

## Knowledge attitude and practice study of HIV/AIDS in Kirkuk

Mohammed Abdul-Aziz Kadir<sup>1</sup>, Zheno Najat Latif<sup>2</sup>, Noor Abbas Ramadan<sup>3</sup>

<sup>1</sup>Ph.D, College of Medicine Kirkuk, <sup>2,3</sup>B.V.M&S, College of Veterinary Medicine  
<sup>1</sup>[mohammdsalam@yahoo.com](mailto:mohammdsalam@yahoo.com), <sup>2</sup>[Zhino.najat95@gmail.com](mailto:Zhino.najat95@gmail.com), <sup>3</sup>[abasn475@gmail.com](mailto:abasn475@gmail.com)

### Abstract

**Introduction:** patients with HIV/AIDS in developing countries have to face discrimination in the society and in health care system .The knowledge of people in such countries also not good enough as many of them don't know the main information about this disease and some of them get infected because of lack of information

**Objective:** To examine the knowledge of people about HIV/AIDS in Kirkuk city among different educational background.

**Subjects and Methods:** A structured questionnaire form related to HIV/AIDS was administrated on the 6000 person included (primary, secondary, high school, university student and employers as well as public people). The questionnaire form included demographic items including gender, age, setting, and educational level and questions on AIDS related knowledge covering main topics. The data was analysed and evaluated by chi-square and student t-test.

**Result:** The results of this study showed that the rate of knowledge about HIV/AIDS regarding the knowledge of people about the causative agent the highest knowledge was virus (80.86%) followed by bacteria (8.9%), parasite (3.38%), fungus (2.23%). the rate of knowledge about HIV/AIDS according to being zoonosis in females (32.1%) was higher than males (21.18%). The knowledge of university student (45.13%) was highest followed by high school (28%), secondary school (19.75%), and the primary school (8.68%). The knowledge of people about the prevention and control of the disease, the rate of correct answer (66.8%) was higher than incorrect one (28.9%).

Conclusion: There is a gap in the existing knowledge of HIV/AIDS regarding route of transmission, causative agent, and general appearance of the disease.

**Key words:** HIV/AIDS, Knowledge, Kirkuk, people.

**DOI:** <https://doi.org/10.32441/kjps.04.01.p2>

### الخلاصة

المقدمة : المرضى المصابين بمرض الايدز في الدول النامية يواجهون التمييز في المجتمع وفي انظمة الصحة . معلومات الناس في هذه البلدان غير كافية بحيث ان معظمهم لا يعرفون المعلومات الاساسيه حول المرض وبعضهم يصابون بهذا المرض بسبب النقص في معلوماتهم حول هذا المرض.

الهدف: معرفة معلومات الناس حول مرض الايدز في مدينه كركوك بين مختلف مستويات التعليم .

طرائق العمل : نظمت استماره الاستبيان المتعلقة بمرض الايدز والتي طبقت على 6000 شخص تشمل ( طلاب المدارس الابتدائيه , طلاب المدارس المتوسطة , طلاب الاعداديه , طلاب الجامعات , موظفين و عامه الناس ) . استماره الاستبيان كانت تشمل العناصر الديموغرافيه والتي تشمل ( الجنس , العمر , المكان , مستوى التعليم و الاسئله المتعلقة بالمعلومات الرئيسيه عن مرض الايدز ) . البيانات فحصت وقيمت احصائيا بواسطه اختبارين (chi -square, students t- test).

النتائج : نتائج هذا البحث تبين معدل معلومات الناس حول مرض الايدز تبعا اذا كان المرض مشترك ( اي ينتقل من الحيوان الى الانسان وبالعكس ) حيث تبين ان معدل اجابات الاناث (32.1%) كانت اعلى من الذكور (21.18%) . وان معلومات طلاب الجامعه (45.13%) كانت الاعلى تليها طلاب الاعداديه (28%) , طلاب المتوسطة (19.75%) و طلاب الابتدائيه (8.68%) . اما فيما يتعلق بمعلومات الناس حول مسبب المرض حيث اعلى معدل كان الفايروس بنسبه (80.86%) يليها البكتريا (8.9%) , طفيليات (3.38%) , فطريات (2.23%) . معلومات الناس حول منع والسيطره على المرض , حيث ان معدل الاجابات الصحيحه (66.8%) كانت اعلا من الاجابات الغير الصحيحه (28.9%) .

