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The Effect of Paid Maternity Leave on Child Health in the Middle East and North Africa

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Abstract

Background: The paid maternity leave is one of the factors affecting the health status of children, but this maternity leave in the Middle East and North Africa is not only less than in developed countries but also the mortality rate of children under 5 years is higher in these countries. Therefore, this study was conducted to investigate the paid maternity leave on children's health in the Middle East and North Africa.

Methods: This descriptive-analytical and applied study was conducted by Panel data regression method with cross-sectional dependence and Common Correlated Effect Mean Group (CCEMG) and Augmented Mean Group (AMG) estimators for 2000 and 2019. The statistical population was 12 countries in the Middle East and North Africa, and annual time series data were extracted from World Bank databases. The study models, cross-sectional dependency tests, Pesaran unit root, Westerlund cointegration, and other required tests were estimated in Stata 16 software.

Results: The average paid maternity leave for 12 countries in the Middle East and North African countries between 2000 and 2019 was 68.8 days, and in 2019, it was 78 days. The effect of maternity leave on infant mortality rate in the Augmented Mean Group and Common Correlated Effect Mean Group were -0.0018 and -0.0006, respectively, and, the effect on the under-5 mortality rate in the mentioned methods was -0.0023 and -0.0007, respectively. The coefficient of female labor force participation rate on infant mortality rate was -0.056 and the under-5 mortality rate was -0.049.

Conclusion: Increasing maternity leave had a negative effect on infant and child mortality rates. Also, health expenditures and female labor force participation rates had a negative effect, and carbon dioxide production had a positive effect on infant mortality rates; therefore, policies to increase paid maternity leave for mothers, as well as policies to increase maternal employment, are proposed to increase fertility while increasing the health of infants.

Keywords: Maternity Leave, Child Health, Female Labor Force Participation, Cross-Sectional Dependence, Cointegration

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Introduction

The first 2 years of a child's life is a very important period because it leads to the social, emotional, and intellec-

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↑What is "already known" in this topic:
The maternity leave in the Middle East and North African counties is shorter and the infant and child mortality rate is higher than in the developed and Organization for Economic Co-operation and Development countries. The paid maternity leave also affects the child's health by spending more time with the child, increasing breastfeeding, reducing postpartum depression in mothers, improving maternal mental health, and increasing the likelihood of medical examinations.

→What this article adds:
In the Middle East and North Africa, expanding paid maternity leave had a negative impact on newborn and child death rates, whereas increasing health expenditures, women's participation rates, and carbon dioxide output had a favorable impact on infant mortality rates, according to this study.

tual development of children, and a disorder in the development of this period causes stress and lifelong consequences for their health (1). Th e first 14 weeks of life are very important for an infant's health because, during this period, infants begin to make neural connections and recognize sound and smell (2). Therefore, the child's health during this period will have a significant role in the physical, mental, and social functioning of the child in the future (3). Among the factors affecting children's health, the role of socioeconomic factors is more than 50%, which highlights the need to provide favorable economic and social factors for the family and especially for the mother in the first months of childbirth. In this regard, paid maternity leave policies are crucial to maintaining the health of working mothers and their newborn children (4).

Over the past 4 decades, most developed countries and over the last 2 decades, most countries in the world have approved or extended paid maternity leave, which includes the father in addition to the mother. Paid maternity leave relieves parents of the worry of not earning full or partial pay and allows them to spend more time caring for their children (5). If women's salaries are paid while on leave and they have work security, they are more likely to return to their old job after giving birth, increasing their prospects of employment and pregnancy, and allowing them to plan their future (1). According to theoretical principles, increasing the duration of the mother's presence with the baby leads to improved infant health (1). Maternity leave improves the health of the child by increasing the likelihood of breastfeeding because breastfeeding is associated with improving the health of the child and the mother (6, 7). Also, maternity leave improves the health of the child by improving the mental health of mothers, as maternity leave Improves the quality of mothers' sleep, increases the number of pediatric medical examinations, and increases household income (1, 8). In general, it can be said that paid parental leave improves the child's health by spending more time with the child, increasing breastfeeding, reducing postpartum depression in mothers, improving the mother's mental health, and increasing the likelihood of the child's medical examinations. Therefore, maternity leave is highly important for parents, especially mothers.

