

Access this article online
Quick Response Code:

Website: www.jehp.net
DOI: 10.4103/jehp.jehp_746_22

Maternal health literacy and pregnancy outcomes in Afghanistan

Mehran Rostamzadeh¹, Zainab Ezadi², Maryam Hosseini³, Abbas Ali Hussein⁴

Abstract

BACKGROUND: A healthy pregnancy and its outcomes are highly dependent on maternal health literacy. This is the first study that targets the association between maternal health literacy and pregnancy outcomes of women in Afghanistan.

MATERIALS AND METHODS: This is a cross-sectional study on 200 women who received a prenatal care program and have given birth at Barchi National – 100 beds hospital in Kabul, the capital city of Afghanistan. As a convenient sample, they answered Maternal Health Literacy and Pregnancy Outcome Questionnaire with 5-point Likert scales. We tested the correlation between maternal health literacy and pregnancy outcome scores via the Pearson's correlation coefficient. The potential association of socio-demographic and fertility variables with both maternal health literacy and pregnancy outcome was tested via independent samples *t*-test or one-way ANOVA. All analysis was performed with a 95% confidence level and a significant level was defined as a *P* value ≤ 0.05 .

RESULTS: The maternal health literacy of Afghan women is inadequate. Maternal health literacy is linked to pregnancy outcome, and both were associated with education level, age, number of gravidities, number of received care, and time that onset the prenatal care. Nutshell, we found evidence of a positive and significant correlation between maternal health literacy and pregnancy outcome.

CONCLUSION: This study brings forth the novel data on maternal health literacy of Afghan women, the members of society that face health crises for more than half a century. This study calls for recognition that inadequate maternal health literacy in Afghanistan significantly influences prenatal care quality and perpetuates the biggest challenge for maternal and child health through pregnancy outcomes.

Keywords:

Afghanistan, maternal and child health, maternal health literacy, pregnancy outcome

¹Psychology Department,
Faculty of Economics,
Administrative and Social
Sciences, Istanbul Gelisim
University, Istanbul, Turkey

²Midwifery Faculty, Khatam
Al Nabieen University,
Kabul, Afghanistan,

³School of Medicine,
International Campus,
Shahid Sadoughi

University of Medical
Sciences and Health
Services, Yazd, Iran

⁴Life Science, and
Biomedical Engineering
Application and Research
Center, Istanbul Gelisim
University, Istanbul, Turkey

Address for correspondence:

Dr. Abbas Ali Hussein,
Istanbul Gelisim
University, Life Science,
and Biomedical
Engineering Application
and Research Center,
Istanbul - 34310, Turkey.
E-mail: husseini.hazara@gmail.com

Received: 31-05-2022

Accepted: 05-08-2022

Published: 28-12-2022

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

Introduction

Afghanistan is a country with one of the poorest health indicators worldwide; a country with increasing difficulties in maternal and child health that the maternal mortality rate is estimated at 638 per 100 000 live births, up to three times higher than in neighboring countries.^[1,2] Life under the Taliban has worsened this condition. The United Nations Population Fund (UNFPA) estimates that without immediate support for women and girls, there could be 51,000 additional maternal deaths, 4.8 million unintended pregnancies, and twice as many people who will not be able to access family

planning clinics between now and 2025. Even before the collapse of the government, an Afghan woman died in childbirth every 2 h.^[3]

In Afghanistan, social services and health policies are insufficient, and, thus, individuals' health behavior is an available determinant of health to figure out the health status of a community. Health behavior itself is a multidimensional context influenced by several determinants particularly health literacy (HL).^[4] HL is "the degree to which individuals can obtain, process, and understand basic health information and services needed to make appropriate health decisions".^[5,6] Although studies show women play a critical role in the developing

How to cite this article: Rostamzadeh M, Ezadi Z, Hosseini M, Hussein AA. Maternal health literacy and pregnancy outcomes in Afghanistan. *J Edu Health Promot* 2022;11:421.

HL,^[7] a high percentage of the population of women in Afghanistan is illiterate (75.8% of women).^[8] Hence, Afghan women are a vulnerable group that should be evaluated in terms of HL.