الاستنتاج : هنالك فجوه في المعلومات قائمه حول مرض الايدز. فيما يتعلق بطرق الانتقال, مسبب المرض, الظهور العام للمرض . ان معلومات الناس في كركوك حول مرض الايدز تتحسن من خلال النشر الصحيح فيما يتعلق بحقائق حول عدوى مرض الايدز من خلال التلفاز , الراديو , الصحف , الانترنت , الاجتماع العام والتوصيه الصحيه خصوصا في المناطق الريفيه .

الكلمات المفتاحيه : مرض الايدز , كركوك, معلومات .

## 1.Introduction

HIV is a virus that attacks cells in the immune system, which is our body's natural defense against illness. The virus destroys a type of white blood cell in the immune system called a T-helper cells are also referred to as CD4 cell. As HIV destroys more CD4 cells and makes more copies of itself, it gradually weakens a person's immune system. This means that

someone who has HIV, and isn't taking antiretroviral treatment, will find it harder and harder to fight off infections and diseases. AIDS is a set of symptoms (or syndrome as opposed to a virus) caused by HIV. A person is said to have AIDS when their immune system is too weak to fight off infection, and they develop certain defining symptoms and illnesses. This is the last stage of HIV, when the infection is very advanced, and if left untreated will lead to death [1]. AIDS represent the final manifestation of HIV and the earlier stages of the infection are asymptomatic [2].

Human are not the natural hosts of either HIV-1 or HIV-2. Instead, these viruses have entered the human population as a result of a zoonotic, or cross-species transmission. Evidence of simian immunodeficiency virus (SIV) infection has been reported for 26 chimpanzees and SIVsm from sooty mangabeys, are the cause of the acquired immunodeficiency syndrome (AIDS) in human together they have been transmitted to human on at least seven occasions. The implications of human infection by a diverse set of SIVs and of exposure to a plethora of additional human immunodeficiency virus-related are discussed [3]. Transmission of HIV occurs through transmission of infected blood and its derivatives (semen, rectal fluid, vaginal fluid) sexual contact, from infected mother to babies injecting drug users and breast feeding [4].

The illness was first described in 1981 and the virus was isolated by the end of 1983[2]. Recent report on the global AIDS epidemic estimates that there were 35.3 million [32.2million- 38.8 million] people living with HIV [5]. Globally, it is known that there is a lack of HIV knowledge among youth between the ages of 15-24 [6]. Many factors put developing countries like Iraq at greater risk for developing HIV. Examples for these factors illiteracy, low per capita income, gender discrimination, poor knowledge about routes of transmission. Social stigma might disallow people with risky behaviours from seeking HIV testing or disclosing a positive status. Population growth, migration to urban areas, sociocultural barriers and poor prevention efforts might also contributing to the spread of HIV/AIDS [7]. Iraq is categorized as a low prevalence HIV epidemic, with a low number of officially reported cases (0.1%) of total population [8].

There are several studies performed in several Iraqi provinces i.e; knowledge of secondary school students on HIV/AIDS in Kirkuk province [9], knowledge about HIV/AIDS among high school students in Erbil city/Iraq [10], knowledge and attitude of health care workers in Baquba Teaching Hospitals toward HIV/AIDS infection [11], HIV and AIDS-related knowledge among women in Iraq [12].

This study aimed to know the awareness of people in Kirkuk city about HIV/AIDS and to compare their knowledge about the disease between different educational level educated and uneducated people.

## 2. Subjects and methods

A prospective study was conducted in Kirkuk city, which is the center of Kirkuk province located in the north of Iraq and its the fifth largest city of Iraq in terms of the population of about 1,200,000 inhabitants according to the department of statistic in Kirkuk for 2019. The study applied on the people inside Kirkuk as well as nearby towns including (Taza, Dakok, Hawihja, Riaz, Dibis and Altun-kopri) and the people from other province including (Baghdad, Salah-Aldien, Mosul, Erbil, Sulaimaniyah, Diyala, Anbar, Duhuk and Babel) from December 2018 to March 2019. The study was applied on 6000 person (3506 females, 2494 males) including high school students and university students, taken from 20 different schools and 9 colleges as well as employers and public people in different ages and different educational background. A special questionnaire form arranged to collect information about studied groups:-

The questionnaire form was consisted of two sections:-

1. Demographic items including gender, age, place, and educational level.
2. Questions on AIDS related knowledge covering three main topics: general information, transmission, and preventative measures. The response categories for the section on knowledge were Yes, No, don't know.

