Scientific Writing
Part 1

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Common Reasons for Rejection

1) **Poor idea and repeated work**

2) **Lack of international importance**

3) **Language, writing and spelling issues**

4) **Faults in presentation, design, and standard methods**

5) Offering **too long**

6) Incomplete data: too small sample size or missing or sample size (e.g., poor controls)

7) Failure to **Statistics**

8) **Inaccurate conclusions** that not supported by the data

9) **Ethical conflicts**

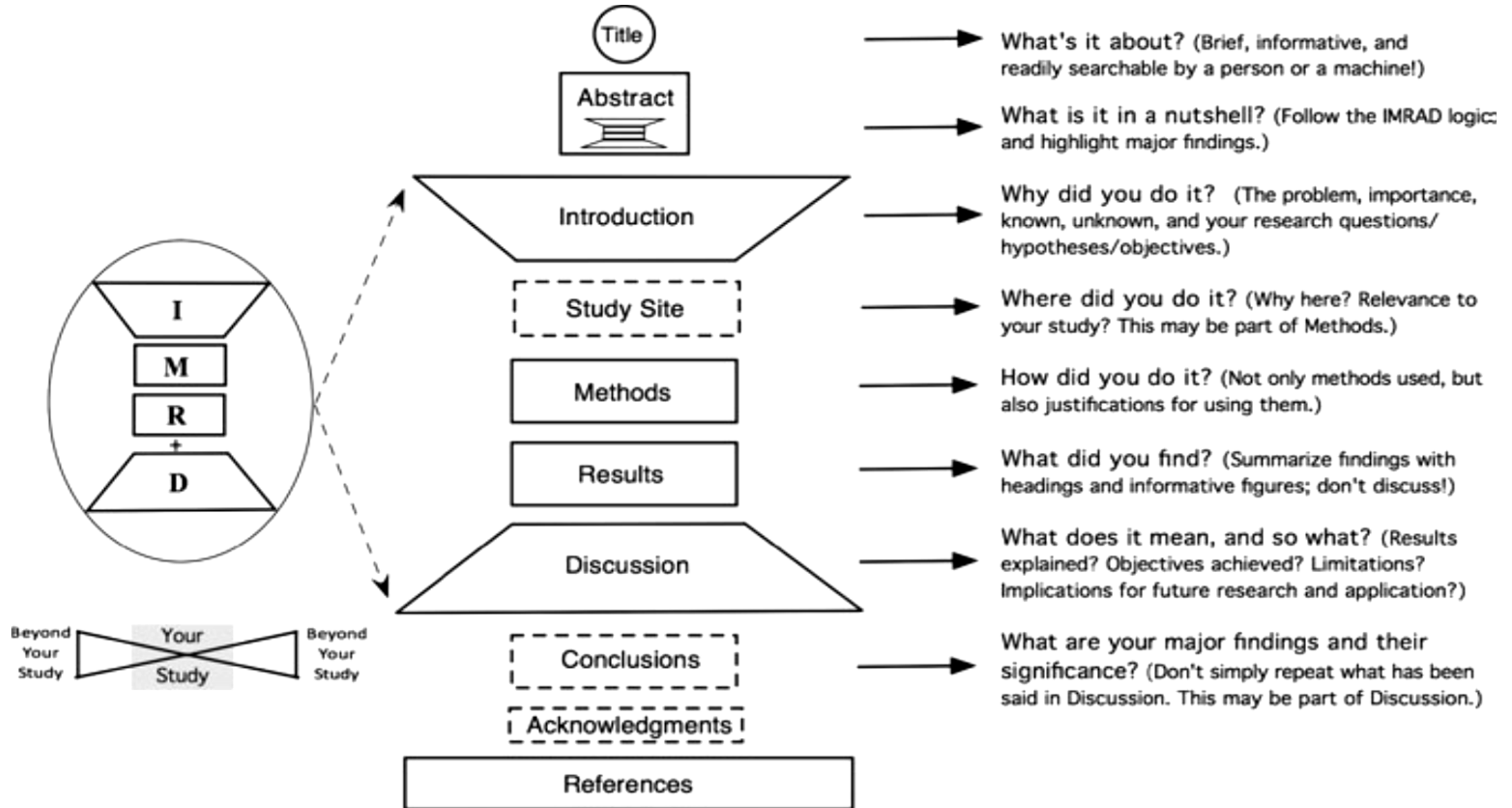10) **Poor response to reviewers**

11) **Out of Journal scope**

Research Ideas

1) Reading **new papers** in your field

2) Follow **hot-topic issues** in your field

3) Register to **Journals** in your field their to receive new articles

4) **Register to well known Journals regardless of your field to get article** (**Nature**, **Science**, **NEJM**, **Lancet**, **JAMA**, **BMJ**, **Ann Intern Med**)

