DISEÑOS DE

INVESTIGACIÓN

Alvaro Whittembury V.

CIENCIA

- (del lat. scientia).
- Conjunto de conocimientos obtenidos mediante la observación y el razonamiento, sistemáticamente estructurados y de los que se deducen principios y leyes generales.

CIENCIA

- La ciencia no define la verdad, es una forma de aproximarse a la verdad.

  … define una manera de pensar.

- Escepticismo: desconfianza o duda de la verdad.

MÉTODO CIENTÍFICO

- Es el proceso generado por la ciencia, mediante el cual se usan experimentos para contestar preguntas.
- Partes:
  - Observación
  - Hipótesis
  - Experimentación.
- Permite conocer el grado de error de nuestras observaciones.

La Medicina es una Ciencia

- Se vale del método científico para generar conocimiento.

¿Pero, por qué?

El Problema de Investigación

- Es lo primero que se delimita.
- Es una dificultad existente acerca de un aspecto determinado de la realidad.
- Puede consistir en el desconocimiento de hechos o en la búsqueda de explicaciones a hechos importantes.
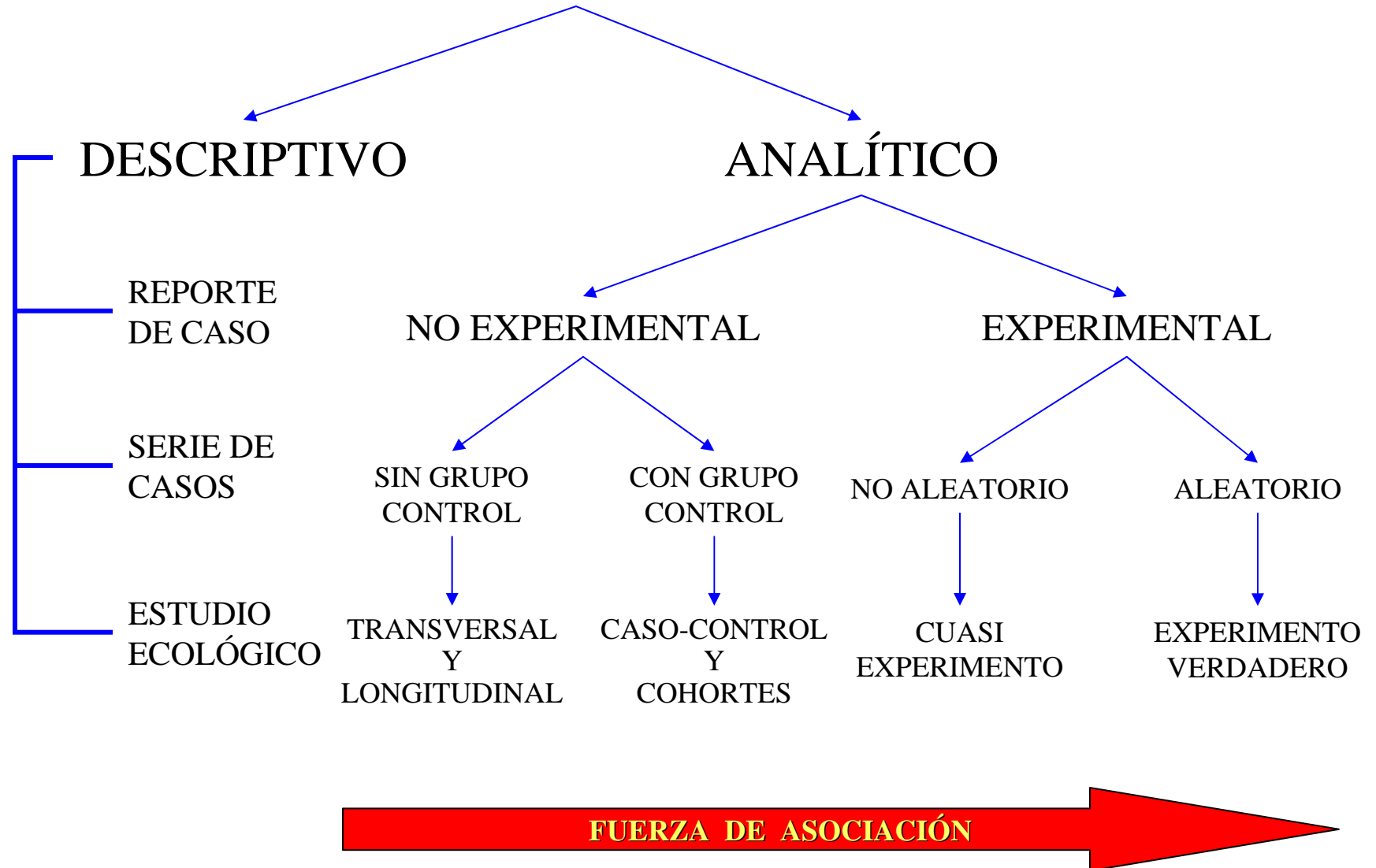
Diseños de investigación

- Se correlacionan con el tenor del problema de investigación.

- Si el problema es descriptivo (¿Cuál es la prevalencia...? ¿Cuáles son las características...?) entonces el diseño será descriptivo también.

- Si el problema plantea asociaciones (¿Hay asociación entre estado nutricional y desarrollo psicomotor? ¿Cuáles son los factores de riesgo de TB?) entoces el diseño será analítico.

Tipos de diseños

- Entonces, tenemos que las investigaciones se agrupan entorno a dos estrategias básicas de investigación:
  - La descripción de las características de una población: *estudios descriptivos*.
 - El análisis de las características individuales: *estudios analíticos*.

DISEÑO DE INVESTIGACIÓN

DESCRIPTIVO

ANALÍTICO

REPORTE DE CASO

NO EXPERIMENTAL

EXPERIMENTAL

SERIE DE CASOS

SIN GRUPO CONTROL

CON GRUPO CONTROL

NO ALEATORIO

ALEATORIO

ESTUDIO ECOLÓGICO

TRANSVERSAL Y LONGITUDINAL

CASO-CONTROL Y COHORTES

CUASI EXPERIMENTO

EXPERIMENTO VERDADERO

FUERZA DE ASOCIACIÓN

Investigación Descriptiva - Analítica

- En realidad la diferencia es solo formal, ya que se trata de momentos diferentes de la investigación, cuya secuencia es una continuidad.