The data was analysed and evaluated by chi-square and t-test using the statistical package of social science (spss inc, chicago) for windows V.7. A p-value of ( $P < 0.05$ ) was considered statistically significant.

## A QUESTIONNAIR FORM

### A-Personal information

Gender: Male  Female  Age ..... Address.....

B- Education level: Primary school  Secondary school  High school   
University  Postgraduate studies  Employers

C-Do you breeding an animal? Yes  No

D- Do you raising an animal? Field  Home

E- Type of animal .....

F- Etiology of HIV/AIDS: Bacteria  Virus  Fungus  Parasite

G- IS it a zoonotic disease: Yes  No

H- Which type of animals that transmit the disease? Monkeys  Dogs  Cats   
Pigs  Cows  Sheep's  Horses  Rodents   
Other animals

I- Mode of transmission: Blood  Sex  Kissing  Insect bite   
Food and drink  Shaking hands  Contaminated syringes  Wounds  
and abrasions  Mother to fetus  Use patient personal tools  Organ  
transplantation  Meat of infected animal

J- Places that transmit the disease: Swimming pools  Cosmetic centre   
Massage centre  Tattoo centre  Dental clinics

K- Is the disease treatable? Yes  No  I don't know

L- Dose the infected person show the clinical signs of disease? Yes  No  I  
don't know

M- Dose the patient required isolation? Yes  No  I don't know

N- Should the infected person tell others about his or her infection? Yes  No   
I don't know

O- Do you support the marriage of infected person? Yes  No  I don't know

P- Methods of control and prevention of disease? .....

.....

### 3.Results

Table 1. Shows the number of people that participate according to the educational level. It was the highest among the university students (44.26%), followed by high school students (27.46%), secondary school students (19.36%) and the lowest was primary school students (1.45%). Statistically there was significant difference between different educational groups ( $p < 0.0001$ ).

Table 1 The number of the participant according to their educational level.

Educational level	Gender		Total
	Male	Female	
Primary school	56 0.93%	31 0.51%	87 1.45%
Secondary school	447 7.45%	715 11.91%	1162 19.36%
High school	537 8.95%	1111 18.51%	1648 27.46%
University	1143 19.05%	1513 25.21%	2656 44.26%

Sig= 0.000

Table 2. Shows the number of people that participate according to their settings which the people that participate inside Kirkuk (83.7%) was highest than outside Kirkuk (6%) and those from other governorate (4.36%). The difference between people of different residency was significant statistically ( $p < 0.0001$ ).

Table 2 The number of participants according to the setting.

Place	Gender		Total
	Male	Female	
Inside Kirkuk	1881 31.35%	3141 52.35%	5022 83.7%
Outside Kirkuk	248 4.13%	112 1.86%	360 6%
Other governorate	164 2.73%	98 1.63%	262 4.36%

Sig=0.000

Table3 The number of participant according to animal breeder and non animal bre

Animal breeder	Geneder		Total
	male	female	
Animal breeder	679 11%	575 10%	1254 21%
Non animal breeder	1674 27%	2931 48%	4605 76%
Total	2353 39%	3506 58%	5859 97%

Table 4. Shows the knowledge of people on the etiology of HIV/AIDS, it is shown that the knowledge of people regarding the causative agents being virus was (80.86%) bacteria (8.95%) parasite (3.38%) and fungus (2.23%) respectively.

Regarding the animal breeding it was found the rate of the affirmative answer among non - animal breeder was (63.43%) was greater than animal breeder (17.06%).

Regarding the educational level among all people the rate of the affirmative answer among the university students was highest (39.06%) followed by high school students (22.7%), secondary school students (13.28%) and the lowest primary school students (8.68%). Statistically there was significant difference between groups ( $p < 0.0001$ ).