Many studies have been conducted to evaluate maternity leave and increase it for parents in developed countries. One group examined the effect of approving maternity leave with pay and the other group examined the duration of maternity leave on children's health. Recent studies by Fabel in Germany have shown that children born after increasing maternity leave are less likely to be hospitalized and less likely to experience mental and behavioral disorders (9). Ahammer et al showed that maternity leave of 6 to 8 weeks did not affect outpatient costs and sick days in Austria (4). Khan for Organization for Economic Co-operation and Development (OECD) countries showed that the adoption and extension of paid maternity leave reduced the infants and under 5 mortality rate (1). Khanam et al showed that increasing maternity leave was associated with prolonged breastfeeding, immunization, and reducing chronic diseases, such as asthma and bronchitis, in Australia (10). Bullinger showed that increasing maternity leave improves the overall health of infants and reduces asthma (11). Sayour (12) and Stearns (13) stated that increasing maternity leave leads to a reduction in the prevalence of emotional disorders, the likelihood of preterm delivery, and increasing newborns' birth weights. Rossin showed that maternity leave has led to a slight increase in birth weight, a reduction in the likelihood of preterm delivery, and a significant reduction in neonatal mortality in the United States (14). Although increased maternity leave has benefited the health of babies and children, some studies have found that it has little effect on children's growth and health, particularly in the long run for diverse countries. Increasing paid maternity leave from 6 months to 1 year in Canada (15), increasing paid leave from 12 to 15 weeks in Sweden (16), and increasing prenatal leave in Austria from 6 to 8 weeks (4) did not affect children's health.

Although the issue of the effect of maternity leave on children's health has been considered in many studies in developed countries, there are still different results regarding the effect of paid maternity leave on children's health. On the other hand, this issue has not been considered much in the Middle East and North African (MENA) countries. Currently, the paid maternity leave in MENA counties is shorter and the infant and child mortality rate is higher than the developed and OECD countries. Therefore, due to the necessity and importance of paid maternity leave for mothers and its impact on the health of children, the duration of this leave has always been challenged in different countries. As a result, the key topic was whether the length of maternity leave granted and implemented in MENA nations has an impact on improving children's health. By adding 1 day to this leave, how much would the death rate of babies and children under the age of 5 be reduced? Therefore, this study was conducted to investigate the effect of paid maternity leave on children's health in the Middle East and North Africa.

Methods

The present descriptive-analytical and applied study was performed for the Middle East and North Africa countries using the cross-sectional panel data method. The Common Correlated Effect Mean Group (CCEMG) and Augmented Mean Group (AMG) were used to estimate the models. From this statistical population, 12 countries (Iran, Bahrain, Qatar, Kuwait, Saudi Arabia, Libya, Oman, Lebanon, Algeria, Egypt, Jordan, and Tunisia), for which the required information was available, were randomly selected. The data required for the study was an annual time series that was extracted from the World Bank databases (17) for selected countries between 2000 and 2019. The required models and tests were estimated in STATA 16 software.

The relationship between maternity leave and child health can be examined from the development of the Grossman model presented by studies by Ruhm (18), Jacobson (19), and Khanam et al (10). According to these theoretical foundations, parents seek to maximize their utility with the $U(H, X)$ function, where H is the children's health and X is the consumption of other goods. Parents face time and budget constraints for this maximization. The time limitation equals $T = R + L + V$, where T represents the total time available to the parents and R, L, and V represent the time of labor, delivery, and other tasks, respectively. The budget constraint is also equal to $Y = P_m M + P_X X = wR + sL + N$, where Y is the total household income, M health care, P_m and P_X the price of M and X goods. W, S, and N are working and maternity leave wages and other household income, respectively. In other words, households spend all their income earned from work, maternity leave, and other non-working income on health care and other goods and services. Maximizing utility with the above constraints, the child health function will be described as $H(B, M, L, V)$, where B is the other factor affecting the child's health. According to the above function as well as the studies of Khanam et al (10), Khan (1), and Fabel (9), the following functions were selected to evaluate the duration of maternity leave on the health of infants and children.