5) Register to **Google Scholar** to receive new articles in your topics

6) Follow Journals in **social media (Twitter, Facebook, Instagram, LinkedIn).**

7) **Read Review Articles**

8) Follow well known researchers in **social networks (ResearchGate).**
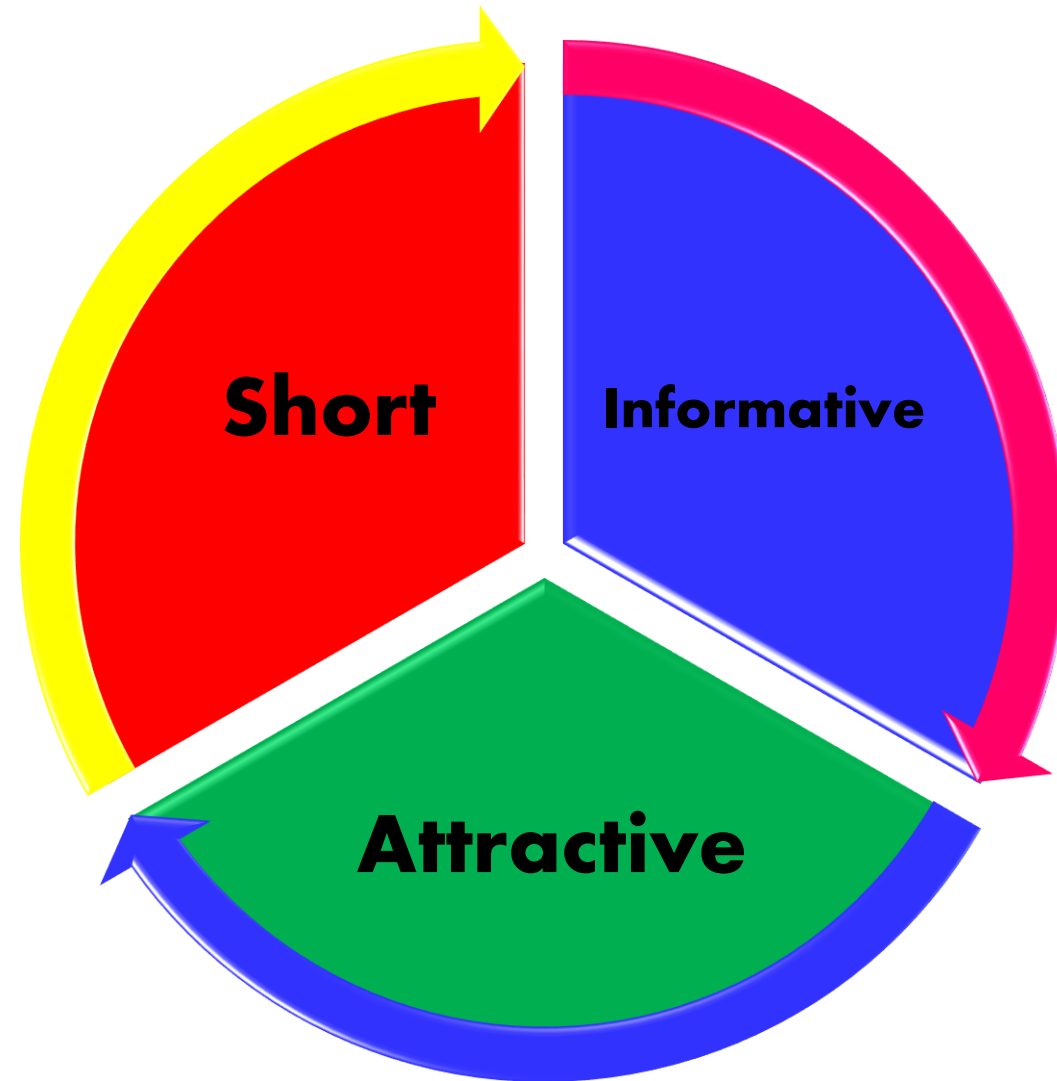
9) Participate in **virtual meetings**