- Cuando los hechos son mal conocidos, urge primero establecerlos con claridad, para luego aventurar hipótesis explicativas.

Dinámica de los estudios
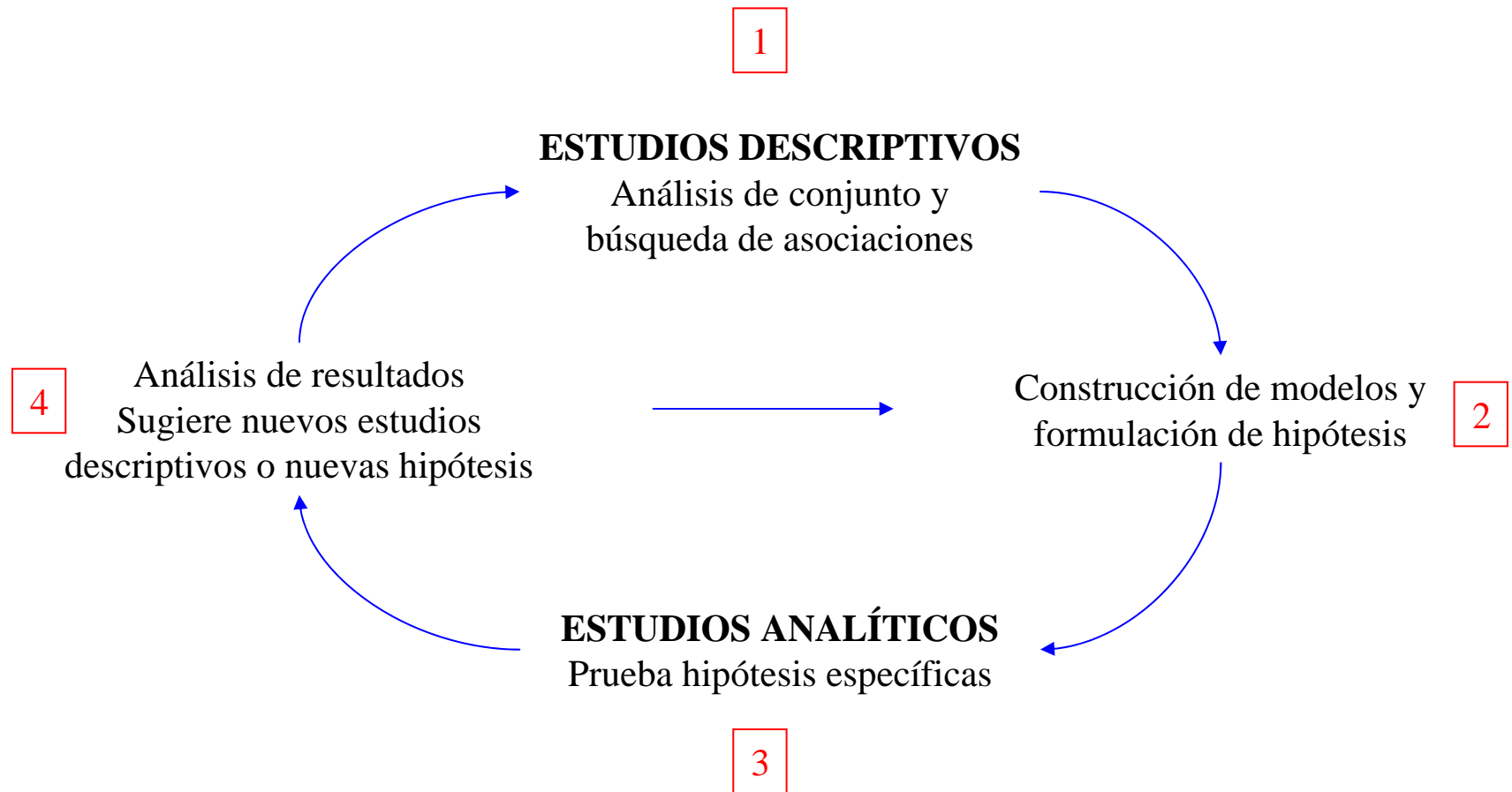
La Descripción

- Es una de las primeras formas de aproximarse al problema de investigación. Se vale de los estudios descriptivos.

- Se llevan a cabo sin una hipótesis específica; prueba *HIPÓTESIS GENERALES*.

- Son de los primeros en realizarse ante daños poco conocidos: *establecen bien los hechos*.

- Permite formular hipótesis asociativas (específicas) de investigación: *explicativas*.

- Suele basarse en el enfoque de las manifestaciones colectivas de la enfermedad.

Reporte de Caso

- Describe algún nuevo hecho clínico que valga la pena, como por ejemplo una inusual combinación de signos y síntomas, experiencia con un nuevo tratamiento etc.

- Sirve para alertar a los demás en la búsqueda de hechos semejantes.

- Se reporta como una simple narrativa clínica.

[Endometriosis involving the ureter.]

[Article in German]

Zugor V, Schott GE.

