The Comparison of Maternal and Child Health Indicators before and after the Family Physician Program in Shiraz, from 2001 to 2012

Roxana Sharifian[1],
Mohaddese Ghanbari
Jahromi[2], Mohammad
Khammarnia[3], Nasrin
Shokrpour[4], Aziz Kasani[5]

[1]Department of Health Information Management and Technology, Faculty of Management and Medical Information Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
[2]Student of Health Services Management, Student Research Committee, Shiraz University of Medical Sciences, Shiraz, Iran
[3]Health Promotion Research Center, Zahedan University of Medical Sciences, Zahedan, Iran
[4]Department of English Language, Faculty of Paramedical Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
[5]Department of Community Medicine, School of Medicine, Dezful University of Medical Sciences, Dezful, Iran

Correspondence:
Nasrin Shokrpour,
Department of English Language,
Faculty of Paramedical Sciences,
Shiraz University of Medical Sciences,
Shiraz, Iran
Tel: +98 917 3162815
Email: shokrpourn@gmail.com
Received: 31 October 2016
Revised: 5 November 2016
Accepted: 5 December 2016

Abstract

Background: One of the aims of the family physician program (FPP) is to improve the maternal and child health indicators. this study aimed to comparison maternal and child health indicators in Shiraz rural areas before and after implementation of FPP during 2001 to 2012.

Methods: This applicable study was conducted in Shiraz in the south west of Iran in 2014. The child and maternal health indicators before (2001 to 2005) and after FPP (from 2006 to 2012) were gathered from the Health Center (Enghelab and Shohadaye Valfajr). The instrument for data collection was a questionnaire consisted of 20 maternal and child health indicators. Descriptive statistics was used and for analyzing the data, Excel and Stata software and comparisons of rates and joint point regression tests were employed.

Results: the results showed that The FPP lead to decrease in stillbirth, infant mortality and child under one-year mortality in the rural area. Also all the vital horoscope indicator (mortality under one month, mortality under one year, the frequency of the infants under one year, the percentage of stillbirths, crude death percentage, crude birth percentage, general fertility percentage, total fertility percentage) have improved after FPP in Health Center rather than Enghelab Health Center .

Conclusion: the maternal and child health indicators had improvement after FPP implementation. Therefore, it is recommended to continue the program.

Introduction

Health system is one of the most important parts of each society. Despite the establishment of the health systems all around the worlds, most of them are not managed efficiently.[1] Health is the most important need of people in each society and governments play very important role in it.[2] The availability of health services is an important factor in Primary Health Care (PHC) for establishing efficient and fair health services. In countries with primary health care system, the treatment costs are lower and the society is usually healthier.[3,4] For receiving these services, people should be able to access and use them. It may decrease the unfair of the health services.[5] In most countries of the world, the health system is organized for the easy access of people to the level one, two and three of health services. This is not only prevent people from unnecessary referrals to more specialized levels, but also controls the hospital care costs.[6] To improve the quality of medical services, the government of Iran introduced a new policy named family physician for making some reform in health department[7] that is very helpful for the

society.[8] From the WHO's point of view, it is possible to improve the quality, costs, efficiency and justice in healthcare systems.[9] Because of the existence of referral culture in rural areas of Iran, family physician program (FPP) was designed and administered in rural areas and towns with population under 20000, from 2005,[10] to control additional costs, boost the health level and prevent unnecessary referrals to the higher levels of medical services.[11] During this period, primary health care was offered by the family physician team.[9] A family physician should have at least a medical doctor degree[12] and his duty is to help all the age and sex groups with any type of disease.[13] Family physicians are responsible for giving health services to people and their families. They prevent disabilities and health problems by on time and effective treatments.[14] Family physician, as a link between people and health care system, has a very important effect on the effectiveness of the health services.[15] Therefore, it is supposed to have an improvement in the quality of the health services by increasing their quantity.[16] By the same token, it is possible to stop increasing the costs and wasting resources through the continuous participation of the family physicians, and accurate and on time referrals to more specialized levels of health services.[17] It is obvious that for better administration of each program in any country, the corporation of people[18] and the supervision of the government are essential to correct any possible defects.[12]

