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# Determinants of Health Education Utilization Among Afghan Immigrants in Southeast Iran: An Application of Anderson's Model

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**Abstract:**

***Introduction:*** This study examines the factors that determine the use of educational services as part of primary healthcare for immigrants in Sistan and Balochistan Province, Iran.

***Methods:*** A cross-sectional study selected 1,000 Afghan immigrants (≥18 years) *via* multi-stage sampling. Anderson's behavioral model of health service utilization was employed to assess the effects of predisposing and enabling variables, health behaviors, and needs on the use of health education services. Multivariable logistic regression was used to predict key determinants.

***Results:*** The study revealed that 60% of immigrants received health education in the past year, but only 24.33% found it comprehensible. There were variations in utilization and needs across different ages and genders. While 57.5% of respondents preferred online health education, 88.92% favored receiving health information from their peers, highlighting the value of peer-led education. Health education priorities included prevention/treatment of noncommunicable diseases (32%) and children's healthcare (49.04%). Chi-square tests identified factors such as age, gender, marital status, religion, having children, employment, working hours, health knowledge, and general health status as significant determinants. Logistic regression analysis showed that male immigrants were less likely to utilize four types of health education (communicable and non-communicable diseases, prenatal care, and childcare) compared to females.

***Discussion:*** Our findings reveal a critical disconnect between health education access and comprehension, underscoring urgent needs for culturally/linguistically adapted materials. A pronounced gender disparity emerged, with men significantly underutilizing services across all domains due to occupational barriers and time constraints. Crucially, migrants expressed strong preferences for peer-delivered education and digital platforms, highlighting systemic gaps in current standardized approaches and opportunities for technology-mediated solutions.

***Conclusion:*** Policymakers should focus on removing structural barriers by offering culturally sensitive programs and using AI-driven tools to improve access to health education for immigrants.

**Keywords:** Afghan migrants, Health education utilization, Anderson health service utilization behavioral model, Anderson's Model, Communicable and non-communicable diseases, Prenatal care.



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## 1. INTRODUCTION

Migration presents significant challenges in the areas of social, political, and health issues for destination cities and countries. Immigrants refer to individuals who relocate from their place of birth to another region or country. Most immigrants face many obstacles to accessing public services due to their distinctive cultural, social, and economic characteristics [1]. It is estimated that 740 million immigrants worldwide are currently in movement [2, 3]. Although migrants need to develop their economic, social, and cultural characteristics in line with those of the destination society, various obstacles, such as low wages, low literacy and education levels, inadequate living conditions, and inadequate environmental supports, prevent them from utilization public health services similar to native residents [2-4]. Cultural barriers, social stigma, and discrimination further limit access to healthcare for immigrants. There is an imbalance in the use of primary public health services between the local and migrant populations [5]. It is important to provide accessible and good-quality public health services to migrants [1]. In the process of migration flows, migrants make a significant contribution to the socio-economic development of the city and social stability [6]. Migrants are exposed to various risks that [7] can make them highly vulnerable to health problems. These risks include communicable diseases, noncommunicable diseases, and occupational diseases [8, 9]. Compared to residents, immigrants utilize less health knowledge, and non-communicable diseases are more common among them [6]. As the results of a systematic review showed, immigrants, compared to residents, suffered from poorer health [10]. Also, rural immigrants were more at risk of various diseases than urban immigrants. Immigrants, like all human beings, have the right to equal access to health standards, regardless of their social or economic conditions [11, 2]. The health status and health knowledge of the immigrant population have a significant impact on the social stability and general health of the host country's population [12]. For this reason, it is necessary to provide a suitable bed to provide comprehensive public health services for immigrants. Providing, maintaining, and improving the health of immigrants has been increasingly recognized by various societies and institutions and has attracted international attention [1].

The World Health Organization seeks to improve the health of immigrants and provide for the health needs of immigrants as part of the global agreement [2]. In some societies, the network system of providing public health services has been developed to equalize primary health services [13]. In Iran, the government budget for providing basic health care is one of the vital policies. The construction of public health services has increased [14]. The primary objective of this strategy was to provide equal and accessible public health services to all citizens, as well as to foreign immigrants [14, 15]. If basic health services are not provided to meet their needs, it can create social problems as well as potential threats to the health of residents [13]. The evaluation of the quality of health services is considered one of the basic steps in the development of programs to improve the quality of health services [16]. Service centers providing educational and health resources, staffed by experienced professionals who deliver comprehensive and effective care, are vital for both the local population and immigrants [17]. Current educational content and traditional methods of health education, including face-to-face education, are unable to meet the increasing needs of the general public in the field of health due to a lack of attention to the actual needs of the target population [18]. In order to implement successful policies to address social and health inequalities among immigrant populations, policymakers need to understand what barriers immigrants face and also need to identify and respond to their health needs [2]. The country of Iran, especially the province of Sistan and Balochestan, is home to a large number of Afghan and Pakistani refugees due to its proximity and special geographical and economic conditions. There is a lack of research on the utilization of health education services and the factors influencing it among immigrants.The results of this research are very important for preventing diseases and improving the health of all migrants within the University of Medical Sciences, as well as the health of the indigenous population. This study aims to [1] assess the difference between health education service utilization behaviors and health education needs, and [2] describe the main potential determinants of health education service utilization based on various socio-demographic characteristics, health behavior, and health outcomes for immigrants covered by Zahedan University of Medical Sciences, by Anderson's simplified behavioral model of health service utilization. The comparisons and conclusions can help us to discover barriers to the utilization of health education services by migrants and guide the actions of targeted interventions to improve health literacy, disease control, and health promotion.

### 1.1. Analytical Framework

Utilizing health services does not happen easily and is affected by various factors related to health, socioeconomic factors, and cultural factors [2]. Researchers in the field of health have presented various models to identify factors affecting the utilization of health services, one of the most well-known of which is Anderson's behavioral model of utilization. Based on this behavioral model, the factors related to the utilization of health services are divided into three categories: 1) Predisposing factors include demographic variables that affect the utilization of health services. These variables include gender, age, education, and health beliefs, 2) Enabling factors include conditions that allow a person to meet the need to utilize health services. Variables such as insurance status, economic status, and distance to the service provider are among these factors, 3) Need-related factors include understanding the changes in health status. The severity of the disease and having a disability are among these factors. According to the mentioned model, justice in the utilization of health services occurs when there is a positive and meaningful relationship between the factors related to the need and the utilization of health services. Additionally, the utilization of prevention services is more influenced by predisposing factors and enabling factors, while the

utilization of inpatient services is more influenced by factors related to need [19, 20].

## 2. MATERIALS AND METHODS

### 2.1. Study Type and Sampling Method

This cross-sectional analytical study was conducted in the spring and summer of 2024 among Afghan migrants with legal residency status in Iran. The target population included all foreign nationals residing in cities under the coverage of Zahedan University of Medical Sciences (Zahedan, Mirjaveh, Khash, Saravan, and Sib and Soran). Eligible participants were non-Iranian migrants aged 18 years or older with at least 1 year of residency in the study area, registered in the Integrated Health System (SIB) of local healthcare centers. Exclusion criteria comprised hearing/ visual impairments, psychiatric disorders, unwill-ingness to participate, or incomplete questionnaire res-ponses. A multistage sampling method was employed: first, two comprehensive health service centers were randomly selected from each city. Subsequently, 100 eligible indi-viduals registered in the Integrated Health System (SIB) were selected from each center using random number tables, ultimately yielding a final sample of 1,000 parti-cipants. Sample size adequacy was verified using G Power 3.1 (two-tailed proportion test, α=0.05, power=80%, effect size=0.1), indicating a minimum requirement of 969 subjects – our 1,000-participant cohort thereby enhanced statistical power and generalizability. Precision was assessed through 95% confidence intervals for sample proportions (z=1.96, $p$=0.5, n=1000), calculated as 0.469–0.531 using the standard CI formula (Formula 1), confirming robust population representativeness.

$$CI = P \pm Z \times \sqrt{\left[\frac{P(1-P)}{n}\right]} \qquad \textbf{(Formula 1)}$$

### 2.2. Data Collection Method

The data collection tool is a structured questionnaire that includes four sections as follows: predisposing factors (social-demographic characteristics), enabling factors (individual/ family resources), need factors (general health status), health behavior factors (health-promoting behaviors, health-related behaviors), and health education seeking behavior (receiving or not receiving health education). The validity of the questionnaire was confirmed by a panel of experts (3 health education experts, 5 experts working in health centers, and 2 health managers) (CVR=0.65 and CVI=0.85), and the reliability of the tool was evaluated through internal consistency. Cronbach's alpha was 0.82 among 30 immigrants. The questionnaire was completed face-to-face by the researcher. In this survey, the level of use and needs of health education were measured by answering the following three questions:

1. In the past year, have you received health education service /services?

These services include educational materials, health counseling, training classes, and face-to-face training. If participants received even one form of health education service during the last year, a score of 1 was awarded; otherwise, a score of 0 was awarded.