Types of articles

1) **Research Articles/Original Article**
2) **Brief Reports/Short Communication/Research letter**
3) **Rapid Communication**
4) **Case Studies/Case reports/Case series/Clinical Picture**
5) **Pictorial essay/Image/photo**
6) **Editorial**
7) **Review Articles** (Narrative Review, Systematic Review, Meta-analysis)
8) **Opinion/Idea/viewpoint/perspective**
9) **Hypothesis**
10) **Letters to the Editor/Commentary**
11) **Technical note/Methodology**

Organization of a Research Paper

Title	What's it about? (Brief, informative, and readily searchable by a person or a machine!)
Abstract	What is it in a nutshell? (Follow the IMRAD logic and highlight major findings.)
Introduction	Why did you do it? (The problem, importance, known, unknown, and your research questions/hypotheses/objectives.)
Study Site	Where did you do it? (Why here? Relevance to your study? This may be part of Methods.)
Methods	How did you do it? (Not only methods used, but also justifications for using them.)
Results	What did you find? (Summarize findings with headings and informative figures; don't discuss!)
Discussion	What does it mean, and so what? (Results explained? Objectives achieved? Limitations? Implications for future research and application?)
Conclusions	What are your major findings and their significance? (Don't simply repeat what has been said in Discussion. This may be part of Discussion.)
Acknowledgments	
References	

A good title

Short Informative **Attractive**

Title: example

1. **Effect of** *Toxoplasma gondii* infection on reproductive function of male rats

2. **Evaluation of** the effect of *Toxoplasma gondii* infection on reproductive function of male rats

3. **A study of** the effect of *Toxoplasma gondii* infection on reproductive function of male rats

4. **Investigations on** the effect of *Toxoplasma gondii* infection on reproductive function of male rats

ORIGINAL ARTICLE

Impaired reproductive function of male rats infected with *Toxoplasma gondii*

- **Effect of** *Toxoplasma gondii* infection on reproductive function of male rats
- **Evaluation of** the effect of *Toxoplasma gondii* infection on reproductive function of male rats
- **A study of** the effect of *Toxoplasma gondii* infection on reproductive function of male rats
- **Investigations on** the effect of *Toxoplasma gondii* infection on reproductive function of male rats

ORIGINAL ARTICLE

Impaired reproductive function of male rats infected with *Toxoplasma gondii*

A. Abdoli[1], A. Dalimi[1] & M. Movahedin[2]

1 Department of Parasitology, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran;
2 Department of Anatomy, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran

Title: example

1. **Evaluation of** ToRCH infections in pregnant women in **Kashan, Iran**

2. **Prevalence of** ToRCH infections in pregnant women with abortion

3. **Association of** ToRCH infections with abortion in pregnant women

ORIGINAL ARTICLE

ToRCH "co-infections" are associated with increased risk of abortion in pregnant women

Title: example

1. **Detection of** toxoplasmosis in cancer patients

2. **Serological and molecular detection of** toxoplasmosis in cancer patients

Screening of toxoplasmosis in cancer patients: a concern

Amir Abdoli[1,2] , Mohammad Barati[3], Majid Pirestani[4] and Abdolhossein Dalimi[5]

A good title of a research paper should:

1. Contain as **few words** as possible
2. Be **easy to understand**
3. **Avoid abbreviations**, **formulas**, and **jargon**
4. **Not contain low-impact words** such as ''Evaluation of...,'' ''Observations on ...,'' ''Some notes on ...,'' ''Investigations on ...,'' ''Study of ...,'' ''Effect of ...'' and ''Survey of ...''
5. Follow the style preference of the target journal.

Title of clinical trials in special journals

Articles

Safety and efficacy of the ChAdOx1 nCoV-19 vaccine (AZD1222) against SARS-CoV-2: an interim analysis of four randomised controlled trials in Brazil, South Africa, and the UK

Articles

Rituximab versus tocilizumab in anti-TNF inadequate responder patients with rheumatoid arthritis (R4RA): 16-week outcomes of a stratified, biopsy-driven, multicentre, open-label, phase 4 randomised controlled trial

ABSTRACT

- **Structured Abstract**
- Usually in clinical studies
- Organization of a structured abstract:
  1) Background/Introduction
  2) Methods
  3) Results
  4) Conclusion/Interpretation

- **Unstructured Abstract**
- Usually written in **one** paragraph
- Word limitation: about **150-250 words**
- It starts with a statement of **rationale and objectives** and reports the **methods** used, the **main results**, and the principal **conclusions** and their significance.

