



Research Methodology

Neda Izadi

Assistant Professor of Epidemiology

Research Institute for Endocrine Sciences

Neda.izady@yahoo.com

- ✓ **Topic of the Research Project**
- ✓ **Title of the Research Project**
- ✓ **Statement of the Problem**
- ✓ **Objectives/Research Questions/Hypotheses**

Topic of the Research Project

Identifying the Research Question

➤ تجارب شخصی / علائق شخصی

➤ مشورت با متخصصین

➤ مقالات Hot Topic

➤ مقالات Evidence Based Medicine

1. Cochrane Review

2. Systematic Review

3. RCT

➤ گایدلاین ها و راهنماهای بالینی

1. Pubmed

2. Trip Database

➤ مقالات مرور سیستماتیک / متاآنالیز یا مقالات نوظهور جدید

➤ پایان نامه ها و گزارشات تحقیقاتی جدید (Unanswered questions)

➤ ژورنال کلاب

➤ مراجعه به فهرست اولویت های تحقیقاتی منتشر شده سازمان های مختلف

➤ تکرار تحقیقاتی که تابع عوامل مکانی / جغرافیایی / فرهنگی و ... هستند

➤ تکرار مطالعاتی که ضرورت انجام آنها توسط محقق احساس می شود (به دلایل متدولوژیک و امثال اینها)

➤ ChatGPT و AI

Prioritizing the Topics

➤ 1. Relevance

- **Definition:** How closely a topic aligns with current issues or needs in the field.

Example: Researching the impact of continuous glucose monitoring (CGM) systems on diabetes management is highly relevant due to the increasing prevalence of diabetes and the need for improved management techniques.

➤ 2. Avoidance of Duplication

- **Definition:** Ensuring that the topic has not already been extensively covered to avoid redundancy.

Example: Before studying the effects of diet on blood sugar levels, a review of existing literature is essential to ensure that the research adds new insights rather than repeating previous studies.

➤ 3. Urgency

- **Definition:** The immediacy of addressing the topic based on current trends or crises.

Example: Investigating the rise of diabetes in children due to lifestyle changes during the COVID-19 pandemic is urgent, as it addresses a growing public health concern.

➤ 4. Political Acceptability

- **Definition:** The extent to which a topic can gain support from stakeholders and policymakers.

Example: Research on the need for subsidized insulin for low-income patients is politically acceptable as it aligns with public health goals and can attract politicians support.

Prioritizing the Topics

➤ 5. Feasibility

- **Definition:** The practicality of conducting research on the given topic, considering resources, time, and expertise.

Example: A study on the efficacy of a new diabetes medication may be feasible if there are existing partnerships with pharmaceutical companies and access to clinical trial participants.

➤ 6. Applicability

- **Definition:** The relevance of the research findings to real-world situations and their potential impact on practice.

Example: Investigating community-based interventions that improve diabetes education and management can be highly applicable, as findings can be directly implemented in local healthcare settings.

➤ 7. Ethical Acceptability

- **Definition:** Ensuring that the research adheres to ethical standards and does not harm participants.

Example: A study exploring the psychological effects of diabetes management on adolescents must ensure informed consent and consider the mental health implications for participants.

Prioritizing the Topics

Relevance

Who? How large? How sever?

- 1.Not relevant; 2.Relevant; 3.Very relevant

Avoidance of Duplication

- 1.Sufficient information; 2.Insufficient information; 3.No information

Urgency

- 1.Not urgent; 2.Relatively urgent; 3.Very urgent

Political acceptability

- 1.Not acceptable; 2.Less acceptable; 3.Fully acceptable

Feasibility

Manpower, Time, Cost

- 1.Not feasible; 2.Feasible; 3.Very feasible

Applicability

- 1.Not applicable; 2.Less applicable; 3.Very applicable

Ethical acceptability

- 1.Major problems; 2.Minor problems; 3.No ethical problems

Rating Form

Rating scale: 1=Low, 2=Medium, 3=High

Row	Proposal topics	1	2	3	4	5	6	7
		Relevance	Avoidance of duplication	Urgency	Political acceptability	Feasibility	Applicability	Ethical acceptability
1								
2								
3								
4								
5								
6								
7								

Examples

- Investigating the Impact of Plant-Based Diets on Blood Sugar Control in Type 2 Diabetes Patients
- Examining the Effects of Telehealth Services on Diabetes Management in Rural Communities of Tehran
- Assessing the Role of Physical Activity in Reducing Diabetes Complications Among Older Adults in Iran

Title of the Research Project

Title of the Research Project, Criteria

- **Clarity:** The title should clearly convey the main focus of the research without ambiguity.

