In Model I, the status of being a PCMESP recipient did not exert any significant influence on the birth outcome. The model itself lacked significance. In Model II, where the socio-demographic and other factors that could lead to low birth weight were controlled, along with the different amounts of subsidies that could have had effects on the birth outcome, the factors that influenced the birth of underweight babies significantly were maternal age (over 35 years of age), education of the mother, multiple pregnancy, and whether or not a C-section was performed. In the meantime, the subsidy amounts of KRW 200,000 and KRW 500,000 showed negative correlations to low birth weight, emerging as potential protective factors. The different amounts of subsidies, however, failed to show any statistically significant effects on changing the birth outcome. Being a PCMESP recipient, in other words, had little impact on preventing low birth weight. The effectiveness of the PCMESP in this regard thus remains undemonstrated.

Table 4-3 lists the results of the binominal regression analysis with preterm birth as the dependent variable. An omnibus test of model coefficients was again performed to test the fitness of the models. Model II emerged as significant at $p < .001$ in comparison to the null model that contained constants only. In Model I, the status of being a PCMESP recipient failed to reveal any significant effects. The model itself also lacked significance. In Model II, by contrast, being a PCMESP recipient

made a significant difference. Once the socio-demographic and other factors that could lead to premature birth were all controlled, the PCMESP subsidy amounts of KRW 300,000 and KRW 500,000 emerged as protective factors exerting statistically significant effects. More specifically, women receiving subsidies of KRW 300,000 each were less likely to give premature births than non-PCMESP recipients. In other words, the PCMESP has been effective in reducing the risk of preterm birth.

〈Table 4-3〉 Binominal Logistic Regression Analysis of Preterm Birth

	Model I			Model II		
	Regression coefficient	(S.E.)	Exp(B)	Regression coefficient	(S.E.)	Exp(B)
Recipient status (non-recipient)						
Group 1 (KRW 200,000)	-.04	(0.23)	0.97	-.22	(0.26)	0.81
Group 2 (KRW 300,000)	-.42	(0.28)	0.66	-.60	(0.30)*	0.55
Group 3 (KRW 300,000)	-.12	(0.33)	0.89	-.34	(0.37)	0.71
Group 4 (KRW 400,000)	-.27	(0.20)	0.76	-.40	(0.22)	0.67
Maternal age (less than 35 years)						
aged 35 years and older				.44	(0.20)*	1.55
Marital status (married)						
Other				.28	(1.08)	1.32
Education (high school graduate)						
Vocational college				-.43	(.24)	0.65
University				-.05	(0.20)	0.95
Avg. monthly household income				.12	(0.15)	1.13
Parity (first birth)						

40 Analysis of the Pregnancy- and Childbirth-Related Medical Expense Subsidization Program in South Korea

	Model I			Model II		
	Regression coefficient	(S.E.)	Exp(B)	Regression coefficient	(S.E.)	Exp(B)
Multipara				.09	(0.18)	1.10
Number of babies (single pregnancy)						
Multiple pregnancy				2.71	(0.37)**	15.06
Delivery method (vaginal)						
C-section				.77	(0.17)	2.16
Adequacy of prenatal care (inadequate)						
Adequate				.77	(0.53)	2.15
N	2,852			2,852		
2Log-Likelihood	1268.33			1152.03		
χ^2	3.51			92.75***		
Df	4			13		
Nagelkerke R ²	0.00			0.09		

***p<.001, **p<.01 *p<.05,

The National Survey of Fertility and Family Health and Welfare upon which this study draws provides a wide enough range of data on socio-demographic and other factors affecting birth outcome and is therefore the most useful source of data available as of yet. Nevertheless, the models developed on the basis of these surveys do not reflect either the values of cash and in-kind benefits provided by different local governments in support for pregnant women or other biological factors, such as the factors posing as health risks for mothers. These shortcomings thus serve to limit the explanatory power of this study.

V

Conclusion

1. Summary
2. Policy Implications



1. Summary

This study analyzes the PCMESP, the most universal and consistently growing policy program for pregnancy and childbirth support in Korea, in terms of how effectively it has achieved its stated objectives of reducing the financial burdens on women related to pregnancy and childbirth and improving the health of babies born or birth outcomes. This study performs a quantitative analysis of the data provided by the National Survey of Fertility and Family Health and Welfare of 2006, 2009, 2012, and 2015.