According to the studies in Maragheh, Iran, about 97% of the population was aware of FPP, 97.6% were referred to family physician for at least one time, and 96.8% of them get the health service insurance. Positive points of the FPP are creating and developing the health document for each person, more appropriate and effective care for pregnant women and babies under 6 years old, easy access of the villagers to physician and drugs and decreasing treatment costs. Negative points of this program on the other side are high referrals of patients to the health houses, lack of enough job positions for the personnel, delay in paying salary to the personnel, and limited time of accessing physical physicians in rural areas.[17] Rayisi's 2011 study showed that administrating FPP had positive effects on all the maternal and child health indicators except maternal death from 2001 to 2007.[19] Based on Barati's 2012 study in Iran, administrating family physician was effective on decreasing infants' death under one year, infants' death under five years, newborn death, and maternal death indicators.[20] Considering the importance of the FPP increasing the health level, controlling the costs and improving the quality of the medical services,[21,22] it is important to investigate effectiveness of this program from different points of view.

Shiraz is located in the south west of Iran and as the sixth Metropolis was implemented FPP in rural area. Accordingly, the present research was done to investigate the maternal and child health indicators in Shiraz rural areas before and after administration of FPP during 2001 to 2012. The results of this study present useful information to the administrators and policy makers of this program to improve administrating it and increasing the health level of the society.

Methods

This retrospective study was conducted as cross-sectional in 2014. The research population was rural population under the administration of FPP around Shiraz from 2001 to 2005 as before FPP implementation and 2006 to 2012 as after FPP implementation. Data were specifically maternal and child indicators of the target population; therefore, all data related to the maternal and child indicators were collected from two Rural Health Centers, Shohadaye Enghelab and Shohadaye Valfajr, from 2001 to 2012, via the enumeration method. These Health Centers had done supportive functions for Health Hoses in rural area. For data collection researchers referred to the Health Centers and the data were gathered from documentation. a Checklist was designed by the researchers. This checklist was consist of twenty maternal and child indicators including the percentage of breast-feeding, the percentage of cesarean deliveries among all deliveries, the percentage of receiving at least one care a year between two- to five-year old children, birth rate per 1000 people, the percentage of receiving at least six cares in pregnancy period, the percentage of receiving at least two cares after delivery, the percentage of prenatal care, the percentage of infants' mortality under 1 month, the percentage of continuing breastfeeding for 12 to 15 month-old infants, the percentage of exclusive breastfeeding till 6 months, the percentage of children under one year, the percentage of 6 to 9 month-old infants which eat additional food, the percentage of mortality under one year, the percentage of total fertility, the percentage of general fertility, the percentage of crude birth, and the percentage of crude death. The data were classified from 2001 to 2012. The validity of the checklist was approved by about eight specialists in health services management and faculty members of the related field. Descriptive statistics was used and for analyzing the data, Excel and Stata software and comparisons of rates and joint point regression tests were employed.

The study was approved by Ethics Committee of Shiraz University of Medical Sciences.

Results

The results of the study showed that the percentage of mortality under 1 month and the percentage of stillbirths were decreased after administrating the FPP (Figure 1).

Another investigation showed that the overall trend of the frequency of the children under one year and the percentage of the mortality under 1 year were decrease after administrating the program (Figure 2).

Figure 3 shows that the percentage of before prenatal cares and pregnancy period cares were decreased after administrating the FPP, while the percentage of the cesarean among all deliveries and post-partum cares were increased.

Table 1 shows that there are statistically significant relationships between four health indicators before and after

administrating FPP in rural areas around Shiraz, Iran, from 2001 to 2012.

Also, Table 2 indicates the means difference of health indicators in rural health centers before and after the family physician program.

As shown in Table 3, the mean of stillbirth, neonatal mortality rate and infant mortality rate had differences before and after the FPP implementation.

Also, Table 4 shows the differences of health indicators based on the Joint point regression in each period.