Because safe childbirth has been seriously hampered because of turmoil surrounding the Taliban's takeover of Afghanistan, pregnancy outcomes (PO) are also an important factor to be considered.^[9] PO is highly dependent on maternal health literacy (MHL) defined as "the cognitive and social skills that determine the motivation and ability of women to gain access to, understand, and use information in ways that promote and maintain their health and that of their children".^[10] MHL and the quality of health care received by mothers both affect maternal-fetal complications.^[11] For instance, on one hand, a high level of MHL reduces the risk of pregnancy complications affected by blood pressure and diabetes in women.^[12-14] On the other hand, birth low weight is a risk factor for infant death and is highly associated with prenatal health care and can be prevented via improving MHL.^[15] Despite the significance of MHL, it has not been scrutinized rigorously in non-Western countries, yet^[4] let alone Afghanistan, which is a country with very poor health infrastructure. There is only one study by Harsch *et al.*^[7] that addressed the HL of women in Afghanistan and showed the HL is low even compared to other Asian countries, and education and age are the key determinants of HL.

There are shreds of evidence on the primary role of HL in the optimal use of prenatal health care.^[16] For instance, Howard *et al.*^[17] found women with low HL have poorer health status if they are unable to utilize available prenatal care. They were of the view that low HL is the same as insufficient knowledge of prenatal care. Albeit pregnant women in Afghanistan have poor HL leads to subsequently negative maternal and child health outcomes, the HL of pregnant women is not a matter of health studies in Afghanistan yet, neither as a marginal matter nor the mainstream matter of those studies.^[18]

According to the pieces of evidence mentioned above, Afghanistan is facing insufficient health services rigorously; maternal-fetal complications such as maternal mortality rate, a large number of unintended pregnancies, and low quality of prenatal health care that may get worse among illiterate women. Those issues have been linked with MHL, while the effects of MHL on healthy pregnancy and PO have been ignored. To fill this gap, this study calls for recognition if inadequate MHL in Afghanistan is significantly correlated with PO. We likewise aim to describe the potential relationship between demographic variables with MHL, on one hand, and PO, on the other hand.

Materials and Methods

Study design and setting

We have carried out a cross-sectional study in Barchi National, 100 beds hospital, one of the most densely populated regions of Kabul Province. The Dasht-e-Barchi Hospital, a 100-bed government-run facility, was supported by the International Humanitarian Organization Doctors without Borders also known by its French name Médecins Sans Frontières that runs a maternity clinic therein.

Study participants and sampling

The target population was all women aged 15 years or older who visited Barchi National, 100 beds hospital for routine prenatal care and parturition or childbirth. For 3 months, 20 Jan – 20 March 2020, we have selected 255 women via convenient sampling based on $\pm 5\%$ margin of error, 95% confidence level, and 50% response distribution of population. After excluding reluctant participants,^[13] addicted women,^[19] patients with chronic disease,^[15] and lower-aged younger than 15 years,^[17] participants who answered the questionnaire with consent were 200. The acceptance rate was 78%.

Data collection tool and technique

To increase harmony and control of nuisance variables and because of the high number of illiterates, a trained confederate obtained oral informed consent and collected answers to the questions of the questionnaire orally. All subjects voluntarily participated in this study. They were asked the questions by the researcher's confederate in a designated room within the hospital. The confederate emphasized that the information gathered would be used for scientific study and that personal information, such as name, address, and phone number would not be included. The data collector explained that they could stop the process of answering the questionnaire at any time and decline to answer it if they are not happy doing so. Consequently, respondents were content with the procedure. Hence, none of the respondents refused to answer the questions and all continued to complete the questionnaire. Data were collected by MHL and PO Questionnaire (MHLAPQ), which includes demographic and fertility information, MHL level, and PO, respectively. The MHLAPQ consists of 26 questions on 5-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree, respectively). Out of which, 14 items measure HL and 12 items assess PO, each question was scored from 1 to 5 (strongly disagree, disagree, agree, and strongly agree, respectively). The range of MHL scores is between 14 and 70 (14 indicates inadequate MHL and 70 indicates excellent MHL). The score of PO results is between 12 and 60 (12 indicates negative PO and 60 indicates excellent

PO). The higher the score, the more and better the MHL and positive PO.