Has the PCMESP met its goal of reducing the financial burdens on women related to pregnancy and childbirth? The absolute costs of care related to pregnancy and childbirth and the rates of co-payment have steadily increased every year since the program was introduced, so women are unlikely to feel that the program has helped to reduce their financial burdens. Although the costs of care unrelated to pregnancy and childbirth have also increased since the program was introduced, the program has failed to stem the growing costs of pregnancy and childbirth at any rate, contrary to expectations. Considering that pregnant women are still required to pay for

the entire costs of some prenatal and postnatal services they receive, the PCMESP has been ineffective on the whole at reducing the medical costs of pregnancy and childbirth.

Has the PCMESP helped to improve the birth outcomes? This study shows that the PCMESP subsidy of KRW 300,000 per woman has significantly reduced the possibility of having preterm birth. Although the model used to reveal this carries only a limited explanatory power, it still shows that the program has been relatively successful in ensuring the birth of more healthy babies. Contrary to previous studies that sought to assess the effectiveness of the PCMESP on the basis of women's awareness of and satisfaction with the program, their willingness to give birth to (additional) children, the amount of money they spend on prenatal and childbirth care, and their preferences for different types of prenatal care institutes, this study relies on birth outcomes, a key measure of the effectiveness of prenatal support policy used in studies around the world. This study therefore provides a more comprehensive assessment of the PCMESP in terms of how effectively it has met its objectives.

2. Policy Implications

Policy support for pregnancy and childbirth should continue to increase in the future. Rather than increasing the amount of cash subsidies (provided with voucher cards) only, however, the

scope of prenatal and childbirth-related medical services covered by the NHI should also expand. In response to this growing demand, the Korean government began to use NHI to cover ultrasound scans for pregnant women in October 2016. Thanks to this change of policy, pregnant women in Korea today pay only 40 percent of the ultrasound scan cost out of their own pockets. They can use the National Happiness Cards (formerly Goun-Mom Cards) to pay for the prenatal and childbirth care not covered by the NHI. Moreover, the Korean government has also begun to cover the costs of medical care crucial to the health of pregnant women and their unborn babies during pregnancy with the NHI. However, the cost of ultrasound scans covered by the NHI is up to four times greater than those not covered by NHI. The media thus recently reported that the overall cost of ultrasound scans during pregnancy go down after the seven NHI-covered ultrasound scans. When the ultrasound scan cost was not covered by the NHI, competition among hospitals and clinics helped to keep the cost more affordable. It is thus crucial for policymakers to monitor the unexpected side effects of increasing NHI coverage of prenatal and childbirth care.

In order for the PCMESP to be effective in promoting childbirth and raising the national birth rate, it should do more than simply help pregnant women financially, and actually motivate women to bear and give birth to children. With Korea's total

fertility rate remaining staggeringly low (below 1.3) for many years, it is important for the government to target, through policy incentives, women who have not yet given birth, and not only those who have already done so. This requires greater effort on the part of the government at advertising the PCMESP and similar policies beyond only existing mothers and on to potential mothers and the entire public as a whole.

The Korean government should reach out and provide more information to the greater public, not only to raise awareness of the PCMESP, but also to raise awareness of the importance of adequate prenatal care. The government, accordingly, should first inform policy targets of the available policy resources supporting pregnancy and childbirth, and also present standardized guidelines on appropriate prenatal care and costs to the public. This is also crucial to increasing the NHI's coverage of prenatal care.

Furthermore, continued monitoring is needed against the possible downsides of the PCMESP in raising overall medical costs related to pregnancy and childbirth. A nationwide database is needed to support more cost-effective policymaking on supporting pregnancy and childbirth with evidence-based research and analysis.

The Korean government needs to continue to expand and increase policy support for pregnancy- and childbirth-related healthcare as part of reversing the nation's low birth rate and

improving the overall social welfare. In order for such policy support to function effectively, it is important to ensure equitable access to the infrastructure of quality care for all citizens across the country. This, in turn, will require both expanding universal support for childbearing-age women and increasing additional support, in consultation with medical experts, for groups with particular needs, such as teenagers, the disabled, high-risk pregnant women, and couples having difficulty conceiving. The subsidies provided in the process should be tailored to fit the stated purposes of the given policy by enabling women to receive proper care at all stages of pregnancy and childbirth.

The Korean government's policy for raising the birth rate can work most effectively only when there is sufficiently extensive infrastructure capable of providing quality prenatal and childbirth care, when individuals have equal access to quality healthcare that meets their medical needs, and when individual women are given adequate financial support for prenatal care.

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