➤ **مثال:** به جای Examining Some Factors in Metabolic Conditions، می توان از عنوان واضح تری مانند Impact of Insulin Resistance on Type 2 Diabetes Progression استفاده کرد.

- **Conciseness:** It should be brief and to the point, ideally containing no more than 10-15 words (**short**, **accurate**, and **concise**).

➤ **مثال:** به جای An Investigation and Analysis of Various Effects of Lifestyle Interventions on Lifestyle Interventions' Effect on Metabolic Syndrome Parameters in Adults، می توان گفت: Metabolic Syndrome in Adults.

- **Relevance:** The title should reflect the key concepts and variables of the study, ensuring it is relevant to the research question.

➤ **مثال:** اگر پژوهش درباره تأثیر رژیم غذایی بر دیابت است، عنوان باید به رژیم غذایی و دیابت اشاره کند، مانند: Role of Low-Carb Diets in Managing Type 1 Diabetes Mellitus.

Title of the Research Project, Criteria

- **Specificity:** It should be specific enough to give readers an idea of the scope and context of the research.

➤ **مثال:** به جای Study on Endocrine Disorders، عنوان خاص تری مانند Prevalence of Metabolic Syndrome in Obese Adolescents with Prediabetes in Urban Areas مناسب تر است.

- **Descriptive:** The title should describe the main outcome or the nature of the research, indicating whether it is observational, experimental, qualitative, etc.

➤ **مثال:** به جای Study on Diabetes، می توان از عنوان توصیفی تری مانند Observational Study on Glycemic Control in Type 2 Diabetes Patients استفاده کرد که نشان دهنده نوع مطالعه (مشاهده ای) و پیامد اصلی (کنترل قند خون) است.

- **Keywords:** Including important keywords can enhance discoverability in databases and search engines.

➤ **مثال:** عنوانی مانند Impact of Exercise and Diet on Metabolic Syndrome Outcomes شامل کلمات کلیدی مانند Exercise، Diet و Metabolic Syndrome است که جستجوی پژوهش را آسان تر می کند.

Title of the Research Project, Criteria

- **Avoidance of Jargon:** Unless the title is aimed at a specialized audience, it should avoid overly technical language or jargon that may not be understood by all readers.

➤ **مثال:** به جای Efficacy of SGLT2 Inhibitors on HbA1c in T2DM، از عنوان ساده‌تری مانند Effect of New Diabetes Drugs on Blood Sugar Control استفاده کنید تا برای غیرمتخصصان نیز قابل فهم باشد.

- **Attractive:** A good title can spark interest and curiosity, encouraging readers to learn more about the research.

➤ **مثال:** به جای Analysis of Lifestyle in Diabetes، عنوان جذاب‌تری مانند Can Lifestyle Changes Reverse Type 2 Diabetes? می‌تواند توجه بیشتری جلب کند، زیرا سؤالی کنج‌گاوکننده مطرح می‌کند.

How to write the title

- ▶ Not journalistic.
- ▶ Explain the abbreviations.
- ▶ It is better to be short and maximum 80 characters.
- ▶ In descriptive studies, specify Who, Where, When (Person, Place, Time).
- ▶ Appropriate words should be used (for example, prevalence and incidence).

Title of the Research Project, Examples

➤ Poor Title

➤ The Investigating Prevalence of Diabetes

Explanation: This title is too vague and lacks specificity.

- It does not indicate the type of diabetes, or the research methods.
- Readers cannot discern what the study is about (who, where, when).

➤ Good Title

➤ The Impact of Diet on Blood Sugar Levels in Type 2 Diabetes Patients

Explanation: This title is clearer and more specific.

- It indicates the focus on diet, specifies the population (Type 2 diabetes patients), and highlights the outcome of interest (blood sugar levels).
- However, it could still be improved.

Title of the Research Project, Examples

- **Excellent Title**
- **Evaluating the Effects of a Mediterranean Diet on Glycemic Control in Adults with Type 2 Diabetes: A Randomized Controlled Trial**

Explanation: This title is specific, descriptive, and informative.

- It clearly states the intervention (Mediterranean diet), the outcome (glycemic control), the population (adults with Type 2 diabetes), and the study design (randomized controlled trial).
- This level of detail helps readers immediately understand the research's scope and significance.

Statement of the Problem

بلافاصله پس از انتخاب موضوع نمی توان سراغ جمع آوری اطلاعات رفت
و باید ابتدا مسئله را تعریف کرد.

Statement of the Problem

- The **scientific justification** for the study; the basis of the need for research to generate **further knowledge** that will contribute to **existing knowledge**.
- Clearly specifies the **gaps in existing knowledge** of the problem and/or the **existing controversy** and the **non-conclusive evidence**.