ABSTRACT

- An abstract is a *mini-version of the paper*
- The length of abstracts: <u>usually</u> in the range of **150–250 words (up to 500 words in clinical trials).**
- **The Abstract should not contain:**

1) **Abbreviations** or **acronyms** unless they are standard or explained
2) Literature **citations**
3) <u>Any information or conclusion not in the paper itself</u>
4) <u>Complex, winding, verbose sentences.</u>

ABSTRACT

➢ **In the abstract, the materials and methods and results are** in **past tense**. **Introduction/Background, aims, interpretation of results, and conclusions** could be in present or past tenses according to the study design.

CORONAVIRUS

SARS-CoV-2 infection protects against rechallenge in rhesus macaques

An understanding of protective immunity to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is critical for vaccine and public health strategies aimed at ending the global coronavirus disease 2019 (COVID-19) pandemic. A key unanswered question is whether infection with SARS-CoV-2 results in protective immunity against reexposure. We developed a rhesus macaque model of SARS-CoV-2 infection and observed that macaques had high viral loads in the upper and lower respiratory tract, humoral and cellular immune responses, and pathologic evidence of viral pneumonia. After the initial viral clearance, animals were rechallenged with SARS-CoV-2 and showed 5 $\log_{10}$ reductions in median viral loads in bronchoalveolar lavage and nasal mucosa compared with after the primary infection. Anamnestic immune responses after rechallenge suggested that protection was mediated by immunologic control. These data show that SARS-CoV-2 infection induced protective immunity against reexposure in nonhuman primates.

ABSTRACT

Safety and Efficacy of the BNT162b2 mRNA Covid-19 Vaccine

Present tenses →

BACKGROUND

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection and the resulting coronavirus disease 2019 (Covid-19) have afflicted tens of millions of people in a worldwide pandemic. Safe and effective vaccines are needed urgently.

Past tenses

METHODS

In an ongoing multinational, placebo-controlled, observer-blinded, pivotal efficacy trial, we randomly assigned persons 16 years of age or older in a 1:1 ratio to receive two doses, 21 days apart, of either placebo or the BNT162b2 vaccine candidate (30 μg per dose). BNT162b2 is a lipid nanoparticle–formulated, nucleoside-modified RNA vaccine that encodes a prefusion stabilized, membrane-anchored SARS-CoV-2 full-length spike protein. The primary end points were efficacy of the vaccine against laboratory-confirmed Covid-19 and safety.

RESULTS

A total of 43,548 participants underwent randomization, of whom 43,448 received injections: 21,720 with BNT162b2 and 21,728 with placebo. There were 8 cases of

Interpretation of results →

CONCLUSIONS

A two-dose regimen of BNT162b2 conferred 95% protection against Covid-19 in persons 16 years of age or older. Safety over a median of 2 months was similar to that of other viral vaccines. (Funded by BioNTech and Pfizer; ClinicalTrials.gov number, NCT04368728.)

Introduction

- A good introduction **is relatively short (about 500 words, up to three paragraphs)**.

- Explains why the author carried out the research and **Clarify what your work adds (Importance)**

- Gives a **background of paper** and a brief review of previous works: **balance of references (For and Against)**

- Defines the nature and extent of the **problems studied**

- Explains the **aims and objectives of investigation**

- Defines any **specialized terms** or **abbreviations** to be used in what follows.

Introduction

Introduction

Intestinal parasitic infect▮▮ (IPIs) are still major a health problem in diff▮▮▮ of the world, especially in tropical a▮▮▮▮ areas. ▮▮▮▮ted by hand-to▮▮ contact or ▮▮▮▮od, water or environmental sur▮▮▮▮ent the socio-economic and hyg▮▮▮ On the other hand, intestinal pro▮▮▮ *Giardia lamblia,* *Blastocystis hominis, Cryp▮▮▮* spp., and *Entamoeba* spp.) are among the important cause of diarrhea in developing countries [2]. IPIs usual▮▮▮ ▮▮▮g in immunocompetent individuals, but it may▮▮▮ ▮bidities (such as persistent diarrhea and ma▮▮▮ patients with immunocompromising conditions [3]. Immunocompromised

patients, such ▮▮▮▮tients, organ transplant recipients, hemo▮▮▮▮ and cancer patients are at greater risk of ▮▮▮▮testinal protozoan than healthy individuals [3,4].