The questionnaire was developed by Mojinyinola^[20] with Cronbach’s alpha coefficient of 0.81, tested the validity and reliability of its Persian version by Kharazi *et al.*^[21] with a slightly better Cronbach’s alpha coefficient of 0.89 in the HL section, and 0.67 in the PO section. We used the Persian version updated for Afghanistan in this study. This questionnaire has three sections. The first section of the questionnaire includes demographic variables; the participants’ educational level, the subjects’ occupation, and their family income; the second section includes fertility information, such as gravidity that is defined as the number of times that a woman has been pregnant, the onset of receiving prenatal care, and the number of received care; the third section is for measuring MHL and PO. All these variables were examined for their relations with MHL and PO.

Data analysis

Tables of frequency distribution display the frequency of various data in the samples. Furthermore, a comparison of the MHL, as well as PO, mean score between different categories of demographic and fertility variables was examined via independent samples *T* or one-way ANOVA tests. The Pearson’s correlation coefficient test examined the correlation between MHL and PO scores. The data were analyzed using IBM SPSS 21.0 Statistics software. All analysis was performed with a 95% confidence level and a significant level defined as a *P* value ≤ 0.05 .

Results

In total, 200 women who gave birth at the Barchi National, 100 beds hospital participated in the study. The frequency distribution of demographic and fertility variables is in Tables 1 and 2, respectively. The sample’s ages ranged from 15 and 40 years old with a mean of 26.7 ± 5.6 years old. Regarding education, 70% of participants had secondary level, followed by

23% elementary level, whereas only 7% of those had higher education. Concerning financial ability, 91.5% of participants were housewives, 53% of those had a family monthly income of less than 10,000 AFN. Furthermore, most of the participants (58%) were in the first gravidity. Only 78.5% of women received prenatal care in the first trimester. In addition, 85.5% of women visit health centers less than five times during pregnancy.

The MHL scores of participants were in the range of 27–47, and the mean score of MHL \pm SD was 37.1 ± 2.9 indicates the inadequate level of HL in Afghanistan. Likewise, the mean score of PO \pm SD was 33.1 ± 3.4 . MHL was associated with demographic variables, such as age ($P \leq 0, 0001$), education level ($P = 0.01$), and monthly family income ($P = 0.005$). The majority of participants (89.5%) were in the range of 20–39, which is the peak reproductive years of women.^[22] Both mean MHL and PO scores increased significantly with age ($P \leq 0, 0001$). Compared with participants with lower education (elementary, mean 31.5) and those who earned lower (income 10,000–15,000 Afg, mean 34.2), the mean value of MHL was higher for participants with higher education (secondary, mean 35.9 and tertiary, mean 36.3) and higher-income (>15,000 Afg, mean 36.9). Likewise, there was also a significant association between PO and education level ($P = 0.02$), but no significant relationship with income ($P = 0.07$).

To understand the influence of fertility variables over MHL and subsequently its influence on PO in Afghanistan, the mean value of both MHL and PO scores was assessed among pregnant women based on the number of gravidities, the number of received care, and the onset time of prenatal care. Thus, the prenatal care variables such as number of gravidities ($P = 0.006$), number of received care ($P = 0.03$), and timing of onset of prenatal care ($P = 0.02$) all influenced HL. Except for the number of received care ($P = 0.25$), both the number of gravidities ($P = 0.03$) and timing of onset of prenatal care ($P = 0.0001$) significantly correlated with PO. For instance, compared to women who received prenatal

Table 1: Maternal health literacy and pregnancy outcome scores in terms of demographic variables