Statement of the Problem

- A logical sequence for presenting the statement would be:
 - **Magnitude, frequency, and distribution:** Affected **geographical areas** and **population** groups affected by the problem. **Ethnic and gender** considerations.
 - **Probable causes of the problem:** What is the **current knowledge** of the problem and **its causes**?
 - Is there **consensus**?
 - Is there **controversy**?
 - Is there **conclusive evidence**?
 - **Possible solutions:** In what ways have **solutions to the problem** been attempted?
 - What has been **proposed**?
 - What are the **results**?
 - **Unanswered questions:** What remains **to be answered**?
 - What areas have not been possible to **understand, determine, verify, or test**?

Statement of the Problem

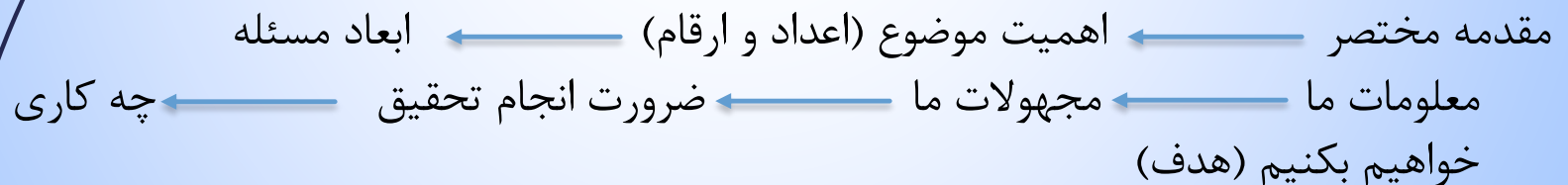
✓ شرح مختصری (یک پاراگراف) از خصوصیات اصلی مسئله

✓ اطلاعات زمینه ای که مستقیماً با مسئله مربوط است. شامل آمار مربوطه (جهت بیان اهمیت مسئله)

✓ ضرورت پرداختن به موضوع و انجام مطالعه

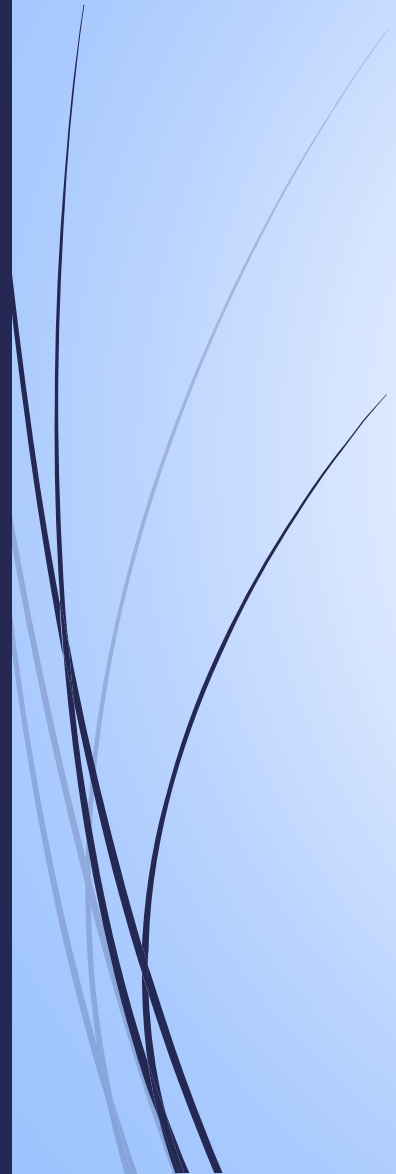
✓ هدف مطالعه

معمولاً بیان مسئله حدود ۱۰۰۰ کلمه است (۲ تا ۳ صفحه)



Statement of the Problem

- تناقضات جاری یا مسئله جاری را بیان می کند.
- اهمیت مسئله را توضیح می دهد.
- مفهوم مسئله را روشن می کند.
- هدف ویژه/ فرضیه یا سوال تحقیق را هدایت می کند.
- چهارچوب تحقیق را تعیین می کند (جمعیت هدف- متغیرها- محل انجام تحقیق)
- چهارچوب آنچه باید تحقیق شود و در پایان نتیجه گیری و گزارش شود را معین می کند.
- توصیف سابقه مربوط به موضوع تحقیق
- اساسی است برای تبیین و روشن کردن بیشتر عنوان انتخاب شده برای تحقیق
- اساسی است برای تبیین اهداف تحقیق، چگونگی اجرای طرح، طرح کار، بودجه و
- اهمیت قضیه را برای کسانی که می خواهند طرح ما را تصویب کنند روشن می کند.