Model 1: $infant_{it} = \alpha_1 + \alpha_2 leave_{it} + \alpha_3 he_{it} + \alpha_4 lco2_{it} + \alpha_5 flfp_{it} + \alpha_6 URBAN_{it} + \varepsilon_{it}$

Model 2: $child_{it} = \alpha_1 + \alpha_2 leave_{it} + \alpha_3 lgni_{it} + \alpha_4 he_{it} + \alpha_5 lco2_{it} + \alpha_6 flfp_{it} + \alpha_7 URBAN_{it} + \varepsilon_{it}$

Where Countries is i = 1, 2… n, and time is t = 1, 2… n.

$infant_{it}$: Infant mortality rate per 1000 live births

$child_{it}$: Under-five mortality rate per 1000 live births

$leave_{it}$: Paid Maternity leave (days)

he_{it}: Health expenditures as a percentage of GDP

$lco2_{it}$: Logarithm of carbon dioxide production (thousand tons)

$flfp_{it}$: Female labor force participation rate

$URBAN_{it}$: Urbanization rate

$lgni_{it}$: The logarithm of Gross National Income per capita in purchasing power parity

Before estimating the above models, the cross-sectional dependence of the model data should be determined, and then the subsequent tests and finally the estimation methods should be determined based on it. Although it is commonly assumed that the data used in panel data models have cross-sectional independence, this assumption may be violated for many panel data due to their interaction, hence the cross-sectional dependence of variables should be assessed first (20). To test the cross-sectional dependence, the Pesaran CD test (CD test) (21) was used. In this test, the null hypothesis is no cross-sectional dependence. To ensure the absence of spurious regression coefficients, stationary tests are required. For this, due to cross-sectional dependence, the Pesaran unit root test (CIPS test) was used (22). If the panel data are cross-sectionally dependent, using panel data unit root tests such as Im, Pesaran, and Shin (IPS), Levin, Lin, and Chu (LLC), and Augmented Dickey Fuller - Fisher (ADF-Fisher) will produce misleading results and raise the risk of erroneous unit root results (23). By converting the IPS test and considering the cross-sectional dependence, Pesaran has proposed a test to check the presence or absence of a unit root, which is known as the CIPS test (22). In this test, the null hypothesis indicates the unit root or nonstationary of the variables. Therefore, if the calculated value of the test is greater than its critical value, the null hypothesis is rejected and the variable is stationary (20). The Pedroni and Kao tests could be used to examine the cointegration between the variables if there is no cross-sectional dependence, and the Westerlund panel data test could be used if there is cross-sectional dependence (24). In this study, due to cross-sectional dependence, the Westerlund panel data cointegration test was used (24). This test provides valid results in cross-sectional dependence, structural breaks, and residuals autocorrelation (24, 25). The null hypothesis of this test is no cointegration. To test the null hypothesis, the calculated z-statistic is used for the Westerlund statistics. If the calculated z statistic is greater than its critical value, the null hypothesis will be rejected and the model variables will be cointegration. It should be noted that the Westerlund cointegration test can be used for both cross-sectional dependence and cross-sectional independence (20). If the cross-sectional dependence is proved, the Westerlund bootstrap method should be used (23).

CCEMG and AMG estimators were used to investigate the cointegration relationship between the variables in the study models. These estimators are suitable for panel data cross-sectional and heterogeneous models. The CCEMG estimator by the Pesaran and the AMG estimator by Eberhardt & Teal were proposed and modeled (26, 27). The CCEMG estimator calculates the unobserved common factors to improve the panel regression coefficients with cross-sectional dependence. Also, the heterogeneity of the panel is considered by specific parameters for the sections. Unlike CCEMG, the AMG estimator introduces an explicit common factor variable. More precisely, the AMG estimator calculates the cross-sectional dependence by considering a common dynamic effect in panel regression (25). The present study was not containing any studies with human participants or animals and secondary data were used, so there was no need to obtain an ethics code; however, all ethical points, including nonplagiarism, duplication, making up or falsifying data, manipulating data analyses, or misrepresenting results were observed.

Results

The mean of infants and under 5 mortality rates were 14.74 and 17.32 per 1000 live births in the sample, respectively. The infant and under 5 mortality rates decreased between 2000 and 2019 for all sample countries. Paid maternity leave in 2019 for the sample countries, including Iran, Bahrain, Qatar, Kuwait, Saudi Arabia, Libya, Oman, Lebanon, Algeria, Egypt, Jordan, and Tunisia, were equal to 180, 60, 50, 70, 70, 98, 50, 70, 98, 90, 70, and 30, respectively. Other descriptive statistics of the model are presented in Table 1.