Variable	Category	Percent (n)	Maternal Health Literacy			Pregnancy Outcome		
			Mean	SD	Outcome	Mean	SD	Outcome
Age (years)	≤ 20	10.5 (21)	32.9	3.2	$F=33$	29.6	2.6	$F=16.2$
	21-30	69.5 (139)	37.4	2.6	$P \leq 0.0001$	33.4	3.2	$P \leq 0.0001$
	31-40	20 (40)	38.3	2.1		34.2	3	
Education	Elementary	23 (46)	31.5	3.3	$F=4.15$	30.8	2.5	$F=3.69$
	Secondary	70 (140)	35.9	5.6	$P=0.01$	33.5	4.2	$P=0.02$
	Tertiary	7 (14)	36.3	6.4		34.3	5	
Family income	<10,000 Afg	53 (106)	35.8	5.1	$F=5.46$	34.1	4.4	$F=2.6$
	10,000-15,000 Afg	42.5 (85)	34.2	5.2	$P=0.005$	33	4.8	$P=0.07$
	>15,000 Afg	4.5 (9)	36.9	6		34.5	4.6	
Total		100 (200)	37.1	2.9		33.2	3.4	

Table 2: Maternal health literacy and pregnancy outcome scores in terms of fertility variables

Variable	Category	Percent (n)	Maternal health literacy			Pregnancy outcome		
			Mean	SD	Outcome	Mean	SD	Outcome
Number of Gravidity	1 st	58 (116)	34.1	4.6	F=5.27	32.7	3.3	F=3.3
	2 nd	27.5 (55)	34.2	5.3	P=0.006	33.9	3.6	P=0.03
	Third or more	14.5 (29)	36.8	6		34	2.8	
Onset time of prenatal care	1 st trimester	78.5 (157)	36.3	5.6	F=3.5	33.5	3.2	F=9.5
	2 nd trimester	14 (28)	33.7	6.5	P=0.03	33	3.5	P=0.0001
	3 rd trimester	7.5 (15)	33.5	6		29.6	2.8	
Number of received care	<5 visit	85.5 (171)	35.7	5.7	T=3.07	33	3.4	T=1.1
	≥5 visit	14.5 (29)	39.3	6.4	P=0.02	33.8	3.3	P=0.25

care from the second or third trimester, the highest score in MHL and PO was for women who received it from the first trimester of pregnancy. In sum, there was a positive and significant correlation between MHL and PO ($P < 0.00001$).

Discussion

Afghanistan encounters a social crisis. Poverty, illiteracy, insufficient budget for medical care and health, lack of infrastructure, and ethnic and religious prejudice somehow indicate a social collapse. Afghan women are most affected by these issues. Cultural and political challenges along with insecure settings in Afghanistan pose difficulties for the study of women. They are kept illiterate, discriminated against, confined at home, punished, left unattended, abandoned, tortured, and die in childbirth. Because of the ongoing poverty, rebelliousness, chaos, turmoil, and war since 1978, studies and data on health and particularly women’s HL are very rare in Afghanistan. Our aim is, along with presenting descriptive results of our study on Afghan women’s HL, to investigate the relationship between MHL and PO in Afghanistan as a crisis-affected country.

This study has faced limitations related to the instrument, sampling, and data collection. The first limitation is related to the questionnaire (MHLAPQ) to assess MHL and PO, which is only measuring cognitive and individual perspectives of HL and does not assess if they apply the knowledge that they receive during prenatal care or not. Hence, we have found only that the Afghan MHL level is low, but we are unable to specify why it is low and if they use this prominent knowledge.

The second limitation is linked to sampling and collecting data. We did not sample from remote populations across Afghanistan or the province, and we sampled from a known hospital in Kabul, the capital city of Afghanistan. Therefore, the sample and findings are not representative of all Afghan women. However, by choosing all women who received prenatal care and gave birth in one hospital in Kabul, the capital city of Afghanistan, we tried to collect data from a population whose features

are representative of the area. Because of the inability to collect representative data on MHL in Afghanistan for security concerns, we focused on investigating MHL and PO in the city region.