2. What are the type/types of health education services have you received in the past year?

These services include the prevention and treatment of occupational diseases, children's healthcare, communi-cable diseases, non-communicable diseases, prenatal care, postpartum care, menopause education, aging education, adolescent and youth education, middle-aged education, and oral health education.

3. Which type/types of health education services do you want to receive in the future?

The types of health education services were the same as in question 2. Respondents should answer the question according to their needs.

### 2.3. Ethics Statement

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki for research involving human participants. Prior to the study, necessary approvals were obtained from relevant regulatory bodies, and informed consent was obtained from all participants. Participation was entirely voluntary, and strict confidentiality measures were implemented to protect personal information. Furthermore, all necessary actions were taken to ensure the rights and well-being of participants in compliance with international ethical standards.The present study is the result of a research project approved by the ethics committee of Zahedan University of Medical Sciences with the ethics code IR.ZAUMS.REC.1402.215. The Sex and Gender Equity in Research (SAGER) Guidelines were followed by the authors.

### 2.4. Data Analysis

To analyze differences in categorical variables, the chi-square test was used. Their odds ratios and 95% confidence intervals were calculated using Binary logistic regression analysis. In the first stage, descriptive statistics and the chi-square test were used to classify the use of health education services (health education services received *versus* health education services not received). In the second step, multivariable logistic regression analysis was used to predict the main determining factors in the utilization of migrant health education services and to control possible confounding variables. To describe the data, the mean and standard deviation were used. The significance level for all analyses was considered $p$<0.05.

## 3. RESULTS

In this study, no missing data were reported, as all questionnaires were directly completed by the researcher. All 1,000 participants completed the study process, and their data were considered for analysis (Fig. **1**).

This study conducted empirical analyses examining demographic characteristics, individual and family re-sources, health-related behaviors, and health needs. The complete list of variables included in the empirical analysis is presented in Table **1**.

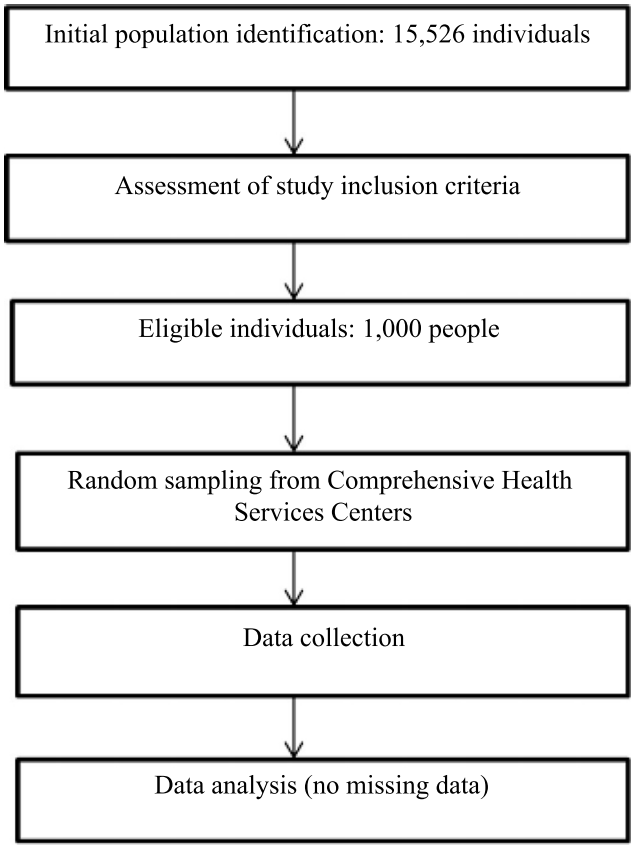


**Fig. (1).** Flow diagram of Afghan immigrant participant selection and study completion.

**Table 1. Variables used in empirical analysis.**

| **Predisposing** | **Demography** | **Age** | **18-24yeras, 25-34, 35-44,45-54, ≥55(Reference group)** |
|---|---|---|---|
| | | **Gender** | **Female(reference group), Male** |
| - | Social structure | Marital status | Unmarried, married, divorced/widowed(Reference group) |
| - | - | Education level | Illiterate, primary school or below, high school, college(Reference group) |
| - | - | Religion | Shia(Reference group), sunni |
| Enabling | Individual resources | Time in the area | <5(Reference group), 5-10, ≥10 |
| - | - | Plan to reside for a long time | No(Reference group), yes |
| - | - | Employment status | Unemployed, housewife, a worker, business(Reference group) |
| - | - | Income monthly | <50000000Rial(Reference), 50000000-100000000, >100000000 |
| - | - | Insurance status | Uninsured, insured(Reference group) |
| - | - | Average daily working time | <8 h(Reference group), 8, >8 |
| - | Family resources | Have at least one child | No(reference group), yeas |
| - | - | Housing source | Own house(Reference group), Rent |
| Health behavior | Health promotion behaviors | Do exercises | Regularly(Reference group), sometimes, not at all |
| - | - | Acquire health knowledge | No(Reference group), yeas |
| - | Health hazard behaviors | Smoking | Regularly(Reference group), sometimes, not at all |
| - | - | Drug use | Regularly(Reference group), sometimes, not at all |
| Need | Having a chronic disease | - | No(Reference group),yes |
| - | Self-evaluation of general health status | - | Excellent(Reference group), good, moderate, poor |

### 3.1. Utilization of Health Education in the Last Year

In this study, 60% of the foreign immigrants received health education services during the last year. The health education provided was understandable for only 24.33% of the immigrants. The characteristics of the samples are presented in Table 2. A total of 1000 foreign immigrants (425 men and 575 women) in the area covered by the Zahedan University of Medical Sciences (Sistan and Balochistan, Iran) over 18 years of age were examined. The age of the immigrants ranged from 18 to 79 years, with an average age of 32.75 ± 13.16 years.

**Table 2. Information on health education received by migrants in different characteristics.**

| Variables | Total | Migrants (N=1000) | | $X^2$ | *p* |
|---|---|---|---|---|---|
| | | Received Health Education n(%) | Did not Receive Health Education n(%) | | |
| Predisposing | - | - | - | - | - |
| Gender | - | - | - | 1.880 | <0.001 |
| Female | 575(57.5) | 450(75) | 125(31.25) | - | - |
| Male | 425(42.5) | 150(25) | 275(68.75) | - | - |
| Age | - | - | - | 10.514 | 0.033 |
| 18-24 | 313(31.3) | 186(31) | 127(31.75) | - | - |
| 25-34 | 301(30.1) | 189(31.5) | 112(28) | - | - |
| 35-44 | 190(19) | 124(20.66) | 66(16.5) | - | - |
| 45-55 | 116(11.6) | 64 (10.67) | 52(13) | - | - |
| ≥55 | 80(8) | 37 (6.17) | 43(10.75) | - | - |
| Religion | - | - | - | - | - |
| Shia | 78(7.8) | 56(9.34) | 22(5.5) | 4.904 | 0.027 |
| Sunni | 922(92.2) | 544(90.66) | 378(94.5) | - | - |
| Marital status | - | - | - | 79.257 | <0.001 |
| Unmarried | 148(14.8) | 41(6.84) | 107(26.75) | - | - |
| married | 819(81.9) | 532(88.66) | 287(71.75) | - | - |
| Divorced/Widowed | 33(3.3) | 27(4.5) | 6(1.5) | - | - |
| Education Level | - | - | - | 6.986 | 0.072 |
| Illiterate | 726(72.6) | 419(69.83) | 307(76.75) | - | - |
| Primary school or below | 210(21) | 135(22.5) | 75(18.75) | - | - |
| High school | 56(5.6) | 40(6.67) | 16(4) | - | - |
| College | 8(0.8) | 6(1) | 2(0.5) | - | - |
| Enabling variables | - | - | - | - | - |
| Income monthly | - | - | - | 3.873 | 0.144 |
| <50000000 Rial | 23(2.3) | 17(2.83) | 6(1.5) | - | - |
| 50000000-100000000 | 511(51.1) | 294(49) | 217(54.25) | - | - |
| ≥100000000 | 466(46.6) | 289(48.17) | 177(44.25) | - | - |
| Time residing in the area | - | - | - | 2.053 | 0.358 |
| <5 years | 224(22.4) | 142(23.67) | 82(20.5) | - | - |
| 5-10 | 156(15.6) | 96(16) | 60(15) | - | - |
| >10 | 620(62) | 362(60.33) | 258(64.5) | - | - |
| Plan to reside for a long time in the area | - | - | - | 0.833 | 0.659 |
| No | 192(19.2) | 118(19.67) | 74(18.5) | - | - |
| Yes | 808(80.8) | 482(80.33) | 326(81.5) | - | - |
| Have at least one child | - | - | - | 60.366 | <0.001 |
| No | 189(18.9) | 66(11) | 123(30.75) | - | - |
| Yes | 811(81.1) | 534(89) | 277(69.25) | - | - |
| Employment status | - | - | - | 2.012 | <0.001 |
| Unemployed | 95(9.5) | 41(6.83) | 54(13.5) | - | - |

