# Diagnostic of Symptoms Using Fuzzy Logic and Decision Making Techniques

## Dr.A.Rajkumar[1,] Sathiyabhama[2]

*Assistant Professor, Department of Mathematics, A.V.V.M. Sri Pushpam (Autonomous) College.*
*poondi.Thanjavur.TamilNadu*
*Assistant Professor, Department of Mathematics,Bahrath college of Arts and Science*
*College.Thanjavur.TamilNadu.*
*Corresponding Author: Dr.A.Rajkumar*

**Abstract:** The clinical interview and history elicitation are very important tools in the field of pediatric medicine. Though it is of much diagnostic value the very process of interdiction with the parents and the child during history taking also has therapeutic value. A pleasant and patient interaction is what any parent desires. There should be fever distractions during the interview. It is good to use lay terms when talking to the parents and avoid medical terminologies as far as possible. While interviewing the pediatrician should also observe the child to look for any clinical clues. In pediatrics, the most important and distinct aspect is the fact that the person giving the history is usually hot the parents are the usual source of information and in certain cases when caretakers (other than the parents) are bringing up the children then they will be the source of information. Make a note of the name of the child, his or her age in years (with months and days),Parents, Name, address, date and time of interview, informants name and relationship to child and their reliability (with regard to the consistency of the information they provide). The main problem or complaint for which the child has been brought for medical attention should be recorded in the informants own terms and should be recorded in chronological order with the duration  of each complaint.
**Keywords:** IPA, ORS, SARS, human T-lymph,

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## I.    INTRODUCTION:

Care, survival and development of children have always been our concern. The government of India and India Academy of pediatrics (IPA) has undertaken several projects over last few decades to improve health of children and it is time to introspect on the ultimate goal. Due to a rapid rise in population I India that stands at **1.2** billion at present, there exists shortage of health personnel and facilities. Though, there has been steady decline in infant and under-5 mortality rate, it is still high and neonatal mortality rate has not much changed over years. Breastfeeding is initiated within first hour only in **25%** of neonates and exclusive breastfeeding in the first 6 months is practiced in **45%** of infants. Only **50%** infants are timely weaned. More than **60%** of the children do visit health facilities for common illnesses but even then **40%** have remained underweight, **45%** stunted, **23%** wasted**, 75%** anemic with **5%** having severe anemia. Two to three percent children under 3 years of age suffer from acute severe malnutrition **with 20-30%** mortality in this group. In spite of availability of free vaccines in expanded program on immunization EPI) program, there is no change over last decade in number of fully vaccinated children that stands at less than **50%.** Similarly, only**45%** children use oral rehydration solution (ORS) during diarrheal episodes. Thus, health indices have not much changed over last decade. It suggests that medical and paramedical personnel do not follow standard simple cost-effective preventive measures, in spite of contact opportunity with the community. In the **1960s** and **1970**, antibiotics and vaccines appeared to have controlled infectious diseases. However, infectious diseases have returned with vengeance. Tripartite interaction between environment, microbes and host status decide outcome of infectious disease. There is complex struggle for survival between humans and microbes, and microbes are exploiting human behavior. Early and frequent exposures to infections, varying nutritional and immune status, lifestyle changes, global travel and misuse of antibiotics have contributed to resurgence of old infections. Microbes have an inherent ability to mutate, change virulence and acquire resistance to antibiotics. This has made battle against infections more difficult. Besides, new organisms are being recognized. Forty new microbes have been recognized over last 30 years. They include viruses such as rotavirus, Ebola virus, hantavirus, parvovirus B19, human T-lymph tropic viruses type 1 and 2, hepatitis C and E, H5NI avian strain of influenza, severe acute respiratory syndrome (SARS), human metapneumovirus,H1N1 swine re-assort ant influenza, bacteria such as legionella, campylobacter jejuni, toxin producing staphylococci, Borrelia, Helicobacter pylori and parasites such as Cryptosporidium and Cyclosporine.

Changing epidemiology has been observed in Dengue fever, leptospirosis, Brucellosis and Rickettsial fever. Due to a breakdown in public health measures, there is resurgence of malaria and tuberculosis.