Our study as the first research on MHL in Afghanistan has specifically investigated the association between MHL and PO among women who have given birth in Afghanistan. To the best of our knowledge, there are two studies that have examined the HL of Afghans, but neither of them studies MHL. Wångdahl *et al.*^[23] found that women’s HL level among Afghan refugee women is vastly insufficient, and at the lowest in the world, compared with European and Asian countries and Harsch *et al.*^[7] found that about half of all Afghan women (51.6%) had an inadequate level of HL. One reason for the low level of HL among Afghan women might be that educational attainment, as a key factor of HL, is generally low among Afghan women.^[7] It is estimated that 75.8% of women in Afghanistan are illiterate because of the inaccessibility to education,^[8] high rates of dropout, the number of school-going girls burnt with acid or poisoned, and the number of girls’ schools closed.^[24] In this regard, our findings on the correlation between MHL and PO with higher education level are consistent with both the above finding, and the finding that general education has an effect on increasing HL and that higher education increases PO satisfaction.^[21,23,25-29]

Our concern was whether the mere awareness of health knowledge guarantees its usage by which gives rise to a healthy pregnancy or whether unhealthy pregnancy can be an objective outcome of low MHL. Our study shows a positive and significant correlation between HL and PO ($P < 0.0001$). The low mean value of MHL (37.1 ± 2.9) also indicates an inadequate HL among Afghan women and, subsequently, the adverse influence on PO (33.1 ± 3.4). This finding is consistent with the finding of the study by Kharazi *et al.* that there was a significant relationship between MHL and healthy pregnancy and its outcomes, such as birth weight and anemia.^[21] This result becomes even more important when we consider the widespread repression of Afghan women, for instance, 80% of forced marriage for women,

the marriage of 50% of girls under 12, and 60% of those under 16 with undeveloped wombs who die in labor,^[18] and leads to child mortality high rate (62 per 1,000 births infant mortality rate),^[2] as well as mother mortality rates (638 per 100 000 live births maternal mortality rate).^[1] Our findings along with other studies delineate the depth of maternal and child health challenges in Afghanistan.

There are various visions of HL that indicate HL is not merely the knowledge of health care but is influenced by the ability to receive, understand, and perform the information. For instance, Sørensen *et al.*^[30] stated “Health literacy is closely linked to literacy and entails the knowledge, motivation, and competencies to access, understand, appraise, and apply information to form a judgment and make decisions in terms of healthcare, disease prevention, and health promotion in everyday life during the life course” or Kickbusch *et al.*^[31] explained, “Health literacy is” more than the ability to read and comprehend health information” and includes functional, interactive, and moreover critical HL.^[32] Our study also shows the number of gravidities, educational level, and received prenatal care are significantly related to both MHL and PO variables. Consistent with this result, Forghani *et al.* approved that low HL has adverse effects on receiving health care during pregnancy.^[33] To show the importance of prenatal health care, MacLean (2020) emphasized that the quality of health care received in this period particularly has a direct effect on maternal–fetal complications.^[18] One explanation for the effect of low MHL on the quality of prenatal health care and PO is an inability to understand medical instructions, women’s preventive measures, and using supplementation improperly.^[34] In contrast, high MHL is effective in reducing the rate of preterm delivery,^[35] and improving MHL could prevent low weight that is a risk factor for infant mortality.^[15] In another study by Yee *et al.*,^[36] 73% of women with low HL developed adverse pregnancy complications.

There are other fertility variables, such as the number of gravidities, and time of receiving prenatal care that are not only associated with MHL but also affects PO equally. However, the number of prenatal care is only associated with MHL, not with PO. The result of a study by Ashraf-Ganjoei *et al.*^[37] showed that women with inadequate or late prenatal care had neonates with lower birth weights that were admitted to the intensive care unit. In contrast, Ratzan^[38] found adequate HL reduced preterm delivery. Likewise, Horsager *et al.*^[39] stated that the onset of prenatal care as soon as the first delay of menstruation alleviates complications for the fetus at birth.

In addition, we found an association between demographic variables such as age, women’s education, family income,

and MHL, which is consistent with several studies^[21,23,25-31] and determine the association of such sociodemographic and MHL as well as the quality of PO. In this study, there is a significant relationship between age and both MHL and PO. This is a prominent finding because women with the lowest HL were under the age of 20, Afghan women are exposed to various forms of discrimination and social inequality, for instance, 50% of girls under the age of 12 and 60% of girls under the age of 16 are forced into marriage.^[24] Lack of HL at the age of 20, on one hand, people are physically immature because of the undeveloped wombs, on the other hand, cognitively illiterate because of the high dropout rates, burnt and poisoned with acid, and closing the girls’ schools, makes them unable to fully follow the prenatal health instructions and in turn will have negative consequences for the pregnancy. It is also consistent with the finding that the risk of death in childbirth for girls under 14 is five times higher than for adult women. Afghanistan has one of the highest maternal mortality rates in the world.^[24]