*(Table 2) contd.....*

| Variables | Total | Migrants (N=1000) | | $X^2$ | *p* |
|---|---|---|---|---|---|
| | | Received Health Education n(%) | Did not Receive Health Education n(%) | | |
| Housewife | 468(46.8) | 387(64.5) | 81(20.25) | - | - |
| Aworker | 366(36.6) | 139(23.17) | 227(56.75) | - | - |
| Business | 71(7.1) | 33(5.5) | 38(9.5) | - | - |
| Housing source | - | - | - | 0.921 | 0.337 |
| Own house | 130(13) | 83(13.83) | 47(11.75) | - | - |
| Rent | 870(87) | 517(86.17) | 353(88.25) | - | - |
| Insurance | - | - | - | 5.327 | 0.070 |
| Uninsured | 970(97) | 577(96.17) | 393(98.25) | - | - |
| Insured | 30(3) | 23(3.83) | 7(1.75) | - | - |
| Average daily working time | - | - | - | 1.002 | <0.001 |
| <8 | 582(58.2) | 430(71.67) | 152(38) | - | - |
| 8 | 119(11.9) | 53(8.83) | 66(16.5) | - | - |
| >8 | 299(29.9) | 117(19.5) | 182(45.5) | - | - |
| Health behavior | - | - | - | - | - |
| Health promotion behaviors | - | - | - | - | - |
| Do exercise | - | - | - | 34.713 | <0.001 |
| Regularly | 95(9.5) | 34(5.67) | 61(15.25) | - | - |
| Sometimes | 209(20.9) | 112(18.67) | 97(24.25) | - | - |
| Not at all | 696(69.6) | 454(75.66) | 242(60.5) | - | - |
| Acquire health knowledge | - | - | - | 8.558 | <0.001 |
| Yes | 600(60) | 582(97) | 18(4.5) | - | - |
| No | 400(40) | 18(3) | 382(95.5) | - | - |
| Health hazard behaviors | - | - | - | - | - |
| Smoking | - | - | - | 12.497 | 0.002 |
| Regularly | 85(8.5) | 36(6) | 49(12.25) | - | - |
| Smetimes | 177(17.7) | 113(18.83) | 64(16) | - | - |
| Not at all | 738(73.8) | 451(75.17) | 287(71.75) | - | - |
| Drug use | - | - | - | 3.649 | 0.161 |
| Regularly | 12(1.2) | 7(1.17) | 5(1.25) | - | - |
| Smetimes | 60(6) | 29(4.83) | 31(7.75) | - | - |
| Not at all | 928(92.8) | 564(94) | 364(91) | - | - |
| Need variables | - | - | - | - | - |
| Having chronic disease | - | - | - | 10.989 | 0.001 |
| Yes | 168(16.8) | 120(20) | 48(12) | - | - |
| No | 832(83.2) | 480(80) | 352(88) | - | - |
| Self-evaluation general health status | - | - | - | 35.534 | <0.001 |
| Exellent | 228(22.8) | 100(16.67) | 128(32) | - | - |
| Good | 479(47.9) | 322(53.66) | 157(39.25) | - | - |
| Moderate | 261(26.1) | 160(26.67) | 101(25.25) | - | - |
| Poor | 32(3.2) | 18(3) | 14(3.5) | - | - |

Fourth, the main ways that foreign immigrants have obtained health information include: health counseling by health workers (74.4%), broadcast of television educational programs (15%), participation in training classes and lectures (3.7%), and educational materials such as pamphlets and tracts (3.3%). 57.5 percent of immigrants wanted to obtain health information through the Internet and virtual spaces. Additionally, 88.92 percent wanted to receive health information through their compatriots.

Descriptive statistics and Chi-square tests were used to describe the information and analyze the factors influencing the utilization of health education based on socio-

demographic factors. The chi-square test showed that age, gender, marital status, religion, having at least one child, employment status, Average daily working time, exercise, health knowledge, smoking, and Self-assessment of general health status are the determining factors influencing immigrants to receive health education (Table **2**).

Gender, religion, monthly income, length of stay, planning for long-term stay, employment status, housing status, average daily working time, doing sports, acquiring health knowledge, smoking, drug use, having a chronic disease, and self-evaluation of general health are among the factors influencing immigrants to receive health education on communicable diseases. Furthermore, gender, age, marital status, education level, monthly income, length of stay, having at least one child, employment status, average daily work time, acquiring health knowledge, having a chronic disease, and self-assessment of general health are important factors that influence immigrants to receive noncommunicable disease health education.

Additionally, gender, age, marital status, having at least one child, employment status, average daily working hours, doing sports, acquiring health knowledge, smoking, drug use, and self-evaluation are the most important factors that influence immigrants to receive antenatal care health education.

Similarly, gender, age, marital status, having at least one child, employment status, average daily working time, doing sports, acquiring health knowledge, smoking, drug use, having a chronic disease, and self-evaluation of general health are important influencing factors on receiving child care health education among immigrants (Table **3**).

**Table 3. Information on the four types of health education received by migrants in different characteristics.**

| Variables | Receive CD Health Education, n(%) | | Receive NCD Health Education, n(%) | | Receive Prenatal Health Education, n(%) | | Receive Child Health Education, n(%) | |
|---|---|---|---|---|---|---|---|---|
| - | Yes | No | Yes | No | Yes | No | Yes | No |
| **Predisposing** | - | - | - | - | - | - | - | - |
| Gender | $X^2$ | 28.175 | - | 7.865 | - | 11.988 | - | 13.593 |
| - | *p* | 0.001 | - | 0.005 | - | <0.001 | - | <0.001 |
| Female | 128(56.39) | 447(57.83) | 65(50.39) | 510(58.55) | 420(70) | 155(38.75) | 196(63.43) | 379(54.85) |
| Male | 99(43.61) | 326(42.22) | 64(49.61) | 361(41.45) | 180(30) | 245(61.25) | 113(36.57) | 312(45.15) |
| Age | $X^2$ | 31.109 | - | 16.007 | - | 51.104 | - | 36.543 |
| - | *p* | 0.700 | - | 0.003 | - | <0.001 | - | <0.001 |
| 18-24 | 78(35.45) | 235(30.13) | 44(35.2) | 269(30.74) | 97(42.17) | 216(28.05) | 98(32.89) | 215(30.63) |
| 25-34 | 63(28.64) | 238(30.51) | 34(27.2) | 267(30.52) | 82(35.66) | 219(28.45) | 92(30.87) | 209(29.77) |
| 35-44 | 48(21.82) | 142(18.21) | 18(14.4) | 172(19.66) | 40(17.39) | 150(19.48) | 51(17.11) | 139(19.80) |
| 45-55 | 20(9.09) | 96(12.31) | 19(15.2) | 97(11.08) | 8(3.48) | 108(14.02) | 37(12.42) | 79(11.25) |
| ≥55 | 11(5) | 69(8.84) | 10(8) | 70(8) | 3(1.30) | 77(10) | 20(6.71) | 60(8.55) |
| Religion | $X^2$ | 25.281 | - | 0.041 | - | 0.735 | - | 0.228 |
| - | *p* | 0.003 | - | 0.840 | - | 0.399 | - | 0.636 |
| Shia | 11(4.85) | 67(8.67) | 10(7.75) | 68(7.80) | 21(9.13) | 57(7.40) | 17(5.50) | 61(8.83) |
| Sunni | 216(95.15) | 706(91.33) | 119(92.25) | 803(92.20) | 209(90.87) | 713(92.60) | 292(94.50) | 630(91.17) |
| Marital status | $X^2$ | 18.157 | - | 10.748 | - | 43.404 | - | 60.678 |
| - | *p* | 0.445 | - | 0.005 | - | <0.001 | - | <0.001 |
| Unmarried | 38(16.74) | 110(14.23) | 25(19.38) | 123(14.12) | 3(1.30) | 145(18.83) | 35(11.33) | 113(16.35) |
| Married | 180(79.30) | 639(82.67) | 102(79.07) | 717(82.32) | 217(94.35) | 602(78.18) | 264(85.44) | 555(80.32) |
| Divorced/Widowed | 9(3.96) | 24(3.10) | 2(1.55) | 31(3.56) | 10(4.35) | 23(2.99) | 10(3.23) | 23(3.33) |
| Education Level | $X^2$ | 29.061 | - | 18.562 | - | 1.026 | - | 4.175 |
| - | *p* | 0.358 | - | <0.001 | - | 0.795 | - | 0.243 |
| Illiterate | 172(75.77) | 554(71.67) | 93(72.10) | 633(72.67) | 171(74.35) | 555(72.08) | 231(74.76) | 495(71.63) |
| Primary school or below | 36(15.86) | 174(22.51) | 28(21.70) | 182(20.90) | 47(20.43) | 163(21.17) | 62(20.06) | 148(21.42) |
| High school | 15(6.61) | 41(5.30) | 7(5.43) | 49(5.63) | 10(4.35) | 46(5.97) | 16(5.18) | 40(5.79) |
| College | 4(1.76) | 4(0.52) | 1(0.77) | 7(0.80) | 2(0.87) | 6(0.78) | 0(0) | 8(1.16) |
| Enabling variables | - | - | - | - | - | - | - | - |
| Income monthly | $X^2$ | 49.209 | - | 9.750 | - | 1.888 | - | 1.192 |
| - | *p* | <0.001 | - | 0.008 | - | 0.389 | - | 0.551 |