Pesaran CD test was used to ensure cross-sectional dependence and the results were presented in Table 2. According to Table 2, the null hypothesis based on the independence of all model variables with a probability of less than 0.001 was rejected, so all variables in both models had a cross-sectional dependence.

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Table 1. Descriptive statistics of model variables

Variable	Mean	Standard deviation	Minimum	Maximum
Infant mortality rate	14.74	7.05	5.60	37.20
Under-five mortality rate	17.33	8.49	6.50	46.60
Paid Maternity leave	68.85	33.84	0.00	180
Gross National Income (per capita)	32956.81	30805.75	5720.00	132440.00
Health expenditures (% GDP)	5.06	2.08	1.60	10.84
Carbon dioxide	129678.70	165297.40	15050.00	637800.00
Female labor force participation rate	28.92	12.38	12.57	60.01
Urbanization rate	78.50	15.26	42.70	100.00

Table 2. The results of the pesaran cross-sectional dependence and the Pesaran Unit Root (CIPS) tests

Variable	Pesaran cross-sectional dependence test (CD)			Pesaran unit root (CIPS)	
	Statistic	*P*-value	Correlation (Pearson)	Statistic	Results (5%)
Infant mortality rate	35.25	<0.001	0.97	-2.81	stationary
Under 5 mortality rate	35.24	<0.001	0.96	-2.27	nonstationary
Paid Maternity leave	11.52	<0.001	0.24	-0.36	nonstationary
Gross National Income per capita (logarithm)	17.18	<0.001	0.47	-2.20	nonstationary
Health expenditures (% GDP)	12.53	<0.001	0.34	-1.97	nonstationary
Carbon dioxide (logarithm)	33.53	<0.001	0.92	-2.42	nonstationary
Female labor force participation rate	22.75	<0.001	0.62	-1.50	nonstationary
Urbanization rate	23.32	<0.001	0.64	-3.68	stationary

*The critical values with constant and trend at the significance of 1%, 5%, and 10% are equal to -2.67, -2.78, and -3.01, respectively.

Due to the cross-sectional dependence of variables in the models, the Pesaran unit root test was used to evaluate the stationary, and the results are presented in Table 2. As stated in the method, the null hypothesis in this test is the existence of a unit root. If the statistic value is less than the critical value, the null hypothesis will be confirmed. The results showed that the variables of infant mortality rate and urbanization rate were stationary at the 5% level and other model variables were nonstationary.

According to the results of the Pesaran unit root, some variables of the model were stationary and others were nonstationary; thus, there was a probability of spurious regression. To ensure the absence of spurious regression due to cross-sectional dependence, the Westerlund cointegration test was used and the results are presented in Table 3. The results of Table 3 showed that all 4 statistics (G_t,G_a, $P_{t,}$ and P_a) for the model (1) with a Robust P value at a 5% significance level rejected the null hypothesis that there is no cointegration, so between the variables of model 1 there was a long-term cointegration relationship. The Robust P value for the Westerlund cointegration statistics for model 2 also showed that except for $the\ G_a$ statistics, all other statistics at the significance level of 5% rejected the null hypothesis; thus, the variables of model 2 also had a long-run relationship. Due to the existence of cointegration in models 1 and 2 without worrying about the spurious regression, the coefficients of the models' variables at the level could be estimated according to the cointegration methods.

According to the cointegration and long-term relationship between the variables of both models, due to the cross-sectional dependence, CCEMG and AMG estimators were used to estimate both models and the results are presented in Table 4. To ensure the stability of the model's results, the Wald and normality of error terms tests were performed. The results of the Wald test of model 1 showed that the null hypothesis that all variables were zero in the AMG estimator is rejected at a 10% significance level and in the CCEMG estimator at a 5% significance level; therefore, the variables of both models were statistically significant. According to the results of the Wald test for model 2, the variables of this model were statistically significant in the AMG estimator at a 5% significance level but were not statistically significant in the CCEMG estimator. The results of the normality test of error terms in both models showed that the calculated P value was higher than 5% and the error terms of both equations were normal.