Discussion

The results showed that among the eight maternal and health indicators in the study in Shiraz, four indicators (morality under 1 month, stillbirth, Mortality of children under one year and crude birth rate) before and after administrating FPP had differences. In other words, these four indicators were improved after administrating FPP that shows the positive effect of this program. This finding shows that FPP could promote health
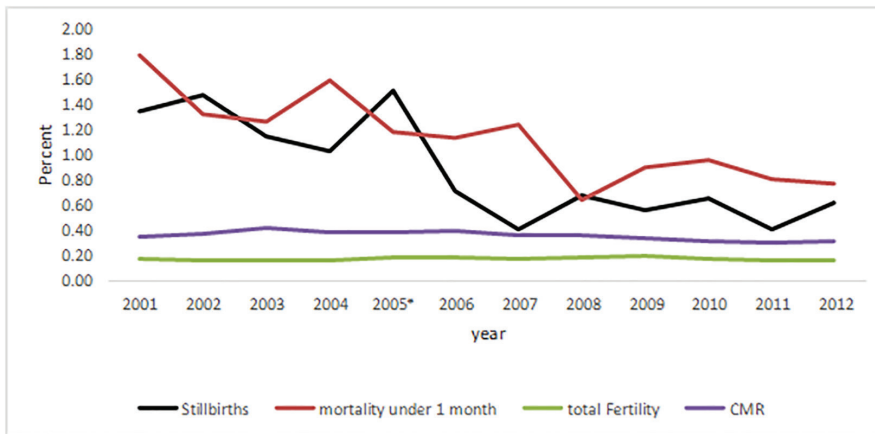
*Implementation of FPP in Shiraz
Figure 1: Overall trend of four health indicators in rural health centers of Shiraz, Iran; 2001 to 2012
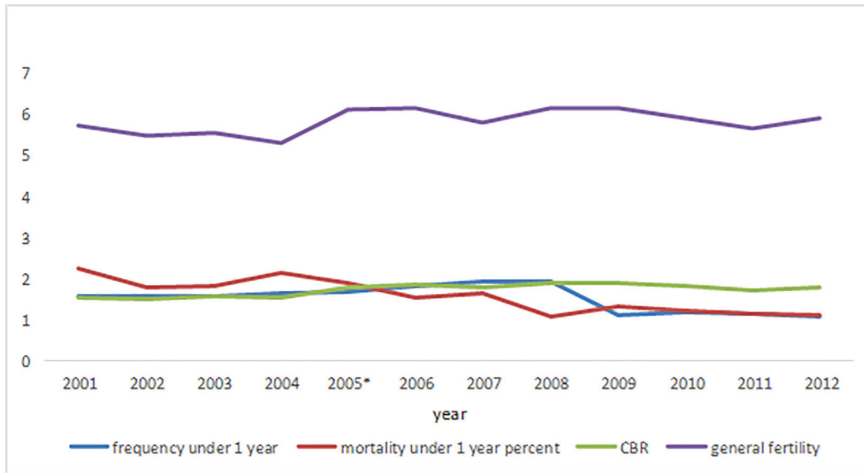
*Implementation of FPP in Shiraz
Figure 2: The overall trend of four health indicators (frequency under one year, mortality under one year, crude birth percentage and general fertility) in Shiraz rural health centers
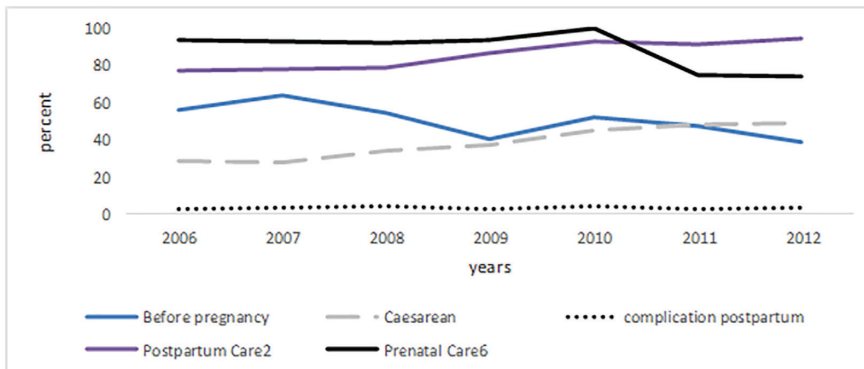