*(Table 3) contd.....*

| Variables | Receive CD Health Education, n(%) | | Receive NCD Health Education, n(%) | | Receive Prenatal Health Education, n(%) | | Receive Child Health Education, n(%) | |
|---|---|---|---|---|---|---|---|---|
| - | Yes | No | Yes | No | Yes | No | Yes | No |
| <50000000 Rial | 6(2.64) | 17(2.20) | 3(2.32) | 20(2.30) | 6(2.60) | 17(2.21) | 11(3.58) | 12(1.73) |
| 50000000-100000000 | 128(56.39) | 383(49.55) | 61(47.29) | 450(51.66) | 126(54.54) | 385(50.07) | 184(59.94) | 327(47.19) |
| ≥100000000 | 93(40.97) | 373(48.25) | 65(50.39) | 401(46.04) | 99(42.86) | 367(47.72) | 112(36.48) | 354() |
| Time residing in the area | $X^2$ | 61.238 | - | 14.858 | - | 3.222 | - | 4.916 |
| - | *p* | <0.001 | - | <0.001 | - | 0.200 | - | 0.086 |
| <5 years | 50(22.03) | 174(22.51) | 17(13.18) | 207(23.76) | 62(26.84) | 162(21.07) | 96(31.27) | 128(18.47) |
| 5-10 | 32(14.10) | 124(16.04) | 28(21.71) | 128(14.70) | 34(14.72) | 122(15.86) | 58(18.89) | 98(14.14) |
| >10 | 145(63.87) | 475(61.45) | 84(65.11) | 536(61.54) | 135(58.44) | 485(63.07) | 153(49.84) | 467(67.39) |
| Have at least one child | $X^2$ | 13.517 | - | 8.599 | - | 20.517 | - | 88.694 |
| - | *p* | 0.141 | - | 0.033 | - | <0.001 | - | <0.001 |
| No | 44(20.46) | 145(18.47) | 25(19.84) | 164(18.76) | 23(9.31) | 166(22.04) | 40(13.38) | 149(21.25) |
| Yes | 171(79.54) | 640(81.53) | 101(80.16) | 710(81.24) | 224(90.69) | 587(77.96) | 259(86.62) | 552(78.75) |
| Plan to reside for a long time | $X^2$ | 55.539 | - | 4.679 | - | 0449 | - | 2.646 |
| - | *p* | <0.001 | - | 0.096 | - | 0.799 | - | 0.226 |
| No | 54(23.79) | 138(17.85) | 24(18.60) | 168(19.29) | 46(20) | 146(18.96) | 29(9.39) | 163(23.59) |
| Yes | 173(76.21) | 635(82.15) | 105(81.40) | 703(80.71) | 184(80) | 624(81.04) | 280(90.61) | 528(76.41) |
| Employment status | $X^2$ | 66.715 | - | 11.833 | - | 2.305 | - | 2.048 |
| - | *p* | 0.001 | - | 0.019 | - | <0.001 | - | <0.001 |
| Unemployed | 21(9.25) | 74(9.57) | 20(15.15) | 75(8.64) | 8(3.48) | 87(11.30) | 25(8.09) | 70(10.13) |
| Housewife | 102(44.93) | 366(47.35) | 44(33.33) | 424(48.85) | 208(90.43) | 260(33.77) | 164(53.07) | 304(44) |
| Aworker | 87(38.33) | 279(36.09) | 57(43.18) | 309(35.60) | 12(5.22) | 354(45.97) | 108(34.95) | 258(37.34) |
| Business | 17(7.49) | 54(6.99) | 11(8.34) | 60(6.91) | 2(0.87) | 69(8.96) | 12(3.89) | 59(8.53) |
| Housing source | $X^2$ | 85.028 | - | 0.930 | - | 1.199 | - | 0.025 |
| - | *p* | <0.001 | - | 0.335 | - | 0.274 | - | 0.874 |
| Own house | 24(10.57) | 106(13.71) | 23(17.83) | 107(12.28) | 22(9.69) | 108(13.97) | 16(5.18) | 114(16.50) |
| Rent | 203(89.43) | 667(86.29) | 106(82.17) | 764(87.72) | 205(90.31) | 665(86.03) | 293(94.82) | 577(83.50) |
| Insurance | $X^2$ | 23.955 | - | 0.265 | - | 5.605 | - | 0.650 |
| - | *p* | 0.157 | - | 0.867 | - | 0.061 | - | 0.723 |
| Uninsured | 219(96.90) | 751(97.03) | 128(99.22) | 842(96.68) | 220(95.65) | 750(97.40) | 301(97.73) | 669(96.68) |
| Insured | 7(3.10) | 23(2.97) | 1(0.78) | 29(3.32) | 10(4.35) | 20(2.60) | 7(2.27) | 23(3.32) |
| Average daily working time | $X^2$ | 62.370 | - | 14.855 | - | 95.053 | - | 11.793 |
| - | *p* | <0.001 | - | 0.001 | - | <0.001 | - | <0.001 |
| <8 | 125(61.28) | 457(57.41) | 46(46) | 536(59.55) | 196(79.67) | 386(51.19) | 186(66.43) | 396(55) |
| 8 | 19(9.31) | 100(12.57) | 23(23) | 96(10.67) | 11(4.47) | 108(14.32) | 29(10.36) | 90(12.5) |
| >8 | 60(29.41) | 239(30.02) | 31(31) | 268(29.78) | 39(15.86) | 260(34.49) | 65(23.21) | 234(32.5) |
| Health behavior | - | - | - | - | - | - | - | - |
| Health promotion behaviors | - | - | - | - | - | - | - | - |
| Do excercise | $X^2$ | 59.081 | - | 2.675 | - | 40.535 | - | 54.924 |
| - | *p* | <0.001 | - | 0.262 | - | <0.001 | - | <0.001 |
| Regularly | 33(14.54) | 62(8.02) | 14(10.85) | 81(9.30) | 5(2.17) | 90(11.69) | 18(5.82) | 77(11.14) |
| Sometimes | 48(21.14) | 161(20.83) | 32(24.81) | 177(20.32) | 27(11.74) | 182(23.64) | 43(13.92) | 166(24.02) |
| Not at all | 146(64.32) | 550(71.15) | 83(64.34) | 613(70.38) | 198(86.09) | 498(64.67) | 248(80.26) | 448(64.84) |
| Acquire health knowledge | $X^2$ | 45.522 | - | 11.492 | - | 10.880 | - | 2.591 |
| - | *p* | <0.001 | - | <0.001 | - | <0.001 | - | <0.001 |