Table 4 Knowledge of people about HIV/AIDS according to the causative agents.

		bacteria	Virus	fungus	Parasite
Gender	Male	218 3.63%	1957 32.61%	56 0.93%	75 1.25%
	Female	319 5.31%	2895 48.25%	78 1.3%	128 2.13%
Animal breeder	Animal breeder	122 2.03%	1024 17.06%	30 0.5%	46 0.76%
	Non-animal breeder	401 6.68%	3806 63.43%	103 1.71%	153 2.55%
Educational level	Primary school	13 0.21%	521 8.68%	5 0.08%	7 0.11%
	Secondary school	214 0.35%	797 13.28%	37 0.61%	58 0.96%
	High school	149 2.48%	1362 22.7%	36 0.6%	62 1.03%
	University	137 2.28%	2344 39.06%	44 0.73%	62 1.03%

Sig (gender) = 0.506      Sig (animal breeder) = 0.18

Sig (education level) = 0.01

Table 5. Shows the knowledge on HIV/AIDS among all people according to being zoonosis or not zoonosis. The rate of the affirmative answer among the female (32.1%) was higher than male (21.18%). The knowledge of non- animal breeder (41.3%) was higher than animal



breeder (11.7%). The rate of the affirmative answer among the educational level the answer among the university students was the highest (22%) followed by high school students (15.93%), secondary school students (11.76%) and the lowest was primary school students (0.88%).

Table 5. Knowledge of people about HIV/AIDS according to being zoonosis

		Zoonosis	Non zoonosis
Gender	Male	1271 21.18%	928 15.4%
	Female	1926 32.1%	1349 22.48%
Animal breeder	Animal breeder	702 11.7%	486 8.1%
	Non animal breeder	2480 41.3%	1776 29.7%
Educational Level	Primary school	53 0.88%	28 0.46%
	Secondary school	706 11.76%	379 6.31%
	High school	956 15.93%	582 9.7%
	University	1320 22%	1138 18.96%

Sig(gender) = 0.431    Sig (animal breeder) = 0.765

Sig (educational level) = 0.000

Table 6. Shows The knowledge of people on HIV/AIDS according to the mode of transmission. It is shown that the percentage of people with the affirmative answer for sex was (58.18%), followed by the using of personal tools (40.66%), organ transplant (35.5%), mother to fetus (31.78%), contaminated syringe (31.53%), kissing (22.83%), meat of infected animals (21.01%), food and drink (19.01%), wound and abrasion (8.68%), shaking hand (14.58%), insect bite (12.5%) and the lowest was blood (3.7%).

Table 6 The knowledge of people about HIV/AIDS according to the mode of transmission.

Rout of transmission	Gender		Total
	Male	Female	
Blood	68 1.13%	154 2.56%	222 3.7%
Sex	1406 23.43%	2085 43.75%	3491 58.18%
Kissing	596 9.93%	774 12.9%	1370 22.83%
Insect bite	342 5.7%	408 6.8%	750 12.5%
Food and drink	416 6.9%	725 12.08%	1141 19.01%
Shaking hands	258 4.3%	617 10.28%	875 14.58%
Contaminated syringes	872 14.53%	1020 17%	1892 31.53%
Wound and abrasions	477 7.95%	644 10.73%	1121 18.68%
Mother to fetus	753 12.5%	1154 19.23%	1907 31.78%
Personal tools	967 16.11%	1473 24.55%	2440 40.66%
Organ transplantation	850 14.16%	1281 21.35%	2131 35.51%
Meat of infected animal	576 9.6%	640 10.66%	1216 20.26%

Table 7. Concerning the prevention of HIV/AIDS show the rate of correct answer was (66.8%) higher than incorrect answer was (28.9%).

Table 7 The knowledge of people about HIV/AIDS according to the prevention of disease.

Answers	Male	Female	Total
Correct answers	2008 33.46%	2000 33.33%	4008 66.8%
Incorrect answers	738 12.3%	969 16.15%	1734 28.9%

Sig =0. 000

#### 4. Discussion

This study explored HIV/AIDS knowledge, and sources of information among different groups of people in Kirkuk governorate Kirkuk-Iraq. HIV/AIDS has become a common problem in the world and its rate increased in many developing countries including Iraq, following the wars, in addition of having social implication, it is necessary to take immediate action to decrease the future spread of this problem.