The results of model 1 in Table 4 showed that the maternity leave coefficient in AMG and CCEMG estimators were -0.0018 and -0.0006, respectively; therefore, by increasing maternity leave by 1 day, the infant mortality rate in AMG and CCEMG estimators decreases by 0.18 and 0.06%, respectively, indicating the negative effect of maternity leave on infant mortality. The female labor force participation rate in the AMG estimator affected the infant

Table 3. Westerlund cointegration test results

	Statistic	Value	Z-value	*P*-value	Robust *P*-value
Model 1	G_t	-3.01	-1.33	0.09	0.05
	G_a	-15.87	-0.97	0.35	0.001
	P_t	-9.05	-0.77	0.02	0.03
	P_a	-14/87	-1.47	0.07	0.001
Model 2	G_t	-3.03	-1.42	0.07	0.03
	G_a	-5.52	3.97	0.09	0.12
	P_t	-10.02	-1.67	0.04	<0.001
	P_a	-11.46	-0.06	0.47	<0.001

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Table 4. Models' estimation with CCEMG and AMG estimators

Variable	Model 1, dependent variable: infant mortality rate				Model 2, dependent variable: Under 5 mortality rate			
	AMG		CCEMG		AMG		CCEMG	
	Statistic	*P*-value	Statistic	*P*-value	Statistic	*P*-value	Statistic	P-value
Paid Maternity leave	-0.0018	0.07	-0.0006	0.027	-0.0023	0.013	-0.0007	0.70
Gross National Income per capita (logarithm)	---	---	---	---	-0.2425	0.40	-0.1517	0.49
Health expenditures (% GDP)	-0.0514	0.13	-0.0622	0.000	-0.0199	0.70	0.0275	0.62
Carbon dioxide (logarithm)	0.0000	0.86	0.00001	0.09	0.0027	0.00	0.0463	0.91
Female labor force participation rate	-0.0566	0.053	-0.0158	0.49	-0.0491	0.09	0.0260	0.52
Urbanization rate	-0.3736	0.49	-0.5188	0.62	0.6408	0.69	0.149	0.92
constant	64.66	0.12	17.95	0.24	127.51	0.06	17.04	0.77
Wald test	chi2= 9.64 *P*-value= 0.08		chi2= 18.20 *P*-value= 0.002		chi2= 10.12 *P*-value= 0.012		chi2= 1.27 *P*-value= 0.97	

mortality rate equal to -0.0566 but was not significant in the CCEMG estimator. Health expenditures and the logarithm of carbon dioxide production had an effect of -0.622 and 0.00001 on the infant mortality rate in the CCEMG estimator. The results of Model 2 in Table 4 showed that the coefficients of the paid maternity leave, logarithm of carbon dioxide production at the 5% level, and female labor force participation rate at the 10% level in the AMG estimator were significant on the under 5 mortality rate and other variables were not significant. The coefficients of paid maternity leave, the logarithm of carbon dioxide production, and female participation rate in the AMG estimator were -0.0023, 0.0027, and -0.0491, respectively. The results of the Wald test in the CCEMG estimator showed that with a probability of 0.97, the model variables had no statistically significant effect on the under 5 mortality rate.

Discussion

This study was conducted to investigate the effect of paid maternity leave on the health status of children in MENA countries from 2000 to 2019. AMG and CCEMG estimators were used to estimate the study models, which is proposed for cointegration in panel data with cross-sectional dependence. For health status, infant mortality rate and under 5 mortality rate were used and other independent variables based on theoretical foundations and previous studies were included in the models. The descriptive statistics showed that the infant mortality rate and the under 5 mortality rate during the period 2000-2019 decreased for all MENA countries, which showed an improvement in the health status of infants and children in these countries.

The study of paid maternity leave in MENA countries showed that Iran with 180 days had the highest maternity leave and Tunisia, with 30 days, had the lowest maternity leave in 2019. Also, the mean paid maternity leave for 12 MENA countries during 2000-2019 was equal to 68.8 days, and in 2018 and 2019, it was equal to 78 days. At least 14 weeks (98 days) of maternity leave is also recommended by the International Labor Organization's Maternity Protection Convention (1), but in many MENA countries, maternity leave was shorter; only Iran, Algeria, and Libya had more than 98 days. This indicates a lack of attention to the health of working mothers as well as their children in the MENA countries. Interestingly, the average of paid maternity leave in all OECD countries was 126.7 days in 2018 (28). This maternity leave is extended, including maternity leave for the father as well as home care for the child, which is available to mothers in many developed countries (with or without salary was equivalent to 377.3 days in 2018) and the gap between MENA and OECD countries in maternity leave greatly increases. Therefore, the policy of increasing paid maternity leave for mothers in the MENA countries is proposed. In Iran in 2013, according to the Family Law, the government was allowed to increase maternity leave to 9 months. In recent years, this law was not implemented due to the financial burden on some organizations and institutions, but health insurance beneficiaries benefited from this leave. The Social Security Organization has also announced an increase in maternity leave from 6 to 9 months in 2021, based on a decision of the Council of Ministers, which can improve the health of the mother and the child and increase fertility.