➤ Fever        - 5 days.
➤ Vomiting   - 4 days.
➤ Loose motions – 4 days.
➤ Decreased urine output – 2 days.
➤ Lethargy – 1 day.
➤ Fast breathing – 1 day.

**Symptoms:**
(i)Vomits frequency     (ii) Cries excessively (iii) wakes up at night
(iv) Has heartburn or chest pain (v) Complains of abdominal pain
(vi) Writhes in pain by arching his/her back and heck (vii) refuses to eat
(viii) Has a hoarse voice, coughs' or wheezes
(ix) Has difficulty in swallowing.

**Change In Your Child's Diet:**
It's important to identity which food and drinks seem to trigger your child's discomfort. You can discus then with your child's doctor. Then you and your child's doctor can decide what changes can be made in your child's mealtime habits and nutritional choice.
Please look down this list of common trigger foods and note whether your child eats or drinks them, rarely (or) often.

➤ A - Orange or grape juice (or) Spicy Foods
➤ B - Tomato ketchup (or) Chocolate
➤ C - Caffeinated and Carbonated drinks (or) flavored food/drink.

| Age | A | B | C | Total |
|---|---|---|---|---|
| Less 0-3 years | 2,000 | 250 | 50 | 2,300 |
| 4-6     years | 3,000 | 220 | 80 | 3,300 |
| 7-11    years | 1,500 | 170 | 30 | 1,700 |
| 12-15  years | 880 | 80 | 40 | 1,000 |
| Total | 7,380 | 720 | 200 | 8302 |

(i)  We follow stratified proportional sampling method and take **10%** of the universe equivalent to the sample size.
(ii) If the size of the sample is **10%** of the universe in the ratio **5:3:2:** and weight age of the length of the ration **4:3:2:1**

The sample size is **10%** of the universe hence 830 people would be selected in the sample size **12 s**trata is formed and we must to follow proportionate stratified sampling method we will take 10% from each stratum. The number of persons selected shall be as follows.

| Age | A | B | C | Total |
|---|---|---|---|---|
| Less 0-3 years | 200 | 25 | 5 | 230 |
| 4-6     years | 300 | 22 | 8 | 330 |
| 7-11    years | 150 | 17 | 3 | 170 |
| 12-15  years | 88 | 8 | 4 | 100 |
| Total | 738 | 72 | 20 | 830 |

In the second case also the size of sample is 830 but the A,B and C due to be in the ratio of **5: 3: 2:** of the sample
i.e.) We take   A)  $\frac{830 \times 5}{10} = 415$.   B)  $\frac{830 \times 3}{10} = 249$.   C) $\frac{830 \times 2}{10} = 166$.
Since the weight age to length of 4:3:2:1: the number selected from each category shall be as given in the

| Age | A | B | C | Total |
|---|---|---|---|---|
| Less 0-3 years | 415x4/10 =166 | 249x4/10 =99.6=100 | 166x4/10 =66.4 =66 | 332 |
| 4-6     years | 415x3/10 | 249x3/10 | 166x3/10 | 248 |

|  | = 124.5 | =74.7 | = 49.80 |  |
|---|---|---|---|---|
| 7-11    years | 415x2/10 =83 | 249x2/10 49.8 | 166x2/10 =33.2 | 166 |
| 12-15  years | 415x1/10 =42 | 249x1/10 =24.9 | 166x1=16.6 | 84 |
| Total | 415 | 249 | 166 | 830 |

The diagnose the problem to be solved and satisfied in the field

**Normalization of payoff matrix is presented using method:**

`Normalization is the process by which the values of the various alternatives available for a given criterion can be transformed to lie between 0 and 1, so that the criteria of different units fall within the same range. This process also helps to ensure that the criterion with larger range will not dominate the criterion with smaller range. Pomerol and Romero (2000) suggested the normalization with salient features which are explained briefly as follows: If fj(a) is the value of criterion j for alternative a send Mj and mj are maximum and minimum values of criterion j in the alternative set N, then the normalized value of criterion j for the alternative a vj(a) is defined as

$$Vj\ (a) = [\frac{fj(a)}{\sum_{a=1}^{N} fj(a)}]$$

The decision-maker may choose a relevant normalization method depending on the available data and planning problem under consideration. More details and application of normalization methods are available in opricovic and Tzeng (2004) and shih et al. (2007). Chen (2000) used the normalization method based on linear scale transformation in fuzzy environment to transform Triangular Fuzzy Numbers (TFN) into normalized TFN (more details on TFN are available in triangular fuzzy number (TFN).