Figure 3: The overall trend of maternal and child health indicators in Shiraz rural health centers from 2006 to 2012

Table 1: The relationship between health indicators in rural health centers of Shiraz, Iran from 2001 to 2012

Indicators	Before Family Physician Program		After Family Physician Program		P value
	Rate	SE	Rate	SE	
Stillbirths(per1000 deliveries)	9.69	0.17	6.54	0.31	0.01
Neonatal mortality rate(per1000 live births)	14.31	1.12	9.31	0.98	0.01
Infant mortality rate(per1000 live births)	21.55	2.12	16.96	1.25	0. 02
Total Fertility Rate(TFR)	1.96	1.99	1.85	2.03	0.38
General fertility Rate(GFR)	61.25	3.25	63.55	4.95	0.18
Crude Birth Rate (CBR)	17.25	1.21	18.49	1.34	0.04
Crude Death Rate(CDR)	5.96	1.08	5.18	1.070	0.12

Table 2: The mean difference of health indicators before and after implementation of the family physician program

Indicators	Before Family Physician Program		After Family Physician Program		P value
	mean	SD	Mean	SD	
Stillbirths	1.26	0.184	0.57	0.331	0.005
Neonatal mortality rate	1.40	0.234	0.921	0.272	0.009
Mortality under1 year	1.59	0.040	1.44	0.826	0.386
Infant mortality rate	1.89	0.245	1.28	0.375	0.009
Total Fertility	0.166	0.007	0.175	0.023	0.74
General fertility	5.63	0.239	5.98	0.46	0.22
Crude Birth Rate	1.57	0.119	1.81	0.059	0.05
Crude Death Rate	0.383	0.027	0.342	0/060	0.285

Table 3: Joint point regression of health indicator in rural health centers of Shiraz, Iran from 2001 to 2012

Indicators	Intercept	Parameter Estimate(B)	SE	t	P value
Stillbirths(per1000 deliveries)	112.21	-0.18	0.2	-7.34	0.01
Neonatal mortality rate(per1000 live births)	86.25	-0.09	0.01	-5.36	0.01
Infant mortality rate(per1000 live births)	226.12	-0.25	0.03	-4.55	0.02
Total Fertility Rate(TFR)	85.26	-0.02	0.85	-1.25	0.13
General fertility Rate(GFR)	225	0.06	0.33	-0.93	0.36
Crude Birth Rate (CBR)	301.41	0.15	0.04	3.38	0.03
Crude Death Rate(CDR)	199.21	-0.11	0.01	-6.38	0.01

Table 4: Joint point regression of health indicators before and after implementation of the family physician program

Indicators	Before Family Physician Program			After Family Physician Program		
	B	SE	P value	B	SE	P value
Stillbirths(per1000 deliveries)	0.01-	0.09	0.32	-0.23	0.03	0.01
Neonatal mortality rate(per1000 live births)	-0.04	0.02	0.02	-0.08	0.02	0.01
Infant mortality rate(per1000 live births)	-0.05	0.08	0.18	-0.22	0.05	0. 01
Total Fertility Rate(TFR)	-0.03	0.06	0.33	-0.05	0.09	0.13
General fertility Rate(GFR)	0.02	0.55	0.36	-0.60	1.04	0.16
Crude Birth Rate (CBR)	0.05	0.01	0.01	0.07	0.01	0.01
Crude Death Rate(CDR)	-0.03	0.02	0.02	-0.16	0.01	0.01

indicators in the rural area. The results are similar to Rayisi's study.[19] Based his study, there was a significant relationship between the mortality of the children under one year, before and after administrating the FPP that is identical to the present research.

Based on the review study of Sans-Corrales in Cuba that studied 365 articles about family physician, there were significant relationships between health level, costs, and FPP.[23] In other words, the FPP improved the health level and decreased the treatment costs.