IPIs have been reported in different parts of Iran, and the most common infectio▮▮▮▮▮▮lia and *B. hominis* [5–10]. Likewise, the hig▮▮▮▮bserved in different groups of immunoco▮▮▮ent, including HD [11,12], HIV/AIDS patien▮▮▮▮abetic patients [15]. Although different stud▮▮▮▮nducted on IPIs in immunocompetent ▮▮▮▮▮promised patients worldwide, few comparative studies have been performed in Iran. Hence, the aim of this study was detection of IPIs among HD and renal transplant recipients (RTR), cancer and HIV/AIDS patients in com▮▮▮with healthy individuals in two central cities of ▮▮▮d Qom), from 2014 to 2015.

Abbreviations

1. Introduction

Neuropsychiatric disorders (NPDs) are among the most important morbidity and mortality worldwide [1,2]. According to the estimation, the global burden of mental illness accounts for 13.0% of disability-adjusted life-years (DALYs) and 32.4% of years lived with disability (YLDs) [1]. Several factors, including environmental conditions, genetic background, immune dysregulation and some infectious agents are known to be involved in the etiopathogenesis of NPDs [3, 4, 5, 6]. In recent years, different investigations have shown the roles of inflammation in the etiopathogenesis of NPDs and anti-inflammatory agents as a therapeutic target of NPDs [7]. On the other hand,

Abbreviations within the text

Abbreviation list

Abbreviations: RTR: renal transplant recipients; HD: hemodialysis patients; IPIs: intestinal parasitic infections; B. hominis: Blastocystis hominis; G. lamblia: Giardia lamblia; Ent. coli: Entamoeba coli; C. mesnili: Chilomastix mesnili; Ent. hartmanni: Entamoeba hartmanni; Ent. histolytica/dispar: Entamoeba histolytica/dispar; I. butschilii: Iodamoeba butschilii; I. belli: Isospora belli

Abbreviation list Before the references

Abbreviations 2D, two-dimensional; 3D, three-dimensional; AD, Alzheimer's disease; ADME, adsorption, distribution, metabolism, excretion; ALT, amyotrophic lateral sclerosis; ASTs, astrocytes; BBB, blood–brain barrier; BECs, brain endothelial cells; bFGF, basic fibroblast growth factor; BMECs, brain microvascular endothelial cells; BRAIN, Brain Research through Advancing Innovative Neurotechnologies; CD, cluster of differentiation; CNS, central nervous system; CTIP2, chicken ovalbumin upstream promoter transcription factor-interacting protein 2;

References of the Introduction

REFERENCES

(1) Zhou, F., Yu, T., Du, R., et al. (2020) Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet* 395 (10229), 1054–1062.

(2) Gazzinelli-Guimaraes, P. H., and Nutman, T. B. (2018) Helminth parasites and immune regulation. *F1000Research* 7, 1685.

(3) Hay, S. I., Abajobir, A. A., Abate, K. H., et al. (2017) Global, regional, and national disability-adjusted life-years (DALYs) for 333 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet* 390 (10100), 1260–1344.

(4) Allen, J. E., and Maizels, R. M. (2011) Diversity and dialogue in immunity to helminths. *Nat. Rev. Immunol.* 11 (6), 375–388.

(5) Salgame, P., Yap, G. S., and Gause, W. C. (2013) Effect of helminth-induced immunity on infections with microbial pathogens. *Nat. Immunol.* 14 (11), 1118–1126.

(6) Abdoli, A., and Pirestani, M. (2014) Are pregnant women with chronic helminth infections more susceptible to congenital infections? *Front. Immunol.* 5, 53.

(7) Taghipour, A., Mosadegh, M., Kheirollahzadeh, F., et al. (2019) Are intestinal helminths playing a positive role in tuberculosis risk? A

References

1. Fishman JA. Opportunistic infections—Coming to the limits of immunosuppression? *Cold Spring Harb Perspect Med.* 2013;3:a015669.

2. Fishman JA. Infection in solid-organ transplant recipients. *N Engl J Med.* 2007;357:2601–2614.

3. Halloran PF. Immunosuppressive drugs for kidney transplantation. *N Engl J Med.* 2004;351:2715–2729.

4. Cohen SN. Toxoplasmosis in patients receiving immunosuppressive therapy. *JAMA.* 1970;211:657–660.

5. Cohen BA, Stosor V. Opportunistic infections of the central nervous system in the transplant patient. *Curr Neurol Neurosci Rep.* 2013;13:1–12.