| Criteria / Alternative | C1 | C2 | C3 |
|---|---|---|---|
| A1 | 0.4000 | 0.4016 | 0.3975 |
| A2 | 0.2987 | 0.2971 | 0.2951 |
| A3 | 0.2000 | 0.1962 | 0.1987 |
| A4 | 0.0102 | 0.0963 | 0.0963 |

All values are triangular fuzzy number. In the fuzzy values are diagnose the problem satisfied in the suchivation and consideration of the 100% curable in the fuzzy values 0 to 1.
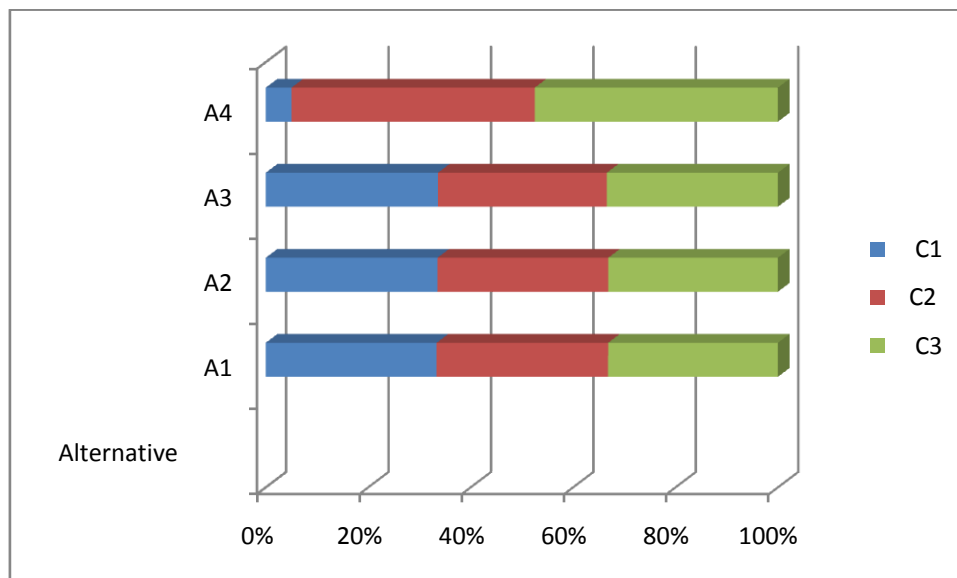


**Stratified sampling methods have the following advantages:**
➢ More representatives. Since the population is first divided into various strata and then a sample is drawn from each stratum there is a little possibility of any essential group of the population being completely

excluded? A more representative sample is thus secured. C.J. Grohmann has rightly pointed out that this type of sampling balances the uncertainty of random sampling against the bias of deliberate.

➤ Greater accuracy. Stratified sampling ensures greater accuracy. The accuracy is maximum if each stratum is so formed that it consists of uniform or homogeneous items.

➤ Greater geographical concentration. As compared with random sample, stratified samples can be more concentrated geographically; the units from the different strata may be selected in such a way that all of them are localized in one geographical area. This would greatly reduce the time and expenses of interviewing.

## II. CONCLUSION

We need to change focus from disease to health. We must combine traditional wisdom with modern science. IPA has formulated guidelines for standard management of many common diseases that should be followed meticulously. Constant updating is necessary to keep up with scientific advances and they should be used selectively. Science will undergo frequent changes as nothing as nothing is constant and ignorance is far more than knowledge. Hence, we need to learn, unlearn and relearn.

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[10].  Bias may be said to exist when the value of a simple statistic shows a persistent tendency to deviate in one direction from the value of the parameter.