Concerning the relationship between income and PO, we did not find the relationship between PO and family income. Because other research showed that more than half (56.6%) of Afghan women reported at least one pregnancy complication in their recent pregnancy because of undocumented, illiterate, and unemployed Afghan women with lower socioeconomic status being more likely to experience adverse POs. Our finding might relate to the sampling of employed women who had a minimum amount of money to manage their pregnancy.

Given the relationship between education and PO, our finding is consistent with Silva *et al.*^[40] study that the education level of pregnant women was associated with both embryonic development and infants’ birth weight. Income is the other important demographic variable that affects MHL approved in a couple of studies.^[26-29]

In Afghanistan, both education and income are at a critical point because a high percentage of the Afghan population is illiterate with the literacy rate among females at 29.81%, and 54.5% of the population lives below the national poverty line.^[41] However, MHL level affects the quality of pregnancy care.^[42,43] Therefore, it is expected to continue low HL, inadequate prenatal care, negative complications in childbirth, high rate of infant mortality, maternal health barriers, and adverse PO.

All these findings show the importance of the relationship between MHL and its effect on the outcome of a healthy pregnancy and childbirth. Education, relative well-being, sufficient income, social peace, sufficient budget, and proper medical centers are necessary for high quality MHL, which individual and social conditions of living in Afghanistan today do not provide it.

Limitations and suggestions for future studies

We suggest other researchers use a questionnaire to assess MHL and its cognitive and individual perspectives of HL as well as a questionnaire that enables researchers to assess the application of the knowledge that mothers receive during prenatal care.

Not all regions in Afghanistan are secure enough for researchers to easily collect data, particularly when subjects are women. Because women in Afghanistan are confined and excluded from social activity, if we are sampling via a convenient sampling method, the sample and findings are not always representative of all Afghan women and are not accurate and representative of the population. As a solution, we recommend random sampling through social media and Afghan confederates.

Conclusion

The HL among women in Afghanistan is extremely inadequate that significantly influences the prenatal care quality. This study brings forth novel data on MHL of Afghan women, the members of society that face health crises for more than half a century. This study calls for recognition that inadequate MHL in Afghanistan significantly influences prenatal care quality and perpetuates the biggest challenge for maternal and child health in PO. We suggest examining inadequate MHL gives rise to psychological complications, such as guilt feeling, postpartum depression, and psychological reactance in Afghan women. We strongly recommend other researchers to review the limitations mentioned above in this study and compare the relationship between MHL and PO of unemployed women, living in different regions such as rural areas, and create a model including all factors interacting with each other symmetrically.

Acknowledgements

We would like to express our sincere gratitude to Afghan women for participating in the study assiduously. We would especially thank the supervisors of Dasht-e-Barchi Hospital for providing time and location for collecting data and convenient cooperation with research confederates during the study.

Ethical consideration

All participants were provided with informed consent and the study protocol has been approved by the Ethics Committee of the Faculty of midwifery, khatam ul Nabieen University in Kabul, Afghanistan (AF.KNU. REB.1400.39).

