

## Article

# Alternative method for analyzing multiple overlapping responses

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**The conventional technique of analyzing multiple response questions, which involves counting of the frequencies for a single code and then reporting its percentage, often gives misleading picture of data characteristics. An alternative method for analyzing such responses has been proposed which is more powerful in terms of revealing data characteristics.**

**Key words:** Multiple overlapping responses, ante-natal checkups, adolescent reproductive sexual health.

## INTRODUCTION

Developing countries are lagging far behind millennium development goals on primary education, health and nutrition. Among these, India and Bangladesh have high population density, which also includes highest concentration of poor people. Despite commitment at highest level, achievements in these sectors have not been in proportion to the money deployed. A major concern of the policy makers and plan implementers has been to identify the impediments and take remedial measures.

One of the ways is to analyze trends of reasons of failures. As there could be several reasons of failures, the responses could be multiple in natures requiring careful diagnostics. Possible types of answers sought by any survey based study could be related to interventions for the targeted population – whether all components of ante natal checkup (ANC) are being provided, whether all aspects of IEC are being covered, and even, which out of several NGOs involved at the grass root level for a large scale intervention are poor performers of implementation. The current practice to analyze such questions is counting of the frequencies for a single code and then reporting its percentage. But, it hardly reveals any useful

information, since the total percentage of all options exceeds hundred which does not clearly depict the actual data characteristics. This type of analysis conceals more than it reveals and, as would be seen later, it does not fully exploit some of the peculiar data characteristics.

In the present paper an attempt has been made to address the above problem and suggest an alternative method of analysis of data with multiple responses which is more powerful than the one being used at present.

## METHODOLOGY

Multiple-Response Categorical Variables are common in surveys where respondents are instructed to "mark all that apply" from a list of items. The method of the present paper is best described through examples.

### Example 1: Ante natal checkups given to pregnant women

Under the ANC given to pregnant women, there is a

**Table 1.** Nature of check-ups.

<b>Nature of check- ups(Base those who had checkup)</b>	<b>Percent</b>
n	367
Gave some medicine	55.0
Examined eyes	12.0
Examined tongue	15.8
Gave dietary suggestions	26.2
Checked pulse	19.1
Examined stomach/abdomen	13.9
Examined nails	12.8
Took urine sample	28.9
Gave the Immunization card	9.8
Blood test	32.7
Checked BP	19.1
Took weight	44.4
Examined palms	6.0
Told about precautions to be taken just before delivery	4.1
Injection	0.0
Things to be arranged for delivery	1.1
Others/DK/CS	3.0

check list of 16 or 17 services that should be included in the checkup, like: examination of eyes, tongue, stomach/abdomen, nails, palms, providing medicine, dietary suggestions, pulse checking, collection of urine sample, providing immunization card, blood test, BP testing, weighing, awareness regarding the precautions to be taken just before the delivery, injection, arrangement of the things required during the delivery. In addition to the ANC, paramedical service providers like Anganwadi Worker (AWW), Auxiliary Nurse Midwife (ANM) and other mobilization functionaries are also supposed to advise pregnant women, like: take TT injections, IFA tablets, enough rest during the day, eat enough nutritious food at least 3 to 4 times in a day, do not eat sour and carry heavy weights, Go for health check-ups, consult doctor for complications and start breast-feeding on first day it self.

These services are provided to the pregnant women through either a Doctor at Primary/ Community health centers/Government hospital, Private Doctor, ANM or AWW. In a study entitled "Assessment of Maternal and Infant Survival Project in the state Madhya Pradesh", done by Institute of Applied Statistics and Development Studies (IASDS), Lucknow for CARE, India in 2005, lactating women of children below 1 year were asked which of the listed items were covered in ANC during their pregnancy and what advice did the AWW/ANM/Community Mobilizer give you when the child was in your womb?" The responses were multiple and were analyzed in the traditional manner. The findings were reported in Tables 1 and 2.

A ready inference drawn from Tables 1 and 2 is that

almost every ANC service and advice that should be given to the pregnant women is being provided at varying levels. An alternative analysis of the same data, however, reveals some more information (Table 3). In the alternative approach, ANC data were again analyzed to ascertain percent of women who were provided only one, only two, only three, and so on..., of the 16 to 17 services under ANC. This analysis produces some interesting findings.

One fourth of women were provided only one, 12% only two, 17.1% only three, and 15.5% only four of these services. Coverage above these had less than 10% rates, there were none receiving more than twelve services. These results when viewed in conjunction with Table 1 provide some value added information. While 55% women were given medicine, 44.4% had weight measurement, 32.7% Blood test, and 28.9% had urine tests. Some other important components had extremely low coverage levels (like checked pulse and BP, 19.1% each; examined – tongue, 15.8%, stomach/abdomen, 13.9%, nails, 12.8%, eyes, 12%, palms, 6%). Providing only the services as above in the name of ante natal checkups does not serve the purpose.