Objectives

Research Questions

Hypotheses

Research Objectives (general and specific)

- The purpose of the research in measurable terms; the definition of what the research should achieve.
- The objectives explain the purpose of the research in measurable terms and define standards of what the research should achieve.
- States the investigator's reasoning and arguments for the attempt to find the evidence that will offer an answer to the question and/or hypothesis.

General Objective

Title

- Investigating the Association Between Sedentary Lifestyle and Metabolic Syndrome in Urban Populations

General Objective

- **To Determine** the Association Between Sedentary Lifestyle and Metabolic Syndrome in Urban Populations

Specific Objectives

- These **disaggregate** and **follow logically** from the general objective. They are a preliminary view of the research design.

Specific Objectives; Descriptive

- **To determine** the **prevalence** of Sedentary Lifestyle by sex in Urban Populations
- **To determine** the **prevalence** of Sedentary Lifestyle by age groups in Urban Populations
- **To determine** the **prevalence** of Metabolic Syndrome by sex in Urban Populations
- **To determine** the **prevalence** of Metabolic Syndrome by age groups in Urban Populations

Specific Objectives; Analytic

- **To determine** the **association** between Sedentary Lifestyle and Metabolic Syndrome by sex
- **To determine** the **association** between Sedentary Lifestyle and Metabolic Syndrome by age groups

Research Question

For Descriptive Objectives

- ▶ How much is the prevalence of sedentary lifestyle among different sexes in urban populations?
- ▶ How much is the prevalence of sedentary lifestyle across different age groups in urban populations?
- ▶ How much is the prevalence of metabolic syndrome among different sexes in urban populations?
- ▶ How much is the prevalence of metabolic syndrome across different age groups in urban populations?

Research Question

For Analytic Objectives

- ▶ There is an association between Sedentary Lifestyle and Metabolic Syndrome by sex
- ▶ There is an association between Sedentary Lifestyle and Metabolic Syndrome by age groups

Null Hypothesis

Null Hypothesis (H_0)

- ▶ The **Null Hypothesis** is a statement that assumes there is no significant effect or relationship between variables in a study. It serves as a default position that indicates that any observed differences or effects are due to chance or random variation. The null hypothesis is typically what researchers seek to test against.

Example: In a study examining the effect of a physical activity program on HbA1c levels in Type 2 diabetes patients, the null hypothesis might be:

- ▶ **H_0 :** There **is no difference in HbA1c levels** between participants who engage in the physical activity program and those who do not.

Alternative Hypotheses

Alternative Hypothesis (H_1 or H_a)

- The **Alternative Hypothesis** is a statement that contradicts the null hypothesis, suggesting that there is a significant effect or relationship between the variables. It represents what the researcher aims to support or prove through their study.

Example: Continuing with the previous study, the alternative hypothesis might be:

- **H_1 :** Participants who engage in the physical activity program **will have lower HbA1c levels** compared to those who do not participate in the program.

Alternative Hypotheses

Key Differences

➤ Purpose:

- **Null Hypothesis (H_0):** Assumes no effect or relationship; serves as a baseline for comparison.
- **Alternative Hypothesis (H_1):** Suggests there is an effect or relationship; represents the researcher's expectation.

➤ Testing:

- Researchers conduct statistical tests to determine whether to reject the null hypothesis in favor of the alternative hypothesis based on the data collected.

➤ Outcomes:

- If the evidence suggests a significant effect, the null hypothesis may be rejected in favor of the alternative hypothesis. If not, the null hypothesis is not rejected.

- عناوین پیشنهادی نگارش و لیست گردد.
- بر اساس جدول اولویت بندی عناوین امتیاز داده شود و امتیاز نهایی محاسبه شود.
- بیان مسئله موضوع انتخابی نوشته شود.
- کنترل کنید که آیا:
 - اطلاعات زمینه‌ای پیرامون موضوع ارائه شده است؟
 - آیا مسئله بوضوح بیان شده است؟
 - (چرا مسئله مهم است؟) بیان شده است؟
 - رابطه علی و عوامل مهم مؤثر بر مسئله بیان شده و جایگاه کاری که شما می‌خواهید انجام دهید مشخص شده است؟
 - آیا مطالعاتی که روی موضوع انجام شده مطرح شده (در مورد مسئله چه اقداماتی شده است) است؟
 - شما چه می‌خواهید بکنید روشن شده است؟
 - اینکه آنچه شما می‌خواهید انجام دهید به چه درد می‌خورد آورده شده است؟