According to Barati's study FPP had decreased mortality indicators (mortality under one month, mortality under five years and maternal death). It means that these indicators were improved in all rural areas of Iran from 2005 to 2006.[20] Thus, by appropriate administration and continuous supervision of this program, it is possible to boost the health level of the society.

Investigating the mortality under one month indicator showed that these indicator was decreased after administrating FPP. Although these indicators were reached the highest level in 2007, its general trend was descending that was due to the positive effect of this program. The mortality rate of infants is a standard indicator in the development of the health system in each country in a way that decreasing the mortality rate of infants under

one year old can be a proof of the appropriate performance of the health centers, hospitals and doctors.[24] Boskabadi mentioned that acute insufficiencies, infections, breathing problems, prenatal asphyxia and background diseases are the main reasons of the infants' death.[25] Also in Jurczak's study, the infection in male infants is one of the reasons of their death.[26] Being an underweight infant,[27] delivery type,[25] pregnancy age[28] and gender[29] are other reasons of the infants' death. Considering the appropriate performance of FPP in decreasing the infant's death, it is possible to lessen infant's death to the minimum amount.

The percentage of the stillbirths was increased in 2005, the starting time of the program, but it was decreased by the time and after administrating the FPP in a way that in 2007, it reached the minimum level. These findings showed the efficiency of the program in increasing the percentage of the stillbirths. The results were similar to Rayisi's study.[19] Hemmatyar claimed that some factors such as poor maternal nutritional status, inappropriate socio-economic status and insufficient care in prenatal period may lead to stillbirth. To prevent these sorts of problems, it is necessary to use health education, suitable nutrition, prenatal care, social support, and midwifery care.[30]

According to the results of the study the percentage of the mortality under one year old was decreased. This may be related to people increasing awareness Safari mentioned that being underweight, feeding with milk powder, and being crude at birth may lead to infants' death.[31] Other studies showed that there is a relationship between the job and education level of the parents and death rate of the children.[32]

The percentage of the total fertility and crude death rate indicators showed similar trend before and after administration of the FPP. In other words, administrating this program had no effect on these indicators. Bradshaw stated that in most developing countries the number of births was decreased by improving the education level of the people, women's role in the society, increasing incomes, and migration from rural to urban areas.[33] But in most developed countries such as Denmark and Sweden, the governments' policies prevent any brunt in the upbringing of children.[34] Considering the governments' policies for increasing fertility and births, it is possible to grow the population by offering some facilities to families in order to improving fertility, offering facilities for employed women, improving the awareness of people and stop offering free pregnancy prevention tools. The maximum means for the years before and after administrating the FPP related to general fertility rate indicator were 1.57 and 1.81 which shows an improvement in this indicator after administrating the program.

Takian's study showed that the Primary Health Care (PHC) is a very important property in facilitating the administration of FPP in rural areas.[35] Also, the World Organization of Family Doctors (WONCA) states that the primary health services will be improved by using family physician in rural areas.[36] These physicians are important links for improving the cooperation between primary health centers, hospitals and more special cares.[37]

Limitations of the study: In this study, among the 20 maternal and child health indicators, only 13 indicators were available for investigation in Shohadaye Enghelab and Shohadaye Valfajr Health Centers of Shiraz. While among them, the information about 8 health indicators was completely available before and after administrating the FPP. Therefore, the lack of enough information and the lack of appropriate recording system were the limitations of this study. Also, there were few studies on this topic around the world, so there was an attempt to use the closest studies to the topic under the study.

Conclusion

The maternal and child health indicators had improvement after FPP implementation. Therefore, it is recommended to continue the program. For future studies it is recommended that the FPP impact in urban area will be investigated in Iran.

Acknowledgement

Conflict of Interest: None declared.

References

1   Chaman R, Amiri M, Raei M, Alinejad M, NasrollahpourShirvani SD. National Family Physician Program in Shahroud: Assessing Quality of Implementation and Condition of Settings. Hakim Research Journal 2011; 14(2): 123- 129.

2   HosseiniFaraji H. Performance evaluation of family physician program in Imam Khomeini's Relief Committee, Yazd province 2005: 24. Thesis [In Persian].