A similar analysis of the other crucial service supposed to be given by ANM/AWW/Community Mobilizer reveals (Table 4) that out of 12 to 13 components of advice, 54.5% were given only one, 7.6% two, 9.7% three, and 13.9% four of these. Coverage above these was also very low. A look at Table 2 reveals that 72.2% women were advised to eat enough nutritious food, followed by TT injections (43.1%), IFA tablets (37.8%), enough rest during the day (20.5%), consulting Doctor for complications

**Table 2.** Suggestions received from the AWW/ ANM/ Community Mobilizer.

All who were visited by AWW/ANM/ Community Mobilizer	Percent
n	288
Take TT injections	43.1
Take IFA tablets	37.8
Eat enough nutritious food	72.2
Take enough rest during the day	20.5
Do not carry heavy weights	10.8
Go for health check-ups	9.7
Eat at least 3-4 times in a day	9.7
Did not give any advice	3.5
Consult doctor for complications	11.5
Start breast-feeding on first day it self	7.3
Not to eat sour	0.0
Avoid taking medicines	1.4
Others	3.4

**Table 3.** Number of ANC's provided.

Number	Control
Only one	24.5
Only two	12.0
Only three	17.1
Only Four	15.5
Only Five	6.8
Only Six	7.6
Only Seven	7.1
Only Eight	4.4
Only Nine	1.6
Only Ten	1.3
Only Eleven	1.1
Only Twelve	0.3
More than twelve	0.0

(11.5%), and not to carry heavy weights (10.8%). All other components of IEC were at below 10% levels. Even an important component, *start breast-feeding on first day it self*, had a coverage of only 7.3%.

### Example 2: Adolescent reproductive sexual health (ARSH) activities

Another important question often asked by project managers implementing large scale targeted interventions through a consortium of NGOs at the grass root level is whether all the intended IEC interventions are being implemented and which of the NGOs are poor performers. This was the case with a research project evaluated by IASDS with the objective to identify the poor performing NGOs and dropping them to improve the

**Table 4.** Number of suggestions provided.

Number	Percent
Only one	54.5
Only two	7.6
Only three	9.7
Only Four	13.9
Only Five	6.9
Only Six	4.5
Only Seven	2.8
More than seven	0.0

interventions. In the study "Mid-Term Assessment of Communication Initiative for ARSH in Bihar and Jharkhand", done for National Foundation for India (NFI) in 2007, it was intended to assess whether the NGOs were discussing as a part of IEC all the ARSH issues like Empowerment, Sexual and Reproductive Health, Gender issues, Delaying first child birth, Life skill, Safe MCH, HIV/AIDS, RTI/STI, Contraception, and hygiene with the adolescents or not.

Table 5 gives two types of information: number of topics addressed by the NGOs in the format only one, only two, and so on, and the issues addressed by them to at least 30% of the targeted adolescents. NGO's actual names have been suppressed, and instead, they have been numbered 1 to 8. It is observed that not only most of the NGOs touched upon merely 2 to 3 topics, they concentrated upon only one of the covered topics. Hygiene and sexual and reproductive health issues were the topics addressed by most of the NGOs. Interestingly, sexual and reproductive health issues were discussed with mostly boys, and girls were hardly covered.

Only two NGOs – 1 (53.3%) and 6 (52.8%) covered girls

**Table 5.** ARSH activities.

<b>Identity of the NGOs</b>	<b>1</b>		<b>2</b>		<b>3</b>		<b>4</b>		<b>5</b>		<b>6</b>		<b>7</b>		<b>8</b>	
<b>Gender</b>	<b>Girl</b>	<b>Boy</b>	<b>Girl</b>	<b>Boy</b>	<b>Girl</b>	<b>Boy</b>	<b>Girl</b>	<b>Boy</b>	<b>Girl</b>	<b>Boy</b>	<b>Girl</b>	<b>Boy</b>	<b>Girl</b>	<b>Boy</b>	<b>Girl</b>	<b>Boy</b>
<b>N</b>	<b>108</b>	<b>105</b>	<b>27</b>	<b>19</b>	<b>48</b>	<b>62</b>	<b>126</b>	<b>166</b>	<b>64</b>	<b>60</b>	<b>58</b>	<b>53</b>	<b>23</b>	<b>23</b>	<b>39</b>	<b>28</b>
<b>Of the 10 topics listed, number of topics discussed in the groups</b>																
Only one	82.2	78.1	75.0	50.0	87.1	57.1	63.8	29.3	48.8	5.9	20.5	12.1	44.4	33.3	48.6	38.9
Only two	17.8	21.9	25.0	50.0	10.8	39.3	19.1	51.7	32.6	58.8	34.1	45.5	22.2	46.7	31.4	33.3
Only three	0.0	0.0	0.0	0.0	0.0	3.6	10.6	17.2	14.0	26.5	34.1	24.2	27.8	20.0	8.6	16.7
Only four	0.0	0.0	0.0	0.0	0.0	0.0	6.4	1.7	2.3	8.8	11.4	9.1	5.6	0.0	2.9	5.6
Only five	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	9.1	0.0	0.0	0.0	5.6
Talking about importance of sexual and reproductive health issues	53.3	37.5	-	50.0	-	-	-	62.1	-	61.8	54.5	52.8	-	80.0	-	55.6
HIV/AIDS	-	-	-	50.0	-	-	-	-	-	50.0	-	52.8	-	-	-	-
Contraception	-	-	-	50.0	-	-	-	-	-	-	-	-	-	-	-	-
Hygiene	46.7	-	62.5	-	-	-	76.6	-	83.7	-	-	-	55.6	-	-	-

under this crucial topic.

Two inferences are readily drawn from the above analysis: None of the NGOs implemented the targeted interventions satisfactorily as they covered far fewer topics than assigned; and among the NGOs, one easily notices that most of

them are poor performers.

#### REFERENCES

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