Consent to participate

Consent forms were signed by all the participants before being included in the study.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. UNFPA. Midwives deployed to remote Afghanistan to lower maternal death rate. 10 Jul 2018. [Online]. Available from: <https://www.unfpa.org/news/midwives-deployed-remote-afghanistan-lower-maternal-death-rate>.
2. WHO. Global Health Observatory: Afghanistan. 2019. [Online]. Available from: <https://www.who.int/data/gho/data/countries/country-details/GHO/afghanistan?countryProfileId=5f0ca8ad-037c-4241-a792-b3f06bdd40e>. [Last accessed in 2019May 20].
3. Jung E, Maroof H. Giving birth under the Taliban. 2022. [Online]. Available from: <https://www.bbc.com/news/world-asia-58585323>. [Last accessed 2022 Jan 06].
4. McKinn S, Linh DT, Foster K. Distributed health literacy in the maternal health context in Vietnam. *Health Lit Res Pract* 2019;3:e31-42.
5. Morrison AK, Glick A, Yin HS. Health literacy: Implications for child health. *Pediatr Rev* 2019;40:263-77.
6. Guler DS, Sahin S, Ozdemir K, Unsal A, Uslu Yuvaci H. Health literacy and knowledge of antenatal care among pregnant women. *Health Soc Care Community* 2021;29:1815-23.
7. Harsch S, Jawid A, Jawid E, Saboga-Nunes L, Sorensen K, Sahrai D, Bittlingmayer UH. Health literacy and health behavior among women in Ghazni, Afghanistan. *Front Public Health* 2021;9:629334. doi: 10.3389/fpubh.2021.629334.
8. World Fact Book Afghanistan. 2019. [Online]. Available: <https://www.cia.gov/library/publications/the-world-factbook/geos/af.html>. [Last accessed on 2019 May 30].
9. UN. UN commits to long-term support for Afghan mothers and newborns: Najaba's story. 28 October 2021. [Online]. Available from: <https://news.un.org/en/story/2021/10/1104262>.
10. Rowlands G. Health literacy. *Hum Vaccin Immunother* 2014;10:2130-5.
11. Taheri S, Tavousi M, Momenimovahed Z, Direkvand-Moghadam A, Tiznobaik A, Suhrabi Z, *et al.* Development and psychometric properties of maternal health literacy inventory in pregnancy. *PLoS One* 2020;15:e0234305.
12. Kandula NR, Nsiah-Kumi PA, Makoul G, Sager J, Zei CP, Glass S, *et al.* The relationship between health literacy and knowledge improvement after a multimedia type 2 diabetes education program. *Patient Educ Counsel* 2009;75:321-7.
13. Amiresmaili MR, Nekoei Moghadam M, Saberi anari SH, Sadeghi A, Saber M, Taheri G, *et al.* Study of health literacy level of women referring to health centers-2010. *J North Khorasan Univ Med Sci* 2013;5:1071-8.
14. McNaughton CD, Kripalani S, Cawthon C, Mion LC, Wallston KA, Roumie CL. Association of health literacy with elevated blood pressure: A cohort study of hospitalized patients. *Medical Care* 2014;52:346-53.
15. Cho YI, Lee SYD, Arozullah AM, Crittenden KS. Effects of health literacy on health status and health service utilization amongst the elderly. *Soc Sci Med* 2008;66:1809-16.
16. Cha E, Kim KH, Dawkins CR, Bello MK, Umpierrez G, Dunbar SB. Health literacy, self-efficacy, food label use, and diet in young adults. *Am J Health Behav* 2014;38:331-9.
17. Howard DH, Gazmararian J, Parker RM. The impact of low health literacy on the medical costs of Medicare managed care enrollees. *Am J Med* 2005;118:371-7.