3   Bunker JP, Frazier HS, Mosteller F. Improving health: measuring effects of medical care. The Milbank Quarterly. 1994; 72(2):225–258. [PubMed]

4   Shi L, Starfield B, Kennedy B, Kawachi I. Income inequality, primary care, and health indicators. Journal of Family Practice. 1999; 48(4):275–284. [PubMed].

5   Starfield B, Shi L, Macinko J. Contribution of primary care to health systems and health. Milbank Quarterly. 2005; 83(3):457–502. [PMC free article] [PubMed].

6   NasrollahpourShirvani D, AshrafianAmiri H, E. Motlagh M, Kabir M. J, Maleki M. R, ShabestaniMonfared A, Alizadeh R. Evaluation of the Function of Referral System in Family Physician Program in Northern Provinces of Iran: 2008. Journal of Babol university of medical science 2009; 11(6):46-52.

7   Takian A, Rashidian A, Kabir MJ. Expediency and coincidence in re-engineering a health system: an interpretive approach to formation of family medicine in Iran. Health policy and planning. 2011; 26(2):163–173. [PubMed]

8   LeBaron SWM, Schultz SH. Family Medicine in Iran:

The Birth of a New Specialty. International Family Medicine. 2005; 37(7):502–505. [PubMed]

9   Khayyati FM, Esmaeilmotlagh MJ, KabirKazemeini H, Gharibi F, Jafari N. The role of family physician in case finding, referral, and insurance coverage in the rural areas.Iranian J Publ Health. 2011; 40(3):136–139. [PMC free article] [PubMed]

10 Tavasoli E, Alidousti M, Khadivi R, SharifiradGh. R, Hasanzadeh A. Relationship between Knowledge and Attitudes of Rural People with Information Resources about Family Physicion Program in Shahrekord (2010). Journal of Health System Research 2014;6(3): 498-505.

11 Kersnik J. An evaluation of patient satisfaction with family practice care in Slovenia.Int J Qual Health Care 2000;12(2):143-147.

12 Mohammad Jafari H, VahidShahi K, Mahmoodi M, Abbaskhanian A, Shahbaznegad L. Survey of effect of continuous medical education on knowledge of general practitioner. Koomesh, Journal of Semnan University of Medical Sciences 2008; 9 (4): 255-62. [In Persian].

13 Hafezi Z, Asqari, Momayezi M. Monitoring Performance of Family Physicians in Yazd. Journal of Yazd School of Health 2009; 6(1-2):16-26.

14 Khuwaja AK, Khuwaja NK. Screening for diseases in family practice. J Pak Med Assoc. 2005;55(3):116–118. [PubMed]

15 Hatam N, Joulaei H, Kazemifar Y, Askarian M. Cost efficiency of the family physician plan in fars province, southern iran. Iran J Med Sci. 2012; 37:253–9. [PMC free article] [PubMed]

16 Mohammadi A, Mohammadi J. Evaluating quality of health services in health centres of Zanjan district of Iran. Indian J Public Health.2012; 56:308–13. [PubMed]

17 Jannati A, Maleki M, Gholizade M, Narimani M, Vakeli S. Assessing the Strengths & Weaknesses of Family Physician Program. Knowledge & Health 2010; 4(4):39-44

18 Ministry of health and medical education.Illustration of health team and family physician services. Tehran: Arvij; 2007. [In Persian].

19 Raeisi P, EbadiFardAzar F, Roudbari M, ShabaniKia HR. The Impact of Family Physician Program on Mother and Child Health Indices in Rural Population Auspices of Mashhad University of Medical Sciences and Health Care Services, Iran; 2009. Journal of Health Management 2011; 14(43): 27-36.

20 Barati A, Malaki M, Gohari M, Kabir M, Amir Asmaili M, Abdi G. The impact of family physiciansonhealth indicators. Journal of Paiesh 2012; 11(3): 361-63.