6. Montoya JG, Liesenfeld O. Toxoplasmosis. *Lancet.* 2004;363:1965–1976.

7. Dalimi A, Abdoli A. Latent toxoplasmosis and human. *Iran J Parasitol.* 2012;7:1–17.

8. Derouin F, Pelloux H. Prevention of toxoplasmosis in transplant patients. *Clin Microbiol Infect* 2008;14:1089–1101.

Materials and Methods

1) Include **all necessary information**, but **avoid unnecessary details** that the readers are supposed (ought) to know.

2) **In clinical studies**, make sure the subjects, including cases and controls, are defined both **clinically and demographically**.

3) **Methods in clinical studies** is usually divided into subsections that include study design, study population and inclusion and exclusion criteria, treatments (Interventions), measurements, and statistical analysis.

4) **In epidemiological studies**, study location, study population, measurements, and statistical analysis.

5) **In experimental studies,** case and control groups, measurements, and statistical analysis

6) **Ethic Subsection**

Materials and Methods

1) **Do not include** <u>excessive description of</u> **common procedures**.

2) **All techniques** are described, <u>at least by name if they are standard</u>, or in as much detail as needed if you have modified a standard technique or devised a new one

3) **All quantities** are in **standard units**

4) **All chemicals** are specifically identified so that another scientist can match them exactly in repeating the work

5) **Every step** is explained, <u>including the number of replications</u>

6) **Irrelevant and unnecessary information** that does not relate to the results or confuses the reader is **avoided**.

1. Example of a Materials and Methods

Materials and Methods
Area of study

Hormozgan Province is located in the north of the Hormuz Strait in southern Iran and cover an area of about 70,697 square kilometers. This province has a very hot and humid climate (ranging between 30-49 °C and humidity of 90%-100% in summers), with an average annual rainfall of 180 mm (12,13).

Study location
Present tenses

Sample size

The study population was pregnant women who referred to the health centers in Hormozgan Province from 2015-2016. The sample size was calculated by the following formula and according to the previous studies in Bandar Abbas that reported the seroprevalence of 38% among pregnant women (10,11). Accordingly, 360 serum samples were collected from pregnant women from 5 different cities of the province (Bandar Abbas, Minab, Haji Abad, Bastak, Qeshm) based on geographic location and climate condition.

Study population and sample size estimation
Past tenses

Sample size formula

$$N = Z^2 P (1-P)/d^2 \quad Z=1.96. \ P=0.38. \ d=0.05$$

2. Example of a Materials and Methods

Serological Evaluation
Conventional ELISA

The presence of anti-*Toxoplasma* IgM and IgG antibodies were screened using ELISA assay, with an ELISA kit (Pishtaz Teb, Tehran, Iran) according to the manufacturer's protocol. The positive cut-off value of IgG and IgM antibodies was defined as the upper limit of ... and 1. 1 U/mL, respectively.

Brief details (according to the reliable protocol)

standard unit

Ethical aspects

The study protocol was approved by the Ethical Committee of Hormozgan University of Medical Sciences Ethical number: (5-HEC-94-3020). All participants were informed about the study, and sampling was conducted with informed consent.

PCR

The final diagnosis of toxoplasmosis in low avidity cases was performed by a 529 bp gene which replicates 200-300 in the *T. gondii* ge-e (14).

Referenced to an available protocol

Sample collection

Two milliliters of blood from women referred to health centers for routine pregnancy tests were collected, and their sera were stored at -20 °C until test. Moreover, information

Statistical analysis

All data were analyzed by SPSS (ver. 20 Chicago, IL, USA) using Chi-square, Cross tab sand Correlate Pearson test.

Results

1) **Present the results simply and clearly**

2) **Do not report** large masses of data; and **present in tables or figures** along with essential statistical information

3) Repeat in the text only the most important findings shown in tables and graphs

4) Include **negative data**—what was not found—only if useful for interpreting the results

5) **Do not present** the same data in tables and graphs

6) **Supplementary tables and figures** are highly recommended for additional data of the work

Results

not statistically significant. As shown in Table 1, there are no statistically significant differences in demographic factors among the case and control groups. The details of risk factors for *T. gondii* infection (such as job, contact to cat, raw/half-cooked meat consumption and consumption of raw vegetables) in the case and control groups are summarized in (Supplementary Table S1).