18. MacLean L. A literature review of health literacy of adolescents during pregnancy. *NursWomen's Health*2020;24:431-9.
19. Harsch S, Jawid A, Jawid ME, Nunes LS, Sahrai D, Bittlingmayer UH. The relationship of health literacy, wellbeing and religious beliefs in neglected and unequal contexts-Results of a survey study in central Afghanistan. *Health PromotJ Austr*2021;32(Suppl 1):80-7.
20. Mojinyinola J. Influence of maternal health literacy on healthy pregnancy and pregnancy outcomes of women attending public hospitals in Ibadan, Oyo State, Nigeria. *Afr Res Rev*2011;5:28-39.
21. Kharazi SS, Peyman N, Esmaily H. Association between maternal health literacy level with pregnancy care and its outcomes. *Iran J Obstet Gynecol Infertil* 2016;19:40-50.
22. ChenM, Luo Y, Fu J, Wang T, Meng Y, Xu C, *et al.* Reproductive health status and related knowledge among women aged 20-39 years in rural China: Across-sectional study. *Reprod Health* 2020;17:90.
23. Wångdahl J, Lytsy P, Mårtensson L, Westerling R. Health literacy among refugees in Sweden-Across-sectional study. *BMC Public Health* 2014;14:1030.
24. Banerjee N. Center of international policy studies. 06 January 2022. [Online]. Available from: <https://www.cips-cepi.ca/>.
25. Berkman ND, Sheridan SL, Donahue KE, Halpern DJ, Viera A, Crotty K, *et al.* Health literacy interventions and outcomes: An updated systematic review. *Evid Rep Technol Assess* 2011;1-941.
26. Khorasani EC, Peyman N, Esmaily H. Measuring maternal health literacy in pregnant women referred to the healthcare centers of Mashhad, Iran, in 2015. *J Midwifery Reprod Health* 2018;6:1157-62.
27. Safaie SZ, Rahebi SM, Mir Haghjou SN, Kazemnejad Leili E. The relationship between maternal health literacy and pregnancy outcome in postnatal wards. *J Biochem Technol* 2018;2:120-7. ISSN: 0974-2328.
28. Pirzadeh A, Nodooshan T, Nasirian M. Association between maternal health literacy level and prenatal care in Iran. *J Health Lit* 2019;4:60-7.
29. Morad Abadi AS, Agha Molaei T, Ramezankhani A, Dadipoor S. The health literacy of pregnant women in Bandar Abbas, Iran. *Sch Public Health Inst Public Health Res* 2017;15:121-32.
30. Sørensen K, Broucke SVD, Fullam J, Doyle G, Pelikan J, Slonska Z, *et al.* Health literacy and public health: A systematic review and integration of definitions and models. *BMC Public Health* 2012;12:80.
31. Kickbusch I, Pelikan JM, Apfel F, Tsouros AD. Health literacy. The solid facts (2013). 5 Feb 2022. [Online]. Available from: <https://apps.who.int/iris/handle/10665/326432>.
32. Nutbeam D. Health literacy as a public health goal: A challenge for contemporary health education and communication strategies into the 21st century. *Health Promot Int* 2000;15:259-67.
33. Forghani T, Ahmadian M, Rezaeisharif F, Ahadi M. Survey of health literacy during pregnancy and its relationship with prenatal care. *J Health Lit* 2021;6:20-30
34. Morad Abadi AS, Agha Molaei T, Ramezankhani A, Dadipoor S. The health literacy of pregnant women in Bandar Abbas, Iran. *J School Public Health Institute Public Health Res*2017;15:121-32.
35. Quillin JM, Silberg J, Board P, Pratt L, Bodurtha J. College women's awareness and consumption of folic acid for the prevention of neural tube defects. *GenetMed*2000;2:209-13.
36. Yee LM, Simon MA. The role of health literacy and numeracy in contraceptive decision-making for urban Chicago women. *J Community Health*2014;39:394-9.
37. Ashraf-Ganjoei T, Mirzaei F, Anari-Dokht F. Relationship between prenatal care and the outcome of pregnancy in low-risk pregnancies. *Open J Obstet Gynecol*2011;1:109-12.
38. Ratzan SC. Promoting Health Literacy to Encourage Prevention and Wellness: Workshop Summary. Washington, DC: Institute of Medicine. The National Academies Press; 2011. Available from: <https://doi.org/10.17226/13186>.
39. Horsager R, Roberts S, Rogers V, Santiago-Munoz P, Worley K, Hoffman B. Williams Obstetrics, Study Guide. 24th ed. McGraw Hill Professional; 2014.
40. Silva LM, Jansen PW, Steegers EA, Jaddoe VW, Arends LR, Tiemeier H, *et al.* Mother's educational level and fetal growth: The genesis of health inequalities. *Int J Epidemiol* 2010;39:1250-61.
41. Afghanistan - Literacy rate. 05 Feb 2022. [Online]. Available from: <https://countryeconomy.com/demography/literacy-rate/afghanistan>.
42. Asadi L, Amiri F, Safinejad H. Investigating the effect of health literacy level on improving the quality of care during pregnancy in pregnant women covered by health centers. *J Educ Health Promot* 2020;9:286.
43. Akbarinejad F, Soleymani MR, Shahrzadi L. The relationship between media literacy and health literacy among pregnant women in health centers of Isfahan. *J Educ Health Promot* 2017;6:17.