The results showed that increasing paid maternity leave had a negative effect on infant mortality rate in both models with AMG and CCEMG estimators and a negative effect on the under 5 mortality rate in the model with the AMG estimator. In general, it can be said that increasing paid maternity leave in MENA countries led to a decrease in infant and under 5 mortality. This result was in line with Khan for OECD countries (1), Fabel for Germany (9), Khanam, et al for Australia (10), Bullinger (12), and Rossin for the United States (11, 14). Fabel examined the increase in maternity leave from 2 to 6 months on children's health in Germany and stated that the change in the law had a positive effect on children's health in the long run (9). Khan for OECD countries showed that the approval of paid maternity leave reduced infant and under 5 mortality rates about 1.5% to 5.2% (1).

Parental leave policies allow them to stop working and focus on childcare because the first year of a child's life is essential for the child's growth (9). This result was also in line with the theoretical foundations that state that increasing the time spent by the mother with the child leads to improved child health (1) Therefore, increasing maternity leave can affect the child's health by spending more time, as well as more childcare. Paid maternity leave also improves the child's health by increasing the probability of

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breastfeeding. Studies have shown that breastfeeding is associated with child and mother health (6, 7, 10). Lichtman-Sadot and Bell showed that paid parental leave increases the duration of breastfeeding from 2 to 12 weeks (6). In a study in California, Pac et al also found that paid maternity leave increases the total duration of breastfeeding by approximately 18 days (7). On the other hand, early return to work reduces the duration of breastfeeding. Children whose mothers returned to work within 12 weeks had a 7.5% lower chance of breastfeeding and a 2.4% lower chance of receiving intensive neonatal care (1). Increasing maternity leave through the mechanism of improving the mother's mental health also affects the child's health. Chatterji and Markowitz (30) stated that increasing the length of leave to more than 12 weeks reduces maternal depressive symptoms by up to 15% and severe depression by up to 2% (29). Mandal also showed that paid maternity leave reduces the negative psychological effects of early return to work. Among women who returned to work within 12 weeks of childbirth, those on maternity leave were less depressed than women who did not have paid maternity leave (30).

While increasing maternity leave may improve the health of children and mothers' motivation to have children, legislators may be concerned that it may limit female labor force participation following childbirth. Of course, there is evidence indicating the association between female labor force participation and fertility is beneficial in several countries. In the mid-1980s, according to Oshio, the link between women's employment and fertility in industrialized countries shifted from negative to positive (31). Women's employment can also make socio-institutional contexts more conducive to fertility. For Iran, Kazemi et al also rejected the inverse relationship between women's participation and childbearing (32). McClamroch found that women's participation in the work market increases their fertility rate in 71 countries (33). He and Zhu also stated that the first child does not hinder women's employment in China (34). Matysiak and Vignoli believe that developed countries that have adopted policies to support working mothers have reduced the negative impact of employment on fertility (35); therefore, the policy of increasing maternity leave by increasing women's pregnancy will not reduce their employment in the labor market and there will be no concern about reducing women's participation in the labor market.

As a result, increasing paid maternity leave in MENA countries has led to a decrease in infant mortality rate by 0.06% to 0.18% and a decrease in the under 5 mortality rate by 0.07% to 0.23%, while according to Khan (1) study for countries OECD, increasing paid maternity leave has led to a reduction in infant and under 5 mortality rates of 0.03% and 0.13%, respectively. It was observed that the rate of decrease in infant and under 5 mortality rates in MENA countries as a result of increased paid maternity leave was higher than in OECD countries. According to the results of Model 2, paid maternity leave should be expanded to 201 days to bring the child mortality rate in MENA nations in line with that of OECD countries. Therefore, increasing paid maternity leave in MENA countries is essential to reduce child mortality and equalize the child mortality rate with OECD countries.