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INTRODUCTION: Endometriosis is a benign proliferation of discarded or ectopic endometrial mucus membranes which retain the histological features and biological reactions of uterine mucus membranes. This tissue is not capable of independent proliferation but is subject to the influence of estrogen progesterone. In this report we describe the clinical course of two patients with histologically proven endometriosis with participation of the uteral region and uronephrosis. CASE REPORT 1: Left-sided uronephrosis was diagnosed in a 36-year-old female during a sonographic examination for hypertension. Our gynaecologists obtained histological proof of endometriosis by laparoscopy. Two days after the laparoscopic detection of foci of endometriosis in the intestine, Douglas' pouch, ovaries as well as in the region of the left terminal ureter, a left percutaneous renal fistula was created under sonographic and radiological control. After resection of the afflicted section of the ureter, implantation of a new left ureter was performed by means of a psoas-hitch plasty. CASE REPORT 2: A 30-year-old female presented with a months-long history of dyspareunia, pain on palpation of the Douglas' pouch, occasional pain on bowel movements and back pain. In addition she had been trying for years to become pregnant. On sonography renal congestion grade III was detected. After admission and appropriate preparation, one week later an open laparotomy with lysis of intestinal as well as uterine adhesions, salpingectomy and, by the urologist, partial left uteral resection with new implantation by the psoas-hitch technique. CONCLUSIONS: Endometriosis of the urinary tract is a rare occurrence affecting 1 - 2 % of all endometriosis patients with the urinary bladder being the most commonly affected site. Endometriosis with involvement of the ureter is often diagnosed very late because of the rareness of this situation and its asymptomatic course. An individual therapy plan depending first of all on the patient's age, desire for children, and the extent of the endometriosis foci should always be attempted.

Serie de Casos

- La serie demuestra que las novedosas observaciones ocurren repetidamente.

- Da la oportunidad de identificar características comunes entre muchos casos y de describir patrones de variabilidad entre ellos.

- Aquellos que incluyen todos los casos en una comunidad tienen valor especial.

Surgical approach to urinary endometriosis: experience on 28 cases.

Antonelli A, Simeone C, Canossi E, Zani D, Sacconi T, Minini G, Cosciani Cunico S.

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OBJECTIVES: Endometriosis (e.) involving the urinary tract must be regarded as a rare condition with specific surgical implications. Our experience on the treatment of 28 patients is presented. PATIENTS AND METHODS: Twenty-eight patients with a urological e. (bladder 11 patients, ureter 14, both bladder and ureter 3) were observed and treated between 1995 and 2005. Thirteen patients (46%) had been previously surgically treated for pelvic e. at a mean distance of 22 months before. All the patients with bladder e. presented with typical symptoms related to menses and the urinary location was isolated in 42.8%. Differently, the patients having ureteral involvement complained often a vague or silent symptomatology, but they always showed some extra-urinary pelvic locations. Among the cases with bladder e., 2 patients underwent TUR and hormonal therapy and 12 partial cystectomy. The patients with ureteral e. were submitted to ureterolysis in 5 cases, segmentary ureterectomy and uretero-ureteroanastomosis in 2 and terminal ureterectomy and ureterocystoneostomy in 8. Two more cases with ureteral e. were nephrectomized due to end-stage renal atrophy. RESULTS: At a mean distance of 58 months (9-110 months) from surgery, 22 patients have a unremarkable follow-up. On the other hand, an urological relapse was evidenced in 5 cases previously submitted to TUR (2 cases), ureterolysis (2 cases) or segmentary ureterectomy and termino-terminal ureteral anastomosis (1 case). The relapsing e. was treated by partial cystectomy or terminal ureterectomy with ureterocystoneostomy, with good results over time. CONCLUSION: Urinary tract is rarely involved by e., but this condition has peculiar clinical and surgical implications. Being TUR ineffective, the therapy of choice of bladder e. is partial cystectomy, possibly via a laparoscopic approach. Differently from bladder e., the preoperative diagnosis of ureteral e. is surely hard. So, a high index of suspect should be regarded in each young female patient with a ureteral stricture and a study of the upper urinary tract (US and/or urography) should be performed in all the patients with pelvic e. Ureterolysis can be successful only in a minority of the cases showing a very limited disease not determining any urinary flow obstructions. In all the other cases the procedure of choice is terminal ureterectomy and ureterocystoneostomy without employing the distal ureter.

Estudio Ecológico

- La unidad de observación es un grupo (población) en vez de un individuo.
- Se requiere conocer la información de cada población con respecto a su exposición o efecto (enfermedad, daño).
- La tasa de incidencia o mortalidad es la medida de preferencia para cuantificar el efecto en poblaciones.
- La mayor dificultad en estos estudios es la falta de información para controlar las variables confusoras: *Falacia Ecológica*.

Environmental Health

Research

Arsenic in drinking water and cerebrovascular disease, diabetes mellitus, and kidney disease in Michigan: a standardized mortality ratio analysis

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Abstract

Background: Exposure to arsenic concentrations in drinking water in excess of 300 µg/L is associated with diseases of the circulatory and respiratory system, several types of cancer, and diabetes; however, little is known about the health consequences of exposure to low-to-moderate levels of arsenic (10–100 µg/L).

Methods: A standardized mortality ratio (SMR) analysis was conducted in a contiguous six county study area of southeastern Michigan to investigate the relationship between moderate arsenic levels and twenty-three selected disease outcomes. Disease outcomes included several types of cancer, diseases of the circulatory and respiratory system, diabetes mellitus, and kidney and liver diseases. Arsenic data were compiled from 9251 well water samples tested by the Michigan Department of Environmental Quality from 1983 through 2002. Michigan Resident Death Files data were amassed for 1979 through 1997 and sex-specific SMR analyses were conducted with indirect adjustment for age and race; 99% confidence intervals (CI) were reported.

Results: The six county study area had a population-weighted mean arsenic concentration of 11.00 µg/L and a population-weighted median of 7.58 µg/L. SMR analyses were conducted for the entire six county study area, for only Genesee County (the most populous and urban county), and for the five counties besides Genesee. Concordance of results across analyses is used to interpret the findings. Elevated mortality rates were observed for both males (M) and females (F) for all diseases of the circulatory system (M SMR, 1.11; CI, 1.09–1.13; F SMR, 1.15; CI, 1.13,-1.17), cerebrovascular diseases (M SMR, 1.19; CI, 1.14–1.25; F SMR, 1.19; CI, 1.15–1.23), diabetes mellitus (M SMR, 1.28; CI, 1.18–1.37; F SMR, 1.27; CI, 1.19–1.35), and kidney diseases (M SMR, 1.28; CI, 1.15–1.42; F SMR, 1.38; CI, 1.25–1.52).