*(Table 3) contd.....*

| Variables | Receive CD Health Education, n(%) | | Receive NCD Health Education, n(%) | | Receive Prenatal Health Education, n(%) | | Receive Child Health Education, n(%) | |
|---|---|---|---|---|---|---|---|---|
| - | Yes | No | Yes | No | Yes | No | Yes | No |
| Yes | 140(61.95) | 460(59.43) | 58(45.31) | 542(62.16) | 227(99.13) | 373(48.38) | 215(69.80) | 385(55.63) |
| No | 86(38.05) | 314(40.57) | 70(54.69) | 330(37.84) | 2(0.87) | 398(51.62) | 93(30.20) | 307(44.37) |
| **Health hazard behaviors** | - | - | - | - | - | - | - | - |
| Smoking | $X^2$ | 34.436 | - | 2.773 | - | 12.181 | - | 13.167 |
| - | *p* | 0.011 | - | 0.250 | - | 0.002 | - | 0.001 |
| Regularly | 15(6.61) | 70(9.06) | 20(15.50) | 65(7.46) | 8(3.48) | 77(10) | 29(9.38) | 56(8.10) |
| Smetimes | 34(14.98) | 143(18.50) | 31(24.03) | 146(16.77) | 35(15.22) | 142(18.44) | 47(15.21) | 130(18.82) |
| Not at all | 178(78.41) | 560(72.44) | 78(60.47) | 660(75.77) | 187(81.30) | 551(71.56) | 233(75.41) | 505(73.08) |
| Drug use | $X^2$ | 40.489 | - | 0.397 | - | 7.739 | - | 28.333 |
| - | *p* | 0.002 | - | 0.820 | - | 0.021 | - | 0.001 |
| Regularly | 1(0.44) | 11(1.42) | 3(2.32) | 9(1.03) | 1(0.43) | 11(1.43) | 6(1.94) | 6(0.87) |
| Smetimes | 12(5.29) | 48(6.21) | 14(10.85) | 46(5.28) | 6(2.61) | 54(7.01) | 6(1.94) | 54(7.81) |
| Not at all | 214(94.27) | 714(92.37) | 112(86.83) | 816(93.69) | 223(96.96) | 705(91.56) | 297(96.12) | 631(91.32) |
| **Need variables** | - | - | - | - | - | - | - | - |
| Having a chronic disease | $X^2$ | 17.877 | - | 99.243 | - | 3.754 | - | 12.690 |
| - | *p* | 0.037 | - | <0.001 | - | 0.053 | - | <0.001 |
| Yes | 31(13.66) | 137(17.72) | 33(25.58) | 135(15.50) | 29(12.61) | 139(18.05) | 49(15.86) | 119(17.22) |
| No | 196(86.34) | 636(82.28) | 96(74.42) | 736(84.50) | 201(87.39) | 631(81.95) | 260(84.14) | 572(82.78) |
| Self-evaluation of general health status | $X^2$ | 72.323 | - | 14.233 | - | 31.262 | - | 38.907 |
| - | *p* | <0.001 | - | 0.003 | - | <0.001 | - | <0.001 |
| Exellent | 57(25.11) | 171(22.12) | 24(18.60) | 204(23.42) | 36(15.66) | 192(24.93) | 76(24.60) | 152(22) |
| Good | 115(50.67) | 364(47.09) | 62(48.06) | 417(47.88) | 145(63.04) | 334(43.38) | 161(52.10) | 318(46.02) |
| Moderate | 49(21.58) | 212(27.43) | 36(27.91) | 225(25.83) | 48(20.87) | 213(27.66) | 63(20.39) | 198(28.65) |
| Poor | 6(2.64) | 26(3.36) | 7(5.43) | 25(2.87) | 1(0.43) | 31(4.03) | 9(2.91) | 23(3.33) |

**Note:** CD: communicable diseases, NCD: noncommunicable diseases.

Table **4** indicates that the most common health education topics received by male immigrants are as follows: prevention and treatment of communicable diseases (19.06%), prevention and treatment of noncommunicable diseases (16.71%), health care during pregnancy (9.41%), and prevention and treatment of occupational diseases (6.59%). However, the five main types of health education that male immigrants wanted to receive were: prevention and treatment of noncommunicable diseases (32%), oral and dental health care (31.05%), children's health care (29.41%), elderly health care (26.12%), and adolescent and youth health care (24.23%).

The four health topics that immigrant women have received the most health education on are: children's healthcare (46.26%), pregnancy healthcare (39.13%), prevention and treatment of communicable diseases (25.39%), and prevention and treatment of non-communicable diseases (24%).

However, the five main types of health education that immigrant women wanted to receive were children's health care (49.04%), prevention and treatment of non-communicable diseases (30.61%), elderly health care (21.56%), prevention and treatment of communicable diseases (20.52%), and health care during pregnancy (20.52%).

The multivariate logistic regression model of the findings shows that all models discriminated between immigrants who received health education and those who did not receive health education. All predictors were statistically significant at the $p < 0.05$ level.

In the model summary, Model[a] explained between 25% (Cox and Snell R-squared) and 33.8%(Nagelkerke R-squared) of the variance in health education utilization as a whole. Model[b] explained between 5% (Cox and Snell R-squared) and 7.6%(Nagelkerke R-squared) of the variance in CD health education utilization as a whole. Model[c] explained between 6.8% (Cox and Snell R-squared) and 10.7%(Nagelkerke R-squared) of the variance in NCD health education utilization as a whole. Model[d] explained between 13.7% (Cox and Snell R-squared) and 33.5% (Nagelkerke R-squared) of the variance in prenatal health education utilization as a whole. Model[e] explained between 25% (Cox and Snell R-squared) and 35.3%(Nagelkerke R-squared) of the variance in child health education utilization as a whole (Table **5**).

**Table 4. Main categories of health education and migrants' expectations to receive by gender.**

| Types | Received n(%) | | p | Hope to Receive n(%) | | p |
|---|---|---|---|---|---|---|
| | Male | Female | | Male | Female | |
| Occupation disease prevention | 28(6.59) | 5(0.86) | <0.001 | 68(16) | 12(2.08) | <0.001 |
| Child health care | 40(9.41) | 266(46.26) | <0.001 | 125(29.41) | 282(49.04) | <0.001 |
| CD prevention | 81(19.06) | 146(25.39) | 0.018 | 96(22.59) | 118(20.52) | 0.431 |
| NCD prevention | 71(16.71) | 138(24) | 0.005 | 136(32) | 176(30.61) | 0.639 |
| Prenatal health care | 5(1.17) | 225(39.13) | <0.001 | 9(2.12) | 118(20.52) | <0.001 |
| Postpartum health care | 0(0) | 74(12.87) | <0.001 | 3(0.70) | 115(20) | <0.001 |
| Menopause health care | 1(0.23) | 24(4.17) | <0.001 | 6(1.41) | 53(9.21) | <0.001 |
| Aged health care | 14(3.29) | 27(4.69) | 0.269 | 111(26.12) | 124(21.56) | 0.093 |
| Adolescent health care | 8(1.88) | 47(8.17) | <0.001 | 103(24.23) | 108(18.78) | 0.037 |
| Middle-aged health care | 23(5.41) | 28(4.87) | 0.700 | 83(19.53) | 96(16.69) | 0.248 |
| Oral health care | 21(4.94) | 28(4.87) | 0.959 | 132(31.05) | 117(20.35) | <0.001 |

**Table 5. Model summary of health education utilization of migrants.**

| - | -2Log Likelihood | Cox and Snell R Square | Nage lkerke R Square |
|---|---|---|---|
| Model [a] | 1058.361 | 0.250 | 0.338 |
| Model[b] | 1019.973 | 0.050 | 0.076 |
| Model[c] | 954.515 | 0.068 | 0.107 |
| Model[d] | 379.963 | 0.137 | 0.335 |
| Model[e] | 994.034 | 0.250 | 0.353 |

**Note:** Model[a]: Binary logistic regression analysis of predictors of health education utilization of migrants, $X^2 = 17.549$, $p=0.025$.
Model[b]: Binary logistic regression analysis of predictors of CD health education utilization of migrants, $X^2 = 51.279$, $p<0.001$.
Model[c]: Binary logistic regression analysis of predictors of NCD health education utilization of migrants, $X^2 = 70.742$, $p<0.001$.
Model[d]: Binary logistic regression analysis of predictors of prenatal health education utilization of migrants, $X^2 = 147.766$, $p<0.001$.
Model[e]: Binary logistic regression analysis of predictors of child health education utilization of migrants, $X^2 = 287.691$, $p<0.001$.