In this study the knowledge about etiology of HIV/AIDS affirmative in females 58.43% higher than males 39.2%. The higher rate among females than males is in contrast with finding of Tahir *et al* [9] who found the affirmative answer in males was higher than females, among secondary school students in Kirkuk and also not in agreement with Othman in Erbil [10], and Abiona *et al* [13]. The higher level of knowledge of men than women might be due to that males desire to learn about the subject and this might encourage them to discuss HIV/AIDS with each other by Huda and Amanullah in Bangladesh [14].

The knowledge about etiology of HIV/AIDS was affirmative in 80.86%. This reflects that the most people know the etiological agent being virus. This is also reported by Sly *et al* [15] and Tahir *et al* [9]. As far as education concern, it seems from the results of this study, that the education level has significant effect on knowledge of people about the etiology of AIDS. As the result of this study showed that the highest positive knowledge was among those with university level (45.13%).

Regarding the knowledge of people about methods of transmission of HIV/AIDS, it was found that the highest rate believe that it is transmitted through sex followed by using patient articles, organ transplantation, vertical transmission (mother to fetus), and contaminated syringes and kissing. It seems from this study that the knowledge of people about mode of transmission is not sufficient as only (3.7%) of studied group believe that HIV/AIDS is transmitted via blood transfusion.

The poor knowledge about mode of transmission by blood is much lower than that in Pakistan [16]. Unsterilized syringes (10%), while in Qatar and Canada Students high rate of student believe that HIV/AIDS can be transmitted by contaminated blood transfusion 92% in Qatar and 95.9% in Canada [17].

In addition to that many people believe that this disease is transmitted through insect bite, meat of infected animal, food and drink, wound and abrasions, shaking hands. As the majority of students believe that it is transmitted by sex, this is identical to that reported by Oyo-ita *et al* in Nigeria [18]. It is identical to that reported by study performed among Diyala and Al-Nahrain university student who found the knowledge and awareness of males 32.6% and in females 67.4% with high level of knowledge about etiology, sexual transmission, blood and blood product. It is also compatible with those reported in Sudan [19] and china [20] and Taiwan [21] in contract to Tahir *et al* in Kirkuk [9].

Regarding the role of insect transmission of HIV/AIDS in this study (12.5%) believed that HIV/AIDS are transmitted by this way. This finding is lower than that reported by Zimbabwean secondary school Wilson *et al* [22] and in Kirkuk Tahir *et al* [9]. The knowledge of people about HIV/AIDS about prevention of disease, the rate of correct answer was

(93.8%), this reflects that the majority of them are aware about prevention of this dangerous disease in our community.

During the period of study, a question was arise about the possibility of HIV/AIDS being a zoonotic disease, it is believed that as this disease is not the natural host of HIV, but the virus entered the human population as a result of zoonotic or cross transmission Hahn *et al* [3]. The knowledge of people regarding residency it was found the information of people among people inside Kirkuk(85.9%) was highest than those residing outside Kirkuk and other governorates . This might be due to higher level of health education about infectious diseases inside Kirkuk than outside and other governorate.

## 5.Conclusions

There is a gap in the existing knowledge of HIV/AIDS regarding route of transmission, causative agent, and general appearance of the disease.

## 6.Recommendation

Its recommended to carry on further studies in other part of the country in order to improve their knowledge about this disease and its prevention. The knowledge of people in Kirkuk could be improved by proper dissemination about the fact related to the HIV infection via TV, radio, newspaper, internet and public meeting especially in rural areas.

---

## Refrence

[1]AIDS. Gov(2017) What is HIV/AIDS?(accessed september 2018)

<https://www.aids.gov/hiv-aids-basics/hiv-aids-101/what-is-hiv-aids/>

[2] Brooks GF, Jawetz E, Butel JS, Melnick JL, Ornston LN and Adelberg EA. Jawetz, Melnick and Adelbergs Medical Micribiology. 20<sup>th</sup> edit. Appleton and Lange, 1995, P.514.

[3] Hahn BH, Shaw GM, De cock KM and Sharp PM. AIDS as a zoonosis: scientific and public health implication, [www.sciencemag.org](http://www.sciencemag.org), 28 January 2000, 287, P:607-613.

[4] Case KK, Ghys PD, Gouws E. etal. Understanding the modes of transmission model of new HIV Infection and its use in prevention planning . WHO 2012, 90, 83-938 .