Conclusion: This is some of the first evidence to suggest that exposure to low-to-moderate levels of arsenic in drinking water may be associated with several of the leading causes of mortality, although further epidemiologic studies are required to confirm the results suggested by this ecologic SMR analysis.

La Investigación Analítica

- Se lleva a cabo una vez que se han establecido bien los hechos con respecto al problema de investigación.

- Se llevan a cabo para probar hipótesis asociaciativas (específicas) de investigación.

- El objetivo es conocer a fondo el problema que se investiga.

- Se sirve de dos grandes tipos de estudios: los experimentales y los observacionales.

Estudios Experimentales

- Son aquellos en los cuales el investigador manipula la variable exposición. Eg: se administra alguna droga o sustancia que se espera produzca algún efecto que se quiere medir en el sujeto de investigación.

- Las características principales de estos estudios son: el grupo control, la aleatorización (R), la medición basal (O), la intervención (X) y la medición del efecto (O).

Tipos: Experimento Verdadero

- Es aquel experimento que tiene todos los elementos citados con anterioridad: grupo control, aleatorización, medición basal, intervención y medición del efecto.

- Podríamos resumirlo en el siguiente esquema:

ROXO (grupo intervención)

O O (grupo control)

Tipos: Experimento Verdadero

- Características principales:
  - Permite manipular la exposición y las condiciones del sujeto de investigación: hay intervención.
  - Puede haber sesgo (error) en la medición del efecto.
  - Permite determinar riesgo de manera directa mediante el uso del Riesgo Relativo (Incidencia grupo intervención / incidencia de grupo control).
  - Es el paradigma de la investigación científica.

Acute stroke: therapeutic transcranial Doppler sonography.

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Ultrasound (US) has emerged as a new tool to treat ischemic stroke. The potential advantage of US is decreased risk of systemic bleeding complications due to its site-specific effect. Moreover, external application is noninvasive and is readily available. Experimental studies showed that low intensity (</=2W/cm2) US safely enhanced thrombolytic drug activity within a wide range of frequencies (0.04-3.4 MHz). In humans, transcranial sonothrombolysis with mid-kHz frequencies showed an unacceptably high rate of intracranial bleeding, while the use of 2MHz yielded promising results in The Combined Lysis of Thrombus in Brain Ischemia Using Transcranial Ultrasound and Systemic TPA (CLOTBUST) study. This study was a phase II randomized clinical trial that included patients with middle cerebral artery (MCA) occlusion within 3 h of stroke onset, who were treated with standard dose of tissue plasminogen activator (t-PA). Residual flow in MCA was monitored with 2MHz US in one group, and the rate of complete recanalization and dramatic clinical recovery significantly increased as compared to t-PA alone. This chapter further discusses diagnosis of an acute occlusion and recanalization using the thrombolysis in brain ischemia (TIBI) waveform flow grading scale, application of fast track insonation protocol, and administration of US. Also, the potential enhancement of sonothrombolysis with microbubbles is discussed.

Brief Communications

Nutritional education and fruit and vegetable intake: a randomized community trial

ABSTRACT

We conducted a community trial-type intervention including a sample of 80 families living in a low income neighborhood in the municipality of Sao Paulo, Brazil, in 2004. The intervention relied on nutritional education to increase the participation of fruit and vegetables in the family diet, and was administered in the form of three two-hour meetings during three consecutive weeks. To evaluate the immediate impact of this educational intervention, families were randomly divided into two groups (intervention and control). Only the immediate impact of the intervention was evaluated, based on the participation of fruit and vegetables in the family's total food purchases in the months prior to and following the intervention. The comparison, which was favorable to the intervention group, showed a 2.9 percentage point increase (95% CI: 0.32; 5.39) in the proportion of total calories derived from fruit and vegetables.

Tipos: Cuasi-experimento

- Le falta la aleatorización.
- Su esquema es como sigue:

  OXO (grupo intervención)

  O O (grupo control)

- Es de los más utilizados cuando se hace intervención en poblaciones. Eg: uso de alguna vacuna nueva; uso de complementos nutricionales etc.
- Sus resultados son válidos para la población estudiada; sin embargo su validez externa debe ser evaluada con cuidado.

Estudios Observacionales

- Se caracterizan porque no hay manipulación de la exposición por parte del investigador. Eg: se sigue a un grupo de sujetos que fuma y a otro que no fuma.

- Se dividen en controlados (con grupo control) y no controlados.

- Los estudios observacionales controlados son el de cohortes y el caso-control.

- Los estudios no controlados, son el longitudinal y el transversal.

Estudio de Cohortes

- Es aquel en el cual la formación de los grupos de investigación se hace en base a la exposición. Eg: se forma un grupo de fumadores y luego otro de no fumadores y se los *observa* por un periodo de tiempo, en búsqueda de casos de cáncer de pulmón.