Express negative data

Supplementary tables for additional data

Toxoplasma gondii IgG antibody was detected in 27.2% (22/81) of case and 28.6% (28/98) of control group (OR = 1.07, P = 0.8). *T. gondii* IgM antibody was detected in 1.2% and 2% of case and [control group respective]ly (OR = 1.6, P = 1) (Table 3). The sero-[prevalence of CMV IgG a]ntibody was found in 87.7% and 90.8% of case and control groups respectively (OR = 0.7, P = 0.49). CMV

Express data with Essential statistical information

Table

Table 4 ToRCH co-infection among case (n = 81) and control (n = 98) groups. Odds ratio (OR with 95% confidence interval [CI])

| Co-infections	Case	Control	P	OR	CI
Toxo IgG + Rubella IgG	18 (22.2%)	26 (26.5)	0.5†	0.79	0.3–1.5
Toxo IgG + CMV IgG	20 (24.7%)	27 (27.6%)	0.6†	0.86	0.4–1.68
Toxo IgG + CMV IgM	7 (8.6%)	1 (1.02%)	0.024‡	9.17	1.1–76.2
Toxo IgG + HSV IgG	18 (22.2%)	26 (26.5%)	0.5†	0.79	0.39–1.57
Rubella IgG + CMV IgG	51 (62.9%)	81 (82.7%)	0.003†	0.35	0.17–0.71
Rubella IgG + CMV IgM	11 (13.6%)	9 (9.2%)	0.35†	1.5	0.6–3.95
HSV IgG + CMV IgG	55 (67.9%)	76 (77.5%)	0.14†	0.61	0.31–1.19
HSV IgG + CMV IgM	15 (18.5%)	9 (9.2%)	0.06†	2.2	0.92–5.44
Toxo IgG + CMV IgG + Rubella IgG	16 (19.7%)	26 (26.5%)	0.2†	0.68	0.33–1.38
Toxo IgG + CMV IgM + Rubella IgG	1 (1.2%)	5 (5.1%)	0.2‡	0.23	0.02–2.03
Toxo IgG + HSV IgG + CMV IgG	16 (19.8%)	25 (25.5%)	0.36†	0.71	0.35–1.46
Toxo IgG + HSV IgG + CMV IgM	6 (7.4%)	1 (1.02%)	0.047‡	7.7	0.9–65.8§
HSV IgG + Toxo IgG + CMV IgG + Rubella IgG	14 (17.3%)	24 (24.5%)	0.2†	0.64	0.3–1.3
HSV IgG + Toxo IgG + CMV IgM + Rubella IgG	8 (9.9%)	8 (8.2%)	0.6†	1.2	0.4–3.4

$P < 0.05$.
†χ^2 test.
‡Fisher's exact test.
§In this case, the SPSS does not make the correct 95% confidence interval result coordinated with P-value.

Figure
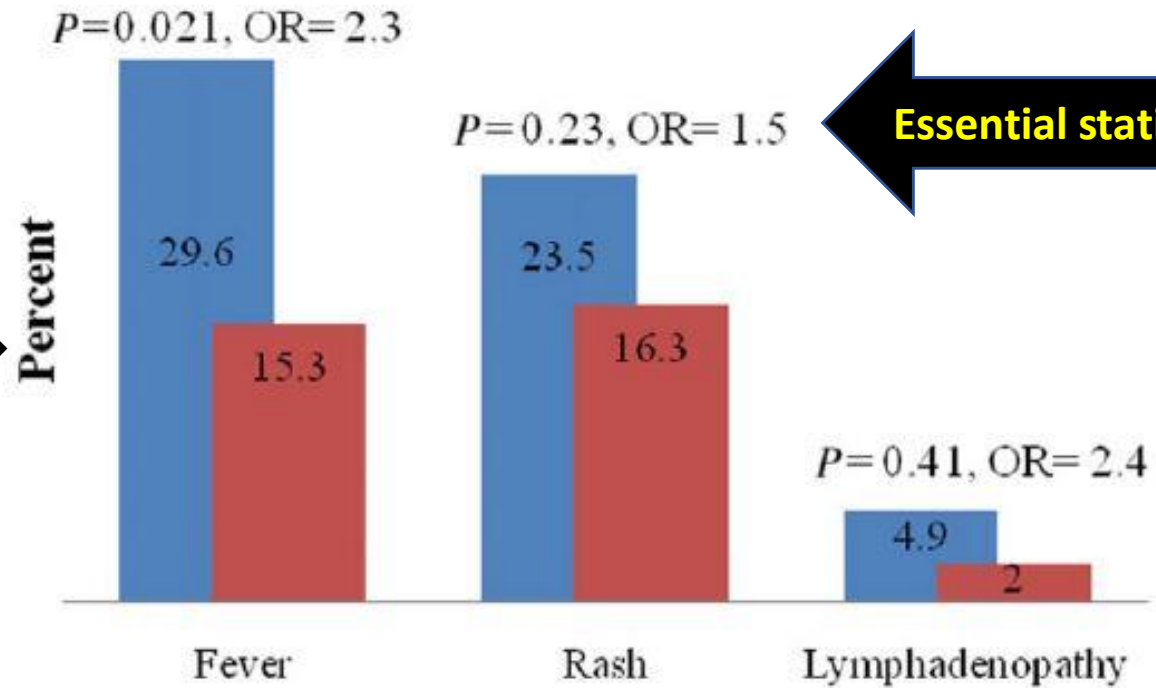
Fig. 1 Clinical symptoms among case and control groups. ■, Case (n = 81); ■, Control (n = 98).