[5] UNAIDS. UNAIDS Report on the Global AIDS Epidemic. 2013. Retrieved from <http://www.unaids.org/en/resources/campaigns/globalreport2013/factsheet/>

[6] UNAIDS. Global AIDS Progress Reporting 2012b. Country Progress Reports. 2012b. Retrieved from [http://webcache.googleusercontent.com/search?q=cache:babpvBov4YAJ:www.unaids.org/en/dataanalysis/knowyourresponse/countryprogressreports/2012countries/ce\\_IQ\\_Narrative\\_Report\[1\].pdf+&cd=1&hl=en&ct=clnk&gl=iq](http://webcache.googleusercontent.com/search?q=cache:babpvBov4YAJ:www.unaids.org/en/dataanalysis/knowyourresponse/countryprogressreports/2012countries/ce_IQ_Narrative_Report[1].pdf+&cd=1&hl=en&ct=clnk&gl=iq)

[7] UNAIDS. UNAIDS Report on the Global AIDS Epidemic. 2012a. Retrieved from. [http://www.unaids.org/en/media/unaids/contentassets/documents/epidemiology/2012/gr2012/20121120\\_UNAIDS\\_Global\\_Report\\_2012\\_en.pdf](http://www.unaids.org/en/media/unaids/contentassets/documents/epidemiology/2012/gr2012/20121120_UNAIDS_Global_Report_2012_en.pdf) .

- 
- [8] Global AIDS progress reporting (2012).
- [9] Tahir SS, Kadir MA, Akbar HS and Amin AM. Knowledge of Secondary School Students on HIV/AIDS in Kirkuk Province/Iraq. J Fac Med Baghdad, 2009; 51(2): 174-177
- [10] Othman SM, Knowledge About HIV/AIDS Among High School Students in Erbil City/Iraq, Global Journal of Health Science, 2015 Jan; 7(1):16-23
- [11] Al-salihy and Enad OM. Knowledge and attitude of health care workers in Baquba Teaching Hospital toward HIV/AIDS infection. Iraqi J Pub. Health, 2017, 1:2, 42-46.
- [12] Siziya S, Muula AS, and Rudatsikira E. HIV and AIDS-related knowledge among women in Iraq. BMC Research Notes, 2008, 1:123
- [13] Abiona, T, Balogun, J, Yohannes, E, etal (2014) HIV/AIDS Knowledge, perception of knowledge and sources of information among university students in USA, Turkey, South Africa and Nigeria. Health Education J, 2014, 1-3.
- [14] Huda MN, Amanullah A. HIV/AIDS-related knowledge among secondary school students in Bangladesh: A cross-sectional study. Advance in infectious disease, 2013, 3(4); 274.
- [15] Sly DF, Eberstein IW, Quadagno D and Kistner JA (1992) Young children awareness, knowledge and beliefs about AIDS : Observation from a pretest. AIDS Edu Prev, 1992, 4:227-239.
- [16] Khan S, Fatima S, Afridi NK, Salhotra VS, Jha KK. Awareness of regarding HIV/AIDS among college students in khyber Pakhtunkhwa. SAARC J Tuberc lung Dis HIV/AIDS 2011, VII(2): 37-41.



- [17] Black E , Wilby K , Perepelkin J . Knowledge and attitudes of pharmacy students in canada and Qatar. Saudi J Health Science , 2015 2 (3):146-150 .
- [18] Oyo-Ita AE, Kpeme BM, Etokidem AJ, et al knowledge of HIV/AIDS among secondary school adolescent in Calabar-Nigeria. Annals of African Medicine, 2005, 4, 2-6.
- [19] Khalid FA , Mohammed AA ,Farah A. Knowledge and awareness of AIDS among university of Kassala students ,Sudan . J Community Med Health Edu 2013 ,3 (2): 1-3.
- [20] Lix , Lin G, Gaoz etal . HIV/AIDS Knowledge and implication for health promotion programs among Chinese college students :Geographic , gender and age difference Health promot Int 2004 ,19 (3): 345-6.
- [21] Tung WC ,Cook DM , Lu M, Ding KA. Comparison of HIV knowledge attitudes and sources of STI information between Female and Male college students in Taiwan. Health care women Int 2015, 30(8): 870-82.
- [22] Wilson D, Greenspan R and Wilson C (1989) knowledge about AIDS and self reported behaviour among Zimbabwean secondary school pupils, Soc.sci. Med, 1989, 2, 1-5.