Table **6** predicts the determinants of the use of health education for immigrants (Model[a]) with multivariable logistic regression. The model[a] shows that immigrants aged 18–24, 25–34, and 35–44 years old in the past year had 2.197 times (OR = 2.197, 95% CI: 1.283, 3.262), 1.944 times (OR = 1.944, 95% CI: 1.777, 3.211), and 1.657 times (OR = 1.657, 95% CI: 1.008, 2.725) higher chances to receive health education, respectively, compared with the group aged 55 years and older. Male immigrants, compared to females, had 0.152 times (OR = 0.152, 95% CI: 0.114, 0.201) less chance to receive health education in the last year. Single immigrants and those who had at least one child in Iran had 0.085 times (OR = 0.085, 95% CI: 0.033, 0.221) and 0.275 times (OR = 0.275, 95% CI: 0.196, 0.385) lower likelihood, respectively, of receiving health education in the last year.

In the past year, housewives, workers, unemployed immigrants, and immigrants with an average daily work-day of less than 8 hours were 12.496 times (OR=12.469, 95%-CI: 8.049, 19.400), 2.271 times (OR=2.271, 95%-CI: 1.253,4.117), 1.986 times (OR=1.986, 95%-CI: 1.141, 3.437), and 4.351 times (OR=4.351, 95%-CI: 3.165, 5.982) more likely to receive health education, respectively. Immigrants who sometimes, as well as those who exercised regularly, had 0.615 times (OR=0.615, 95%-CI: 0.450, 0.842), 0.297 times (OR=0.297, 95%-CI: 0.190, 0.465) less chance to receive health education in the last year, respectively.

In addition, the probability of receiving health education in immigrants with poor health status was **2.625 times** (OR = 2.625, 95% CI: 1.889, 3.629), with moderate status was **2.028 times** (OR = 2.028, 95% CI: 1.413, 2.910), and with good health status, it increased by **1.646 times** (OR = 1.646, 95% CI: 0.781, 3.469) compared to people who evaluated their health status as high.

Additionally, immigrants with a chronic disease were 1.833 times (OR=1.833, 95% CI: 1.277, 2.633) more likely to receive health education in the last year than those without a chronic disease.

**Table 6. Analysis of factors influencing the utilization of health education among migrants using multivariate logistic regression.**

| Variables in the Equation | Model[a] | - | - | - |
|---|---|---|---|---|
| | B (SE) | Wald | OR[95%-CI] | *p* |
| Predisposing variables | - | - | - | - |
| Age(Ref= ≥55) | - | - | - | - |
| 18-24 | 0.505(0.254) | 3.958 | 1.657[1.008, 2.725] | 0.047 |
| 25-34 | 0.665(0.256) | 6.751 | 1.944[1.177, 3.211] | 0.009 |
| 35-44 | 0.787(0.274) | 8.228 | 2.197[1.283, 3.762] | 0.004 |
| 45-54 | 0.350(0.297) | 1.386 | 1.419[0.792, 2.541] | 0.239 |
| Gender(Ref= Femal) | - | - | - | - |
| Male | -1.887(0.143) | 173.495 | 0.152[0.114, 0.201] | <0.001 |
| Marital stutes(Ref=Divorced) | - | - | - | - |
| Unmarried | -2.463(0.487) | 25.556 | 0.085[0.033, 0.221] | <0.001 |
| married | -0.887(0.457) | 3.763 | 0.412[0.168, 1.009] | 0.052 |
| Enabling variables | - | - | - | - |
| Have at least one child(Ref=No) | - | - | - | - |
| Yes | -1.292(0.172) | 56.138 | 0.275[0.196, 0.385] | <0.001 |
| Employment stutes(Ref=Business) | - | - | - | - |
| Unemployed | 0.686(0.280) | 6.006 | 1.986[1.141, 3.437] | 0.014 |
| Housewife | 2.525(0.224) | 126.603 | 12.496[8.049, 19.400] | <0.001 |
| A worker | 0.820(0.303) | 7.310 | 2.271[1.253, 4.117] | 0.007 |
| Average daily worling time(Ref=>8) | - | - | - | - |
| <8h | 1.470(0.162) | 81.991 | 4.351[3.165, 5.982] | <0.001 |
| 8h | 0.111(0.231) | 0.233 | 1.118[0.711, 1.756] | 0.629 |
| Health behavior | - | - | - | - |
| Health promotion behavior | - | - | - | - |
| Do exercise(Ref= Not at all) | - | - | - | - |
| Regularly | -1.214(0.228) | 28.251 | 0.297[0.190, 0.465] | <0.001 |
| sometimes | -0.485(0.160) | 9.212 | 0.615[0.450, 0.842] | 0.002 |
| Need variable | - | - | - | - |
| Having chronic disease(Ref=No) | - | - | - | - |
| Yes | 0.606(0.185) | 10.777 | 1.833[1.277, 2.633] | 0.001 |
| Self-evalution general health(Ref=Exellent) | - | - | - | - |
| Good | 0.498(0.381) | 1.714 | 1.646[0.781, 3.469] | 0.190 |
| Moderate | 0.707(0.184) | 14.714 | 2.028[1.413, 2.910] | <0.001 |
| Poor | 0.965(0.165) | 34.138 | 2.625[1.889, 3.629] | <0.001 |
| Constant | 0.087(0.398) | 0.045 | 1.123 | 0.615 |

**Abbreviation:** B Unstandardized regression coefficient; SE standard error; OR odds ratio; CI confidence interval; Ref reference category
Model[a]: Multivariate logistic regression analysis of predictors of health education receipt by migrants.

In Table 7, the results of predicting the determining factors of utilization from health education for communicable diseases, noncommunicable diseases, prenatal care, and child care for immigrants (Modeld[b], Model[c], Model[d], Model[e]) with logistic regression test several variables are provided.

Model [B] shows that the chance of receiving health education for the prevention and treatment of communicable diseases in immigrant men was 0.692 times (OR = 0.692, 95% CI: 0.509, 0.940) less than that of immigrant women. Additionally, different age groups were less likely to receive health education on the prevention and treatment of communicable diseases compared to the 55 years and older age group. Immigrants, by acquiring health knowledge, were 86.638 times (OR=86.638, 95%-CI: 27.646,277.813) more likely than other people to receive have health education CD. Model[c] shows that immigrant men and people with chronic diseases had 0.635 times (OR=0.635, 95%-CI: 0.462, 0.874) and 6.645 times (OR=6.645, 95%-CI: 4.095, 10.781) less chance of receiving health education on the prevention and treatment of non-communicable diseases. However, immigrant people with acquired health knowledge had 256.982 times (OR=256.982, 95%-CI: 35.536,185.403) more chances to receive NCD health education in the last year. Model[d] shows that immigrant men and single individuals were 0.019 times (OR=0.019, 95%-CI: 0.008,0.045) and 0.030 times (OR=0.030, 95%-CI: 0.004, 0.225) less likely to receive prenatal care health education, respectively.

**Table 7. Multivariate logistic regression analysis of predictors of four types of health education utilization of migrants.**