Discussion

1) **Highlight the issue** (**Not repeat** what has already been said in the **introduction**)

2) <u>**Discuss your**</u> **obtained results** and make **interpretations**

3) **Literature review** and **interpret/compare** with your results

4) State honestly the **limitations of the study** at the end of discussion

5) The Discussion section is written in **both present and past tenses.**

6) Current knowledge (from literature) is stated in **present tense,** whereas **the work being reported and discussed in the paper (your own work)** is presented in **past tense**

Discussion

Discussion

It is estimated that approximately a quarter of the world's population has experienced infection with at least one parasitic infection during their life, particularly people living in developing countries.[85,86] Given the potentially devastating effects of IPIs on pregnant women and their foetuses, we conducted a systematic review and meta-analysis in order to estimate the global prevalence and associated risk factors among this high-risk population. Providing more details about the epidemiology of IPIs in women of childbearing age and pregnant women could be helpful for physicians and public health policymakers, especially in countries with lower health status.

In our analyses, geohelminths (hookworm, *A. lumbricoides* and *T. trichiura*) along with the protozoa, including *Blastocystis* sp., *E. histolytica/dispar* and *Giardia* sp., were the most common IPIs in pregnant women. Geographically, most of the included studies were from the three continents of Africa, Asia and South and Central America. This observation may reflect that these three continents have the majority of low-income and least-developed countries (Supplementary Table 1). F was only a single study from Turkey.

Highlight the issue

Interpretations of the obtained results

Supplementary informations

Express *strength* and *limitations* of the work

Strength of the work →

The strengths of this study include a comprehensive literature search, rigorous methodology, large sample size, defined clear inclusion and exclusion criteria, studies from different countries and continents, quality assessment and subgroup analysis considering the type of intestinal parasites and risk factors. However, this systematic review and meta-analysis has certain limitations, including the online registration (PROSPERO) failed because the data were already extracted.

Limitations →

Although we undertook a comprehensive search of the available peer-reviewed literature and included a large number of studies that had assessed the prevalence of IPIs in pregnant women, we cannot exclude the possibility that some studies may have been missed in the 'grey' literature. Other limitations included that some IPIs (especially protozoa) were not investigated by some studies, so their exact burden was not known; the lack of published information on the prevalence of IPIs in pregnant women from many low- and middle-income countries; (5) studies reported only in English were included; different parasitological methods with various sensitivities and specificities were used (diagnosis of parasitic infection was based on microscopic analysis of the stool); the

← **Limitations**

Conclusions and Future Directions

1) Some journals do not allow a separate Conclusion section. In that case, the last paragraph can be used to state the conclusions.

2) Conclusions should, rather than just repeating results, state well-articulated outcomes of the study and briefly suggest future lines of research in the area based on findings reported in the paper.

3) In poor writing, it is not uncommon to find conclusions such as ''more research is needed before conclusions can be drawn.'' In that case, why publish a paper from which conclusions cannot be drawn?

Conclusions

Pasman 2012; Abdoli and Pirestani 2014). Hence, it is reasonable that co-infections have greater adverse impacts than single infections during pregnancy and our study is consistent with this hypothesis. Taken together, the results of this study provide a new insight about the role of ToRCH co-infections in the etiology of spontaneous abortion. These findings can be used for the design of prevention programs for ToRCH infections in pregnant women.

Repeating the results

Briefly suggest future lines

Conclusions

Conclusion

Repeating the results →

The results of this review emphasize the important roles of TEs in leishmaniasis. Hence, TEs could be assessed as a prognosis factor in leishmaniasis. Also, TEs could prescribe as an adjuvant for the treatment of leishmaniasis.

← Briefly suggest future lines

Thanks for your attention