Expuestos

Con Efecto

Sin Efecto

No expuestos

Con Efecto

Sin Efecto
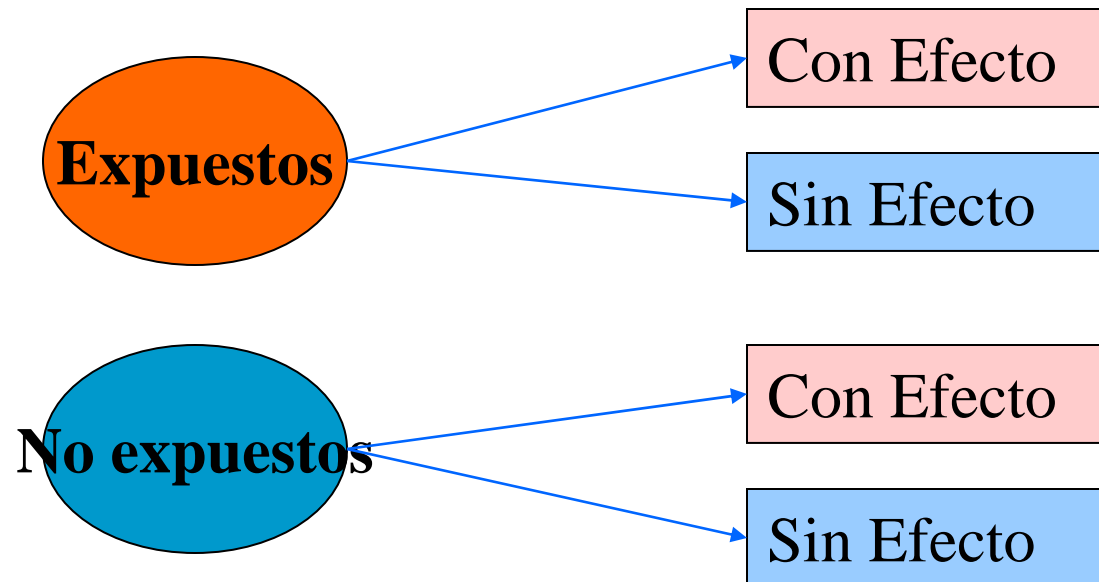
Estudio de Cohortes

- Características:
  - Con frecuencia no hay sesgo en la determinación de la exposición.
  - Probabilidad de sesgo en la medición del efecto.
  - Permite medir directamente el riesgo mediante el Riesgo Relativo (RR).
  - Son costosos y requieren un tiempo de seguimiento de los sujetos de investigación.

Deteriorated Health-Related Quality of Life in Healthy Male Smokers.

[Article in English, Spanish]

Cayuela A, Rodriguez-Dominguez S, Otero R.

Unidad de Apoyo a la Investigacion. Hospital Universitario Virgen del Rocio. Sevilla. Espana. aurelio.cayuela.sspa@juntadeandalucia.es.

OBJECTIVE: To analyze the association between smoking and health-related quality of life (HRQL) in male smokers compared to male nonsmoker, both with no history of chronic disease at 3 health centers in Seville, Spain. PATIENTS AND METHODS: We conducted a retrospective cohort study of smokers and nonsmoker who were matched on the basis of potentially confounding variables (age, marital status, occupation, education, and health center). Data were compiled in interviews conducted by a qualified and previously trained interviewer. HRQL was assessed using the 36-item short form general health questionnaire (SF-36). RESULTS: Except for the physical functioning dimension, which refers to physical activities of daily living (P=.111), smokers had significantly worse (P< .05) HRQL scores measured with the SF-36 questionnaire. On average, smokers scored 10 points less than nonsmoker in the 8 HRQL dimensions. The greatest difference was observed in the dimensions reflecting mental health, particularly in limitations experienced as a consequence of emotional problems (emotional role score 14 points less for smokers; P=.001). When compared to national norms, the scores of smokers were on average 12 points lower in the 8 HRQL dimensions. The greatest differences were observed in physical role (31 points) and bodily pain (17 points). CONCLUSIONS: Even smokers who have not developed acute or chronic comorbidity associated with cigarette smoking have a poorer HRQL than nonsmoker.

Estudio tipo Caso-Control

- Es aquel estudio en el cual la formación de los grupos de investigación se hace a partir del efecto (enfermedad) para luego investigar su exposición a ciertos factores.

- Eg: se seleccionan dos grupos, uno de pacientes con ca de pulmón y otro sin ca de pulmón, luego de lo cual se investiga en ellos sus antecedentes.
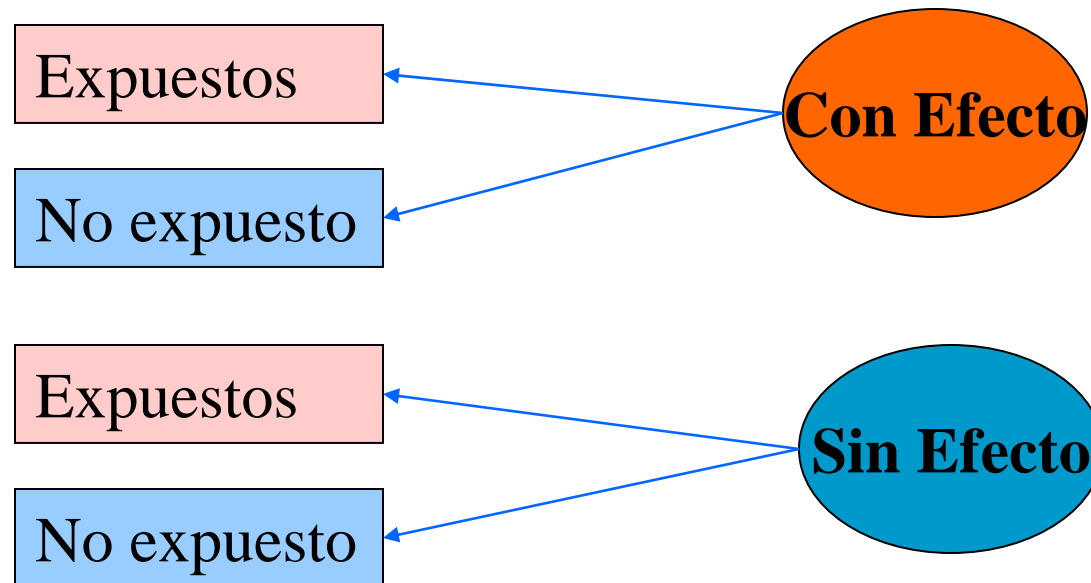
Caso - Control

- Características:
  - No hay sesgo en la medición del efecto (enfermedad).
  - Hay probabilidad de sesgo en la medición de la exposición.
  - El riesgo se mide de manera indirecta mediante el uso del Odds Ratio (OR) que estima el RR.

	Con efecto	Sin efecto
Expuestos	a	b
No expuestos	c	d

$OR= ad/bc$

Cigarette smoking and primary liver cancer: a population-based case-control study in US men.

Zhu K, Moriarty C, Caplan LS, Levine RS.

US Military Cancer Institute, Walter Reed Army Medical Center, 6900 Georgia Avenue, NW, Building 1, Suite A-109, Washington, DC, 20307-5001, USA, kangmin.zhu@na.amedd.army.mil.