21 Raeissi P, Ghorbani A, Tabarraie Y. Factors Determining Satisfaction with Family Practitioner Program from the Perspective of Rural Insurance Card holders affiliated with Sabzevar University of Medical of Sciences 2011. Journal of Health Management 2012; 15(49): 69-76.

22 Manca DP, Varnhagen S, Brett- MacLean P, Allan GM, Szafran O,Ausford A, et al. Rewards and challenges of family practice: Webbasedsurvey using the Delphi

method. Can Fam Physician 2007; 53(2):278-86.

23 Sans- Corrales M, Pjol E, Badia J, Pasarin M, Perez B, Brunet J. Family medicin attributes related to satisfaction, health and costs. Journal of Family Practice 2006; 23(3): 308-316.

24 MirzaRahimi M, Abedi A, Shahnazi F, Saadati H, EnteshariMoghadam A. [The causes and rate of mortality among newborns in NICU and newborns unit at Imam Khomeini and Alavi Hospitals in Ardabil from September 2006 to September 2007]. Ardebil Univ Med J 2008; 8(4):424-30.

25 Boskabadi H, Parvini Z, Barati T, Mouadi A. Investigate of causes and risk factors of mortality in Mashhad Ghaem Hospital 2009-2010. Iraninan Journal of Obstetrics Gynecology andInfertility 2011; 14(7): 6- 9.

26 Jurczak A, Kordek A, Grochans E, Giedrys-Kalemba S .Clinical forms of infections in neonates hospitalized in clinic of obstetrics and perinatology within the space of one year. Advances in Medical Sciences 2007; 52:23-25.

27 Falahi M, Joudki N, Mohseni Bandpey H. [Causes neonatal mortality hospitaled in shohadaytajrish hospital in 1383-1386]. Pajouhandeh 2009; 14(1):43-6. [In Persian].

28 Stoll BJ, Kliegman RM. Overview of mortality and morbidity. In: Behrman RE, Kliegman RM, Jenson HB. Nelson textbook of pediatrics. 18th ed, Philadelphia: Saunders; 2007:671-4.

29 Joseph KS, Wilkins R, Dodds L, Allen VM, Ohlsson A, Marcoux S, et al. Customized birth weight for gestational age standards: perinatal mortality patterns are consistent with separate standards for males and females but not for blacks and whites. BMC Pregnancy and Childbirth 2005 Feb 20; 5(1):3.

30 Hematyar M, Yarjou S. Causes of perinatal mortality at Javaheri hospital during a 7- year period 1996-2003. Mel Sci J Islamic Azad Univ,TehranMed Unite 2005;1(15):37-40.

31 Safari H, Nooripour S, Emadi Z, Shakeri R, Jandaghi J, Mirmohammadkhani M. Associated factors of mortality of children aged 1 to 59 months in rural areas of Semnan: A nested case-control study based on 10 years of surveillance data. Journal of koomesh. 2014; 15 (3):282-288.

32 Jung-Choi K, Khang YH. Contribution of different causes of death to socioeconomic mortality inequality in Korean children aged 1-9: findings from a national mortality follow-up study. J Epidemiol Community Health 2011; 65:124-129.

33 Bradshaw, M., Dymond, P. and Chako, E., 2007, Contemporary World Regional Geography, MC Graw Hill, New York.

34 Billari, F.C. & Kohler, H.P., 2004, Patterns of Low and Lowest – Low Fertility in Europe, Population Studies 58(2), pp. 161-177.

35 Takian A, Doshmangir L, RashidianA. Implementing family physician programme in rural Iran: exploring

the role of an existing primary health care network. Journal of Oxford 2013; 30(5): 551- 559.

36 De Maeseneer J, van Weel C, Egilman D, et al. Strengthening primary care: addressing the disparity between vertical and horizontal investment. Br J Gen Pract 2008; **58(546)**: 3–4.

37 Creating Unity for Action, An Action Plan for Rural Health: World Organisation of Family Doctors (Wonca), Wonca Working Party on Rural Practice 2003. http://www.sbmfc.org.br/media/ file/GT Medicina Rural/ action plan for rural health draft 2003. Pdf (accessed on 1 Jun 2013).