| Variables in the Equation | Model[b] | | | | Model[c] | | | |
|---|---|---|---|---|---|---|---|---|
| | B(SE) | Wald | OR[95%-CI] | p | B(SE) | Wald | OR[95%-CI] | *p* |
| **Predisposing variables** | - | - | - | - | - | - | - | - |
| Gender(Ref=female) | - | - | - | - | - | - | - | - |
| Male | -0.368(0.156) | 5.553 | 0.692[0.509,0.940 | 0.018 | -0.454(0.163) | 7.792 | 0.635[0.462,0.874] | 0.005 |
| Age(Ref=≥55) | - | - | - | - | - | - | - | - |
| 18-24 | -9.022(4.684) | 3.710 | 0.001[0.981,1.243] | 0.054 | - | - | - | - |
| 25-34 | -6.910(3.400) | 4.131 | 0.001[1.274,1.781] | 0.042 | - | - | - | - |
| 35-44 | -7.575(3.817) | 3.938 | 0.001[1.721,1.902] | 0.047 | - | - | - | - |
| 45-54 | -8.507(3.549) | 5.746 | 0.001[1.202,2.000] | 0.007 | - | - | - | - |
| Marital stutes(Ref=Divorced) | - | - | - | - | - | - | - | - |
| Unmarried | - | - | - | - | - | - | - | - |
| Married | - | - | - | - | - | - | - | - |
| **Enabling variables** | - | - | - | - | - | - | - | - |
| Have at least one child(Ref=No) | - | - | - | - | - | - | - | - |
| Yeas | - | - | - | - | - | - | - | - |
| **Health behavior** | - | - | - | - | - | - | - | - |
| Acquire health knowledge(Ref=No) | - | - | - | - | - | - | - | - |
| Yes | 4.473(0.589) | 57.746 | 86.638[27.646,277.813] | <0.001 | 5.549(1.009) | 30.218 | 256.982[35.536,185.403] | <0.001 |
| **Need variable** | - | - | - | - | - | - | - | - |
| Having chronic disease(Ref=No) | - | - | - | - | - | - | - | - |
| Yes | - | - | - | - | -1.894(0.274) | 58.818 | 6.645[4.095,10.781] | <0.001 |
| Constant | 3.002 | 15.826 | 0.241 | 0.005 | 2.514 | 17.289 | 0.115 | <0.001 |
| **Predisposing variables** | - | - | - | - | - | - | - | - |
| Gender(Ref=female) | - | - | - | - | - | - | - | - |
| Male | -3.989(0.458) | 75.886 | 0.019[0.008,0.045] | <0.001 | -1.447(0.464) | 9.710 | 0.235[0.095,0.584] | 0.002 |
| Age(Ref=≥55) | - | - | - | - | - | - | - | - |
| 18-24 | - | - | - | - | 1.509(0.518) | 8.481 | 4.521[1.638,12.478] | 0.004 |
| 25-34 | - | - | - | - | 1.520(0.508) | 8.932 | 4.571[1.687,12.383] | 0.003 |
| 35-44 | - | - | - | - | 1.099(0.520) | 4.464 | 3.00[1.083,8.312] | 0.035 |
| 45-54 | - | - | - | - | 1.012(0.0.562) | 3.892 | 2.752[0.986,1.023] | 0.056 |
| Marital stutes(Ref=Divorced) | - | - | - | - | - | - | - | - |
| Unmarried | -3.495(1.023) | 11.684 | 0.030[0.004,0.225] | 0.001 | - | - | - | - |
| Married | -0.570(0.561) | 1.032 | 0.565[0.188,1.699] | 0.310 | - | - | - | - |
| **Enabling variables** | - | - | - | - | - | - | - | - |
| Have at least one child(Ref=No) | - | - | - | - | - | - | - | - |
| Yeas | - | - | - | - | -4834(1.183) | 16.643 | 0.008[0.001,0.082] | <0.001 |
| **Health behavior** | - | - | - | - | - | - | - | - |
| Acquire health knowledge(Ref=No) | - | - | - | - | - | - | - | - |
| Yes | 0.589(0.252) | 5.452 | 0.555[0.338,0.910] | 0.020 | 5.441(0.715) | 57.875 | 230.761[56.798,937.545] | <0.001 |
| **Need variable** | - | - | - | - | - | - | - | - |
| Having chronic disease(Ref=No) | - | - | - | - | - | - | - | - |
| Yes | - | - | - | - | -1.040(0.245) | 18.004 | 3.530[0.219,0.571] | <0.001 |
| Constant | 0.597 | 1.367 | 0.151 | 0.123 | 3.602 | 19.258 | 0.159 | 0.361 |

**Note:** Model[b]: Multivariate logistic regression analysis of predictors of CD health education utilization of migrants.
Model[c]: Multivariate logistic regression analysis of predictors of NCD health education utilization of migrants.
Model[d]: Multivariate logistic regression analysis of predictors of prenatal health education utilization of migrants.
Model[e]: Multivariate logistic regression analysis of predictors of child health education utilization of migrants.

In contrast, immigrants with health knowledge were 0.555 times (OR=0.555, 95%-CI: 0.338,0.910) more likely to have received prenatal health education in the past year. Model[e] shows that the chance of receiving child health education in the past year was lower among immigrant men (OR=0.235, 95%-CI: 0.095,0.584), those with at least one child in Iran (OR=0.008, 95%-CI: 0.001,0.082), and immigrants with chronic diseases (OR=3.530, 95%-CI: 0.219,0.571). Immigrants in the age groups of 18–24, 25–34, 35–44, and people who acquired health knowledge were, respectively, 4.521 times (OR = 4.521, 95% CI: 1.638, 12.478), 4.571 times (OR = 4.571, 95% CI: 1.687, 12.383), 3.000 times (OR = 3.000, 95% CI: 1.083, 8.312), and 230.761 times (OR = 230.761, 95% CI: 56.798, 937.545) more likely to receive child care health education in the last year.

## 4. DISCUSSION

This study attempted to describe the differences between the needs and the utilization of health education services and the main determining factors related to the utilization of health education services for immigrants living in the area covered by Zahedan University of Medical Sciences, located in Sistan and Balochistan province of Iran, in order to facilitate their utilization of health education services.

### 4.1. Utilization and Needs of Health Education

Our research showed that although many immigrants were aware of the need for health education and were willing to access health information to improve their health, only 60% of the immigrants received health education in the past year.

Most of the migrants surveyed were women, who received more health education services such as prenatal health care, child health care, and prevention and treatment of communicable and noncommunicable diseases, than the male group. It seems that the reason for the gender-based difference in health education among immigrants is that most men do not have the opportunity to visit comprehensive health service centers during the day due to their physical and strenuous work, and access to them is usually more difficult than for women.

Health education programs were not based on accurate needs assessment because, due to the cultural characteristics and also the high number of children of immigrants, these people, in addition to the responsibility of taking care of the elderly at home, must take responsibility for the care of their children and youth, therefore, there is a relatively high need for health education services in the field of health care and prenatal care, children, teenagers, and young people. Similar to the study by Shao *et al*. [2], contrary to expectations, both the receipt and need for health education services regarding the prevention and treatment of occupational diseases are very low, especially among immigrant men who are highly exposed to occupational diseases (especially musculoskeletal disorders) due to performing hard work in difficult conditions.

The reason for the low need for health education regarding occupational diseases among migrants appears to be that, unlike many acute diseases that typically occur after a short period of exposure, occupational diseases typically occur only after prolonged exposure to the relevant hazards [21, 22]. Given the prolonged latency period of occupational diseases and low health literacy levels, migrants are unable to comprehend the causal relationship between risk factors and disease. Furthermore, due to unstable employment conditions and inadequate knowledge about occupational hazards, they fail to devote sufficient attention to this issue even when chronic occupational diseases develop.

### 4.2. Factors Determining the Utilization of General Health Education Services

The rate of use of health education was higher in the 25-34 and 35-44 age groups compared to other age groups, particularly in the 45-54 age group.

This result was similar to a study in China, where the utilization rate of health education services among immigrants in the 25-34 and 35-44 age groups was higher than that of other age groups, but the utilization rate of health education services was lowest among immigrants aged 55 and over [2]. This disparity may arise from two key factors: first, younger individuals, many of whom were born in Iran, exhibit higher educational attainment, more stable employment, greater Persian language proficiency, and superior health literacy compared to those aged 55 and above, enabling them to access accurate health information more effectively. Meanwhile, this research also showed that immigrants with acquired health knowledge are more likely to receive health education. Health literacy is related to health knowledge, health decisions, health behaviors, and population health outcomes [23, 24]. On the other hand, limited education and health awareness create challenges and obstacles in comprehending complex health-related information, medical decisions, and health outcomes [25]. Second, selection bias occurred due to the small sample size of immigrants aged 55+. Future studies should specifically examine the health education utilization behaviors and influencing factors of this population.

### 4.3. Determining Factors of Utilization from Four Types of Health Education

There were gaps between the needs and utilization of four types of health education, including CD, NCD, childcare, and pregnancy care, among the general population of immigrants under investigation. For immigrants, we observed that the male group from the predisposing variable and the acquisition of health knowledge from the health behavior variables significantly contributed to the variance of the four types of utilization of health education. Compared to female immigrants, male immigrants utilized fewer than four types of health education. In other words, engaging in heavy work and having limited health knowledge reduces the opportunity for male migrants to access health education. In addition, according to previous

research [26-28], migrants in informal employment receive less health education than those in formal employment. Meanwhile, foreign migrants in Iran are mostly employed informally in difficult and hazardous jobs that carry higher health-related risks and have less access to health education compared to formal jobs [29, 30]. Meanwhile, informal and temporary work situations, long working hours, and environmental stresses reduce the need for health information, especially on occupational, communicable, and noncommunicable diseases, for male migrants.