OBJECTIVE: Using the case-control data from the Selected Cancers Study, the authors assessed whether cigarette smoking increases the risk of primary liver cancer in the US. METHODS: Cases were men who were pathologically diagnosed with primary liver cancer during 1984-1988, were 31-59 years old, and lived in the areas covered by eight US cancer registries (n = 168). Controls were men without a history of primary liver cancer who were selected by random-digit telephone dialing (n = 1910). RESULTS: Relative to non-smokers, the risks of liver cancer were 1.85 (95% confidence interval (CI), 1.05-3.25) and 1.49 (95% CI, 0.83-2.68) for former and current smokers, respectively. The adjusted odds ratio (OR) estimates were 0.96, 1.43, 1.80, and 1.87 for smoking for less than 15, 15-24, 25-34 and 35 or more years, respectively (p for trend = 0.039). The OR estimates were 1.41 (95% CI, 0.74-2.68), 1.67 (95% CI, 0.93-2.98), and 1.83 (95% CI, 0.89-3.76) for less than 1, 1-2, and 2 or more packs smoked per day (p for trend = 0.068). CONCLUSIONS: Cigarette smoking may be a factor that contributes somewhat to the occurrence of primary liver cancer among men in the United States, a country with low risk of liver cancer.

Estudio Longitudinal

- Es aquel en el cual se estudia a toda una población sin formar grupos. Se les hace una medición basal y luego seguimiento con la finalidad de objetivar la aparición del efecto que se busca.

- Eg: a la población de Hiroshima se les hizo un seguimiento luego de la explosión de la bomba atómica buscando la aparición de casos de cáncer.
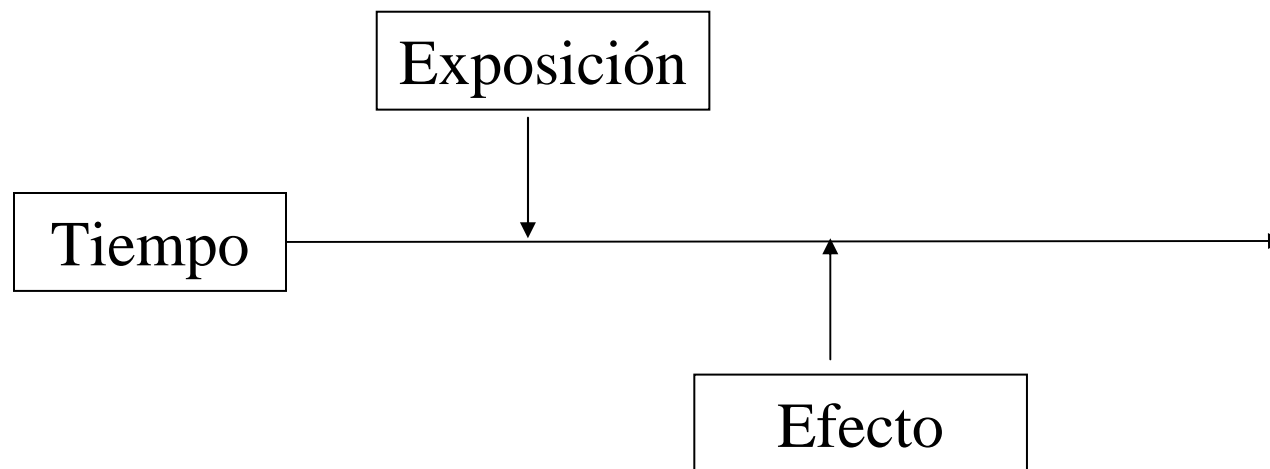
Estudio Longitudinal

- Son muy útiles para determinar la incidencia de una enfermedad, pero no sirven para hallar asociaciones y por lo tanto factores de riesgo: no hay grupo de comparación.

- Sin bien no existe grupo control, se puede categorizar la población de acuerdo a las características de persona, lugar y/o tiempo, y luego hacer comparaciones que sí pueden dar medidas de riesgo: mayor o menor exposición.

Prognosis of chronic low back pain: design of an inception cohort study.

Costa LC, Henschke N, Maher CG, Refshauge KM, Herbert RD, McAuley JH, Das A, Costa LO.