The results showed that women's participation rate had a negative effect on infant mortality rate. In other words, increasing women's participation led to improved neonatal health status. Many studies have shown a negative relationship between women's participation and child mortality rates. For 133 low- and middle-income countries, Farag et al stated that increasing the rate of women's participation in the labor market has led to a reduction in under 5 mortality and infant mortality (36). Shahraki and Ghaderi (39) also confirmed the above relationship for upper-middle-income countries, and stated that at a high child mortality rate, women's participation in the labor market would lead to a more reduction in child mortality rate (37). The results also showed that health expenditures (% GDP) had a negative effect on the infant mortality rate. This result was in line with the studies of Farag et al for 133 low- and middle-income countries (36), Rajkumar and Swaroop for 91 developing countries (38), and Shahraki and Ghaderi for upper middle-income countries (37), which indicated that an increase in public health expenditures has led to a reduction in the infant and child mortality rates. Increasing investment in health improves children's health indicators (1). Even in upper-middle-income countries, public health spending has a significant impact on lowering baby and under 5 death rates. To put it another way, increasing public health spending is more successful in lowering child mortality and improving health (37).

The influence of paid maternity leave on health status in MENA nations was investigated in this study, which has never been done before, and it is useful in deciding whether to increase paid maternity leave and ensure that women's participation rates in these countries do not fall. Another merit of the study is that it studied the existence of cross-sectional dependency in panel data and applied the most recent panel econometric methods as a result. Finally, the authors encountered some limitations in this study, including the fact that more variables affect child health according to theoretical principles, but due to the limitations of variables in the cointegration model, only the main variables discussed in this study were sufficient; also, some variables affecting child health, such as national income and urbanization rate, were not statistically significant and interpretable in the models.

Conclusion

The results of the study showed that paid maternity leave in MENA countries was shorter than in developed countries. Also, the increase in paid maternity leave had a negative effect on the infant and under 5 mortality rates. Health expenditures and female labor force participation rate had a negative effect, and carbon dioxide production had a positive effect on the infant mortality rate. Due to the coefficients of the paid maternity leave in reducing the under 5 mortality rates, to equalize the mortality rate of children in MENA countries with OECD countries, it is recommended to increase the paid maternity leave by more than 200 days. The policy of increasing paid maternity leave will be especially useful for countries that are seeking to increase fertility and population, and where the fertility rate of working women is lower than other women. Also, considering the negative impact of female labor force participation rate on infant mortality rate, policies to increase women's employment are proposed.

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Conflict of Interests

The authors declare that they have no competing interests.