Instead, immigrants who had acquired health knowledge were more likely to receive health education. Health knowledge appears to improve attitudes, enhance self-efficacy, and promote health literacy, leading to the correction of misconceptions and increased disease awareness. Consequently, this fosters greater motivation for disease prevention and improvement of personal and family health.

In Rincon *et al*.'s review, it was also demonstrated that acquiring health knowledge helps correct misconceptions about conditions related to epidemics, increases understanding of susceptibility to infectious risk factors, and improves self-efficacy for self-protection. It was also demonstrated that the acquisition of health knowledge has a positive relationship with self-protection and preventive measures in the field of health [31, 32]. Studies have shown that acquiring health knowledge is a predictor of health behaviors, including seeking health and medical help, maintaining personal hygiene, taking preventive medications, and adopting a healthy lifestyle [33, 34].

### 4.4. Using New Technology in Health Education

The emergence of information technology has had profound effects on human life. Perhaps the most important and profound effects have been in the field of education and learning, enabling all people to get information about their world at any time. The development of technology is so great that its effects in the field of health education cannot be ignored. Advancements in information technology demonstrate that smartphones and the internet have become an inseparable part of our lives and are widely utilized in health information research [35-38]. This technology is compared to traditional health education tools, such as text-based materials like posters, tracts, brochures, and newspapers, as well as media tools like social media, and provides more effective methods for delivering health information [39, 40]. For example, mHealth leverages smartphones, tablets, and wearable devices to deliver healthcare services, including online education, patient empowerment, direct provider-patient communication, and improved service quality and accessibility at reduced costs. New technology can play an important role in modern lifestyles [41]. Internal platforms such as Ita, Bale, Rubika, and Sorush can serve as a foundation for information technology and the frequent exchange of messages to support health management. These platforms facilitate long-distance communication by transmitting voice, text, images, and videos, thereby enhancing access to healthcare services [42]. Information regarding the prevention and treatment of various diseases can be accessed at any time through these programs, ensuring quick and convenient availability of health resources [41, 42]. The growing adoption of smartphones among immigrant populations creates an effective mobile platform for delivering health education [43]. In their study, 96.4 percent of immigrants received their health information through health workers, television, and printed materials (brochures, tracts), which are expensive methods for both the country and society. On the other hand, due to the fact that most male immigrants are employed in hard, full-time jobs, they do not have access to these educational resources. MHealth intervention strategies serve as a modern educational tool with significant potential for enhancing health education and driving behavioral change. These approaches play a crucial role in mitigating the transmission of infectious diseases and curbing the rising prevalence of chronic conditions. By utilizing mobile technologies such as applications, reminder-based messaging, and remote medical services, mHealth interventions expand accessibility and foster greater engagement in health-related activities [44, 45]. It seems that this technology can be used to improve the health of immigrants.

### 4.5. The Use of Health Volunteers in Health Education for Immigrants

The majority of immigrants tended to receive health information from their own countrymen. Various factors seem to be involved in this, including illiteracy and a low level of education, insufficient command of the Persian language, a lack of familiarity with health resources, the cost of accessing information, and cultural differences. Thus, in the study by Riahi *et al*. [46], it was shown that foreign immigrants with a low literacy level most often obtained health information from their own countrymen. Additionally, the high cost of health education services, linguistic and cultural differences, low educational levels, and a lack of familiarity with health resources are some of the challenges immigrants face in accessing health information [46]. Health volunteers, by serving as role models in society, have a lasting impact on people's understanding, beliefs, attitudes, and convictions, and exert a significant influence on health issues. In fact, volunteers are considered a bridge between health workers and the public [47]. It seems that establishing a network of immigrant health volunteers, leveraging shared language/cultural backgrounds and providing free, comprehensible education, can effectively address immigrants' health education needs.

## CONCLUSION

This study reveals a significant disparity between the health education needs and service utilization among foreign immigrants in Sistan and Balochestan Province. Findings indicate that despite high demand for education in prenatal care, child health, and communicable/noncommunicable disease prevention, only 60% of immigrants accessed health education services in the past year. This gap stems from structural barriers, including gender disparities, occupational constraints, low health literacy, and cultural/linguistic differences, necessitating targeted policy interventions.

Prioritizing health education for male immigrants through innovative approaches like mHealth and workplace-based programs could enhance accessibility. Additionally, establishing health volunteer networks within immigrant communities, leveraging shared language and cultural understanding, could improve trust and engagement. Integrating occupational health education for migrants engaged in hazardous labor would further mitigate work-related health risks.

The adoption of digital technologies, such as SMS-based health messaging, mHealth applications, and teleconsultation services, could significantly improve access, particularly in remote areas. Ultimately, macro-level policymaking must emphasize equitable access to health education for all migrant subgroups, including women, working men, and the elderly. Future research should evaluate the effectiveness of these interventions in improving immigrant health outcomes.

## STUDY LIMITATIONS AND GENERALIZABILITY CONSIDERATIONS

This research has several limitations that should be considered when interpreting the findings:

1. Methodological Limitations: The cross-sectional design precludes causal inference, and the absence of a control group challenges precise evaluation of health education program impacts.

2. Sampling Constraints: Geographic restriction to a specific region and potential underrepresentation of vulnerable subgroups (undocumented migrants, women, and individuals with low health literacy) may limit generalizability. Selection bias may exist due to likely higher participation rates among more educated individuals.

3. Measurement Limitations: Self-reported questionnaire data may be subject to response biases (*e.g.*, social desirability bias). The instrument lacks cross-cultural validation, and the dichotomous assessment of health education receipt (without quality evaluation) represents another limitation.

4. Analytical Constraints: The absence of qualitative data restricts a deeper understanding of participants' lived experiences and cultural barriers.

5. Generalizability Challenges: Differences in healthcare systems and cultural contexts across countries, particularly regarding insurance coverage and access to free services, may limit the applicability of findings to other settings.

6. Implementation Barriers: Legal concerns or fears of participation consequences may have affected sample composition among certain migrant groups.

Despite these limitations, the findings offer valuable insights into the planning and delivery of health education services for migrants, providing guidance for policymakers, health system managers, and practitioners.

## RECOMMENDATIONS FOR FUTURE RESEARCH

To address the current study's limitations and advance understanding of migrant health education utilization, several research directions are proposed. First, longitudinal studies incorporating intervention designs would enable causal inference and assessment of long-term program impacts. Second, employing mixed-methods approaches that integrate robust quantitative measures with in-depth qualitative interviews could provide richer insights into both behavioral patterns and underlying socio-cultural determinants. Particular attention should be given to targeted sampling strategies that ensure adequate representation of typically underrepresented groups (*e.g.*, undocumented migrants, women with limited mobility, and low-literacy populations). Additionally, there is a pressing need for the development and validation of standardized assessment instruments that demonstrate cross-cultural sensitivity and appropriateness for diverse migrant populations. Future investigations should particularly focus on elucidating how intersecting socio-cultural factors, including gender norms, acculturation stress, and healthcare beliefs,- mediate health education engagement. Together, these methodological advancements would significantly strengthen the evidence base for designing equitable, effective health education programs for migrant communities.

## AUTHORS'CONTRIBUTIONS

The authors confirm their contributions to the paper as follows: H.M.: Responsible for analysis and interpretation of results; E.O. and M.K.S.: Conducted data collection; G.M.: Developed the methodology; H.I. and S.N.: Prepared the draft manuscript. All authors reviewed the results and approved the final version of the manuscript.

## LIST OF ABBREVIATIONS

| | | |
|---|---|---|
| CD | = | Communicable Diseases |
| NCD | = | Noncommunicable Diseases |
| SIB | = | Integrated Health System |
| CVR | = | Content Validity Ratio |
| CVI | = | Content Validity Index |
| SAGER | = | Sex and Gender Equity in Research |

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The present study was approved by the Ethics Committee of Zahedan University of Medical Sciences Iran, with the ethics code IR.ZAUMS.REC.1402.215.

## HUMAN AND ANIMAL RIGHTS

All procedures performed in studies involving human participants were in accordance with the ethical standards of institutional and/or research committee and with the 1975 Declaration of Helsinki, as revised in 2013.

## CONSENT FOR PUBLICATION

Informed consent was obtained from all participants.

## STANDARDS OF REPORTING

STROBE guidelines were followed

## AVAILABILITY OF DATA AND MATERIALS

All data generated or analyzed during this study are included in this article.

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None.

## CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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