ABSTRACT: BACKGROUND: Although clinical guidelines generally portray chronic low back pain as a condition with a poor prognosis this portrayal is based on studies of potentially unrepresentative survival cohorts. The aim of this study is to describe the prognosis of an inception cohort of people with chronic low back pain presenting for primary care. METHODS: The study will be an inception cohort study with one year follow-up. Participants are drawn from a cohort of consecutive patients presenting with acute low back pain (less than 2 weeks duration) to primary care clinics in Sydney, Australia. Those patients who continue to experience pain at three months, and are therefore classified as having chronic back pain, are invited to participate in the current study. The cohort will be followed up by telephone at baseline, 9 months and 12 months after being diagnosed with chronic low back pain. Recovery from low back pain will be measured by sampling three different outcomes: pain intensity, interference with function due to pain, and work status. Life tables will be generated to determine the one year prognosis of chronic low back pain. Prognostic factors will be assessed using Cox regression. DISCUSSION: This study will determine the prognosis of chronic non-specific low back pain in a representative cohort of patients sourced from primary care. The results of this study will improve understanding of chronic low back pain, allowing clinicians to provide more accurate prognostic information to their patients.
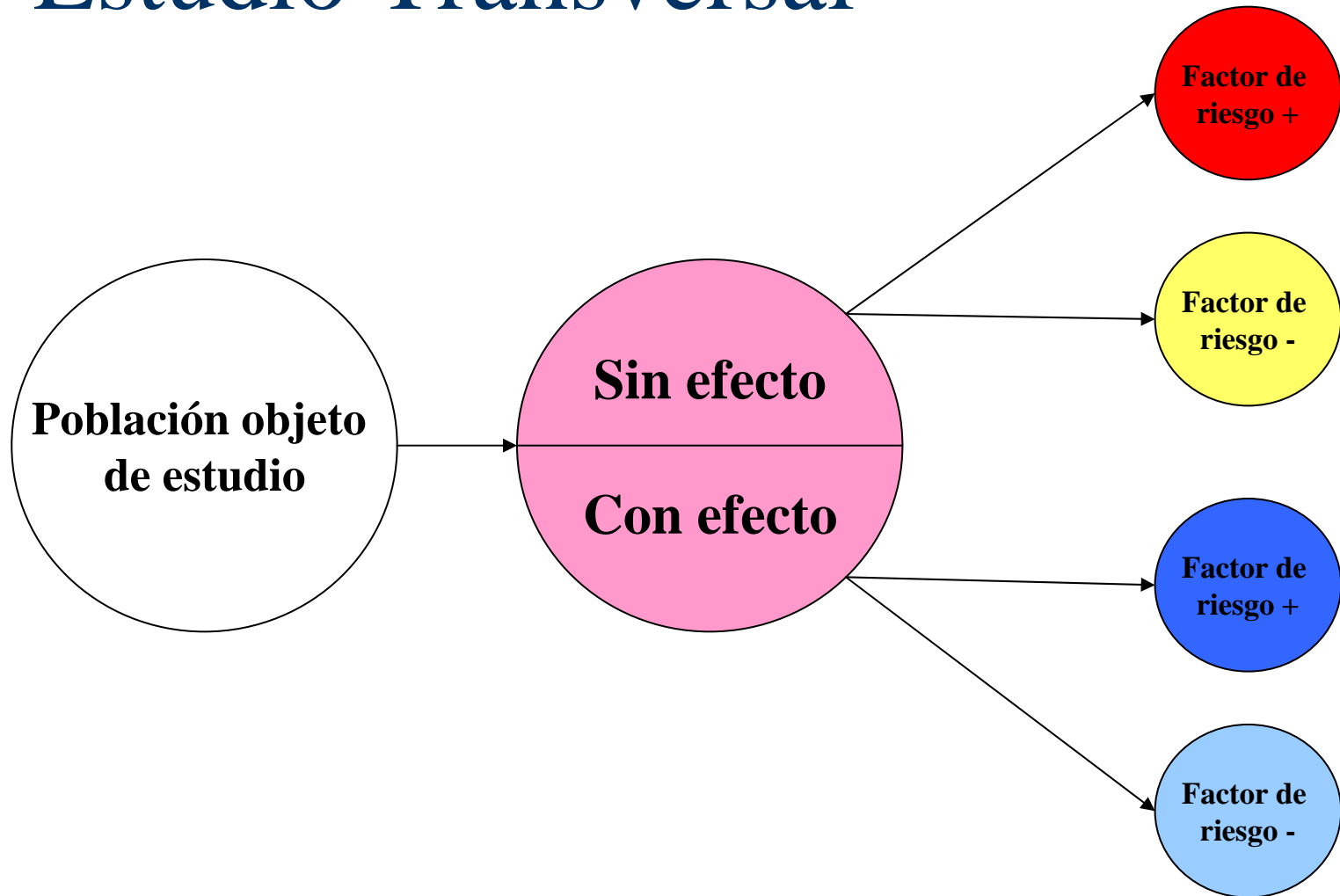
Estudio Transversal

■ En este tipo de estudio la exposición y el efecto son obtenidos al mismo momento. Eg: un estudio mide en niños desarrollo psicomotor y al mismo tiempo evalúa desnutrición.

Estudio Transversal

Población objeto de estudio → **Sin efecto** / **Con efecto**

- Factor de riesgo +
- Factor de riesgo -
- Factor de riesgo +
- Factor de riesgo -
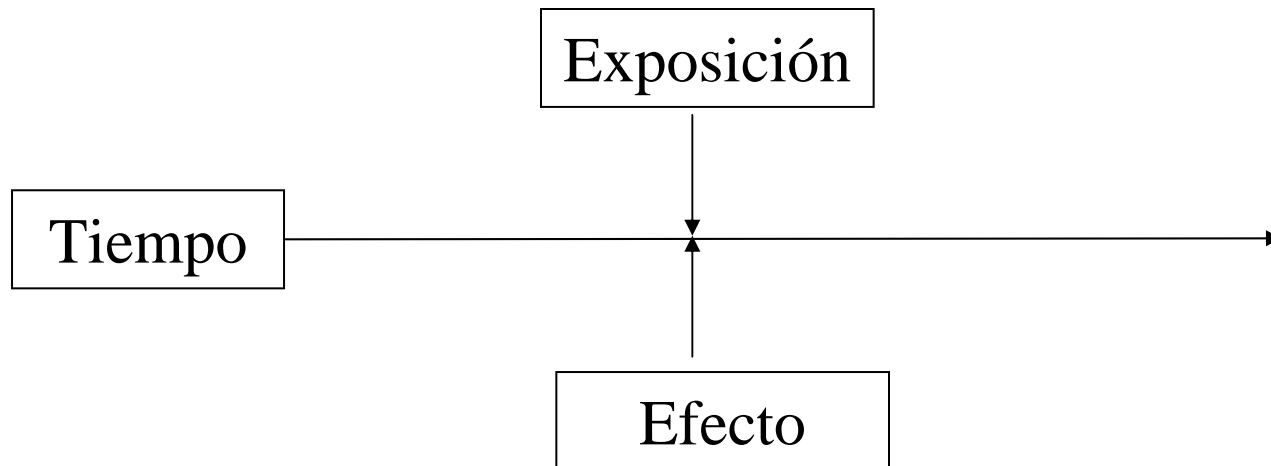
Estudio Transversal

- Una limitación es que la dirección que tome la relación de causalidad es ambigua, ya que puede ser dirigida en ambos sentidos (¿qué fue primero…?).

- Generalmente la información obtenida es muy reciente como para tener significado etiológico.

- Como las mediciones se ubican en un determinado lugar y tiempo, los casos que se involucran en el estudio son casos prevalentes.

- No es adecuado para estudiar daños de baja prevalencia.

Relationship Between Habitual Refractive Errors and Headache Complaints in Schoolchildren.