References

1. Khan MS. Paid family leave and children health outcomes in OECD countries. Child Youth Serv Rev. 2020;116:105259-
2. Schulte B, Durana A, Stout B, Moyer J. Paid family leave: How much time is enough? Washington, DC: New America; 2017.
3. Shahraki M, Agheli L, Assari Arani A, Sadeqi H, Ghaderi S. The relationship between mother's socioeconomic status and child health. J Res Health. 2018;8:143-51.
4. Ahammer A, Halla M, Schneeweis N. The effect of prenatal maternity leave on short and long-term child outcomes. J Health Econ. 2020;70:102250.
5. Lester G. A defense of paid family leave. Harvard J Law Gend. 2005;28:1-84.
6. Lichtman-Sadot S, Bell NP. Child Health in Elementary School Following California's Paid Family Leave Program. J Policy Anal Manage. 2017;36:790-827.
7. Pac JE, Bartel AP, Ruhm CJ, Waldfogel J. Paid family leave and breastfeeding: Evidence from California. Washington DC: National Bureau of Economic Research; 2019.
8. Stanczyk AB. Does Paid Family Leave Improve Household Economic Security Following a Birth? Evidence from California. Soc Serv Rev. 2019;93:262-304.
9. Fabel M. Maternity leave and children's health outcomes in the long-term. J Health Econ. 2021;76:102431.
10. Khanam R, Nghiem HS, Connelly L. The effects of parental leave on child health and postnatal care: Evidence from Australia. Econ Anal Policy. 2016;49:17-29.
11. Bullinger LR. The Effect of Paid Family Leave on Infant and Parental Health in the United States. J Health Econ. 2019;66:101-16.
12. Sayour N. The impact of maternal care on child development: Evidence from sibling spillover effects of a parental leave expansion. Labour Econ. 2019;58:167-86.
13. Stearns J. The effects of paid maternity leave: Evidence from Temporary Disability Insurance. J Health Econ. 2015;43:85-102.
14. Rossin M. The effects of maternity leave on children's birth and infant health outcomes in the United States. J health Econ. 2011;30:221-39.
15. Baker M, Milligan K. Evidence from Maternity Leave Expansions of the Impact of Maternal Care on Early Child Development. J Hum Resour. 2010;45.
16. Liu Q, Skans ON. The duration of paid parental leave and children's scholastic performance. B E J Econom Anal Policy. 2010;10:1-35.
17. World bank. World Bank Indicators Washington, D.C: world bank; 2021 [Available from: https://data.worldbank.org/.
18. Ruhm CJ. Parental leave and child health. J Health Econ. 2000;19:931-60.
19. Jacobson L. The family as producer of health--an extended Grossman model. J Health Econ. 2000;19:611-37.
20. Ghaderi S, Shahraki M. The Impact of Military Expenditures on Health Indices in the Middle East; Evidence of Cross-Sectional Panel Convergence. Health Res J. 2021;6:226-38. [In Persian]
21. Pesaran MH. General diagnostic tests for cross-sectional dependence in panels. Empir Econ. 2021;60:13-50.
22. Pesaran MH. A simple panel unit root test in the presence of cross-section dependence. J Appl Econ. 2007;22:265-312.
23. Adeneye YB, Jaaffar AH, Ooi CA, Ooi SK. Nexus Between Carbon Emissions, Energy Consumption, Urbanization and Economic Growth in Asia: Evidence From Common Correlated Effects Mean Group Estimator (CCEMG). Front Energy Res. 2021;8.
24. Westerlund J. Testing for Error Correction in Panel Data. Oxf Bull Econ Stat. 2007;69:709-48.
25. Damette O, Marques AC. Renewable energy drivers: a panel cointegration approach. Appl Econ. 2019;51:2793-806.
26. Eberhardt M, Teal F. Aggregation versus Heterogeneity in Cross-Country Growth Empirics. Cent Study Afr Econ. 2010–32 2010;1-37 .
27. Pesaran MH. Estimation and Inference in Large Heterogeneous Panels with a Multifactor Error Structure. Econometrica. 2006;74:967-1012.
28. Organisation for Economic Co-operation and Development. OECD Family Database. PF2.1: Parental Leave Systems Paris2021 [Available from: https://www.oecd.org/els/family/database.htm.
29. Chatterji P, Markowitz S. Family leave after childbirth and the mental health of new mothers. J Ment Health Policy Econ. 2012;15:61-76.
30. Mandal B. The Effect of Paid Leave on Maternal Mental Health. Matern Child Health J. 2018;22:1470-6.
31. Oshio T. Is a positive association between female employment and fertility still spurious in developed countries? Demogr Res. 2019;41:1277-88.
32. Kazemi S, Mazyaki A, Mostafavi SF. Female labor force participation and fertility in iran. Iran Popul Stud J. 2017;2:39-62. [In Persian]
33. McClamroch K. Total fertility rate, women's education, and women's work: What are the relationships? Popul Environ. 1996;18:175-86.
34. He X, Zhu R. Fertility and Female Labour Force Participation: Causal Evidence from Urban China. Manchester Sch. 2016;84:664-74.
35. Matysiak A, Vignoli D. Fertility and Women's Employment: A Meta-Analysis / Fécondité et travail des femmes: une méta-analyse. Eur J Popul. 2008;24:363-84.
36. Farag M, Nandakumar AK, Wallack S, Hodgkin D, Gaumer G, Erbil C. Health expenditures, health outcomes and the role of good governance. Int J Health Care Finance Econ. 2013;13:33-52.
37. Shahraki M, Ghaderi S. The Interaction Effects of Good Governance and Public Health Expenditure on Children's Health Status: Quantile Regression for Upper-Middle Income Countries. J School Public Health Institute Public Health Res. 2021;19:53-68. [In Persian]
38. Rajkumar AS, Swaroop V. Public spending and outcomes: Does governance matter? J Dev Econ. 2008;86:96-111.