Hendricks TJ, DE Brabander J, VAN DER Horst FG, Hendrikse F, Knottnerus JA.

Department of General Practice, University of Maastricht, The Netherlands (TJWH, FGvdH, JAK), Department of Ophthalmology, Eye Research Institute Maastricht, University of Maastricht/Academic Hospital Maastricht, The Netherlands (JdB, FH), and Care and Public Health Research Institute, University of Maastricht, The Netherlands (FGvdH, JAK).

PURPOSE.: Refractive error (RE) is considered to be a possible cause for headaches. We aimed to gain insight into the relation between habitual RE (sphere and astigmatism) and headache complaints. METHODS.: In a cross-sectional study the habitual refractive state of 487 children, aged between 11 and 13 years, was measured using an autorefractometer (Topcon, RM-8000B). Headache complaints were measured using a questionnaire. Data were analyzed using Pearson correlation coefficients, bivariate analysis, and multiple logistic regression analysis. RESULTS.: For right eyes we found 15% habitual myopia <-0.50 D and 12% habitual hyperopia >+0.50 D; habitual astigmatism >0.25 D was found in 33% of children. Pearson R between right and left eyes was 0.76 for the spherical component and 0.42 for the cylindrical. In the total group of children 70% reported the occurrence of headache in the last year. These headaches were reported as "often or frequent" by 37% of children, "severe" by 15%, "with long duration" by 45%, and "with severe burden" by 27%. In the total sample we found various associations between gender, sphere/cylinder components of habitual RE, and headache complaints. Headache was reported more in girls than in boys. Of the total variance of headache complaints in girls, the sphere component of habitual RE explained 4% of frequency, 6% of intensity, 2% of duration, and 2% of amount of burden. Of the total variance of headache complaints in boys the cylinder component of habitual RE explained 3% of frequency, and 4% in amount of burden. CONCLUSION.: Habitual RE and headache complaints are relatively common conditions in schoolchildren aged between 11 and 13 years. Headache complaints showed a small but statistically significant association with the sphere component of habitual RE in girls and the cylinder component of habitual RE in boys. The associations found between habitual RE and headache complaints indicate that habitual RE might be a risk factor for headache in children.

Gender Differences of Oligomers and Total Adiponectin during Puberty: A Cross-sectional Study of 859 Danish School Children.

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Context: Pubertal stages have been shown to influence total adiponectin (ADPN) levels. Further, testosterone has been shown to alter the isomer distribution of ADPN. Objective: To investigate whether pubertal stages and testosterone levels influenced total serum ADPN levels and the distribution of ADPN isomers. Design: Cross-sectional study. Patients: 859 children and adolescents (396 males) aged 6 to 20 yrs. Main Outcome Measures: Total ADPN and ADPN isomers were measured using a validated in-house immunoflurometric assay. Fractioning of the ADPN into the 3 major molecular fractions was performed in representative subgroups of pre- and post-pubertal males and females (n= 40, 10 in each group) using a validated fast protein liquid chromatomography method. Results: Total ADPN levels before puberty were 13.4 (11.1 - 15.9) mg/l (median and inter quartile range) and 14.7 (12.3 - 18.1) mg/l (P=ns), in males and females, respectively. After puberty, ADPN levels were significantly reduced in males, 9.7 (8.2 - 12.0) mg/l, but remained unchanged in females, 12.1 (9.7 - 15.3) mg/l (P<0.0001). Concomitantly, a reduction was seen in the ratio of high molecular weight (HMW) isomers to total ADPN (HMW ratio) when comparing pre-pubertal and post-pubertal males. Also, post-pubertal males had lower HMW ratios than corresponding females (P=0.038). Finally, a negative correlation was seen between HMW ratio and testosterone (r= - 0.430, P=0.007). Conclusion: Serum total ADPN levels decrease through puberty in males. Also, reduced HMW ratio is seen in males at the onset of puberty. We speculate that the suppression of HMW ADPN may be caused by testosterone.

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VALIDEZ DE UNA INVESTIGACIÓN

Validez

- El estudio de la validez nos va a permitir conocer la fiabilidad de los resultados de una investigación.

- Dos tipos:
  - Validez interna.
  - Validez externa.

Validez Interna - Error sistemático

- ## Sesgo de selección.
  - Se presenta cuando la selección de la población de estudio no es la más adecuada (criterios de inclusión/exclusión).
  - Eg: El objetivo de la investigación es identificar factores de riesgo para otitis media. Pero no se aplican criterios diagnósticos adecuados de otitis media aguda. Esto conlleva a una inadecuada selección de la población con OMA.

Error sistemático

- Sesgo de medición, información o memoria.
  - Se presenta cuando la técnica o el instrumento de medición que estamos utilizando no es el más adecuado para identificar las variables de estudio; cuando la fuente de información no es fidedigna; o cuando hay probabilidad que un grupo de sujetos recuerde mejor o peor una circunstancia.
  - Eg: uso de cuestionarios diagnósticos no validados; revisión de historias clínicas mal llenadas; interrogatorio sobre eventos que ocurrieron en el pasado lejano.

Error sistemático

- **Efecto confusor.**
  - Se presenta cuando una variable está relacionada tanto con la exposición como con el efecto de igual manera.
  - Eg: investigación sobre prevalencia de transtornos depresivos sin controlar el sexo de los participantes; investigar sobre prevalencia de cáncer sin tomar en cuenta el análisis de la distribución de la edad.

Validez externa

- Referida al procedimiento de muestreo.
  - Tipo de muestreo: aleatorio/conveniencia.
  - Tamaño de la muestra.
  - Variabilidad de la población.
- Da a conocer la capacidad de inferencia estadística de los resultados del estudio a una población.

Análisis crítico de un artículo

- Objetivos.

- Materiales y métodos.
  - Evaluación de la validez interna y externa.

- Resultados.

- Conclusiones.

I keep six honest serving men

(They taught me all I know);

Their names are WHAT and WHY and WHEN

And HOW and WHERE and WHO

- Rudyard Kipling

Premio Nobel de Literatura 1907