A simplified methodology for the community-based assessment of breast-feeding and amenorrhoea in Mexico

R.A. Danko, B.J. Selwyn, R. Zamora-Romero, & X.P. Chavez-Ordoñez

Reported is the use of a simplified methodology for carrying out a community-based epidemiological assessment that is compatible with the goals of primary health care research. For this purpose, a current-status life table analysis of data from 1131 women who were served by community health workers in the State of México was used to determine the distributions of the duration of postpartum breast-feeding, amenorrhoea, and contraceptive use. The field methods used incorporated quality assurance procedures. At 1 month postpartum, 78% of the infants were still breast-fed, at 5 months 50%, and at 12 months 25%. The level of amenorrhoea at 1 month postpartum was 85%, at 3 months 50%, and at 5 months 25%. Use of contraceptives was initiated at an early stage, with 42% of all users beginning during the first month postpartum. The simplified method described permitted the area's primary health care administrators to carry out research projects for programme development rapidly and was compatible with the locally available resources.

Introduction

WHO's support of the principles of primary health care offers challenges and paradoxes for public health research. For research to be truly at the primary level it must do more than simply focus on primary health topics. The entire orientation of the research process—personnel, study design, collection and analysis methods, and action upon the findings—must do within the bounds of local interest, resources, and decision-making capabilities. At the same time, standards of scientific rigour must be upheld and the validity and reliability maintained. Credible data are even more important in locations where there is a dearth of information for programme development purposes.

The desire for "appropriate" scientific methods has led to the development of the innovative "rapid epidemiologic assessment" approach (12) and to the

concept of a "simplified methodology". Simplified methods are not rough approximations; rather, they are based on rigorous scientific approaches which have been streamlined, scaled down, and rendered appropriate for locally available resources. Such methods permit the rapid processing of information and public health decision-making at the local level.

The present study, which was conducted in collaboration with the Institute of Health of the State of México (IHSM), used a simplified method designed to assess population-level data on the durations of breast-feeding and amenorrhoea, and on the patterns of postpartum contraceptive use among women in the State of México. The study was conducted to gather information that could be used to make planning decisions about community health worker programmes, and offered the opportunity to evaluate the simplified methodology proposed by the WHO Maternal and Child Health (MCH) Working Group.  

Breast-feeding and amenorrhoea

Over the last 20 years biomedical and social science research has turned its attention towards the relationship between breast-feeding, amenorrhoea,
and postpartum infecundity. At the population level, high quality breast-feeding increases the duration of postpartum amenorrhhea (6–8). Postpartum amenorrhoea can help to lower fertility rates, and in many communities its effect is greater than that of the use of modern contraceptive methods (1, 6).

The presence of amenorrhoea alone does not necessarily indicate infecundity: the first menstrual cycle postpartum may be anovulatory or the first ovulation may precede the return of menses (8, 14). While the incidence of pregnancy during postpartum amenorrhoea is usually in the range of 1–10% (8), the absence of menses is a good proxy for postpartum infecundity, especially since return of menses is a clearly observable and significant event.

The quality of breast-feeding—its timing, frequency, and suckling patterns (especially nipple stimulation (3))—is an important variable that affects the duration of lactational amenorrhoea. However, premature use of high-dose estrogen oral contraceptives or premature inclusion of nutritional supplements in the diets of infants interferes with and interrupts breast-feeding, and results in an earlier return to menses and ovulation (3, 5). Reliance by individuals on breast-feeding as a contraceptive method is risky. At the population level, however, women who have collectively breast-fed for longer also exhibit longer periods of amenorrhoea, anovulation, and infecundity, and this results in longer birth intervals and, ultimately, lower rates of population growth (6, 10, 13, 14). The effect of breast-feeding on fecundity is prevalent to some degree among all populations, but can vary widely depending on differences in breast-feeding norms.

Simplified methodologies

Central to the WHO/MCH Working Group’s goal of a scientifically sound methodology that is appropriate for local-level resources is the use of current-status life table analysis. For this purpose, data on the duration of breast-feeding and of amenorrhoea are required. Current-status analysis avoids the bias inherent in interview procedures that rely on the interviewee’s recall by using “current status” prevalences, e.g., whether at the time of the interview the respondent is or is not breast-feeding. Provided the respondents can accurately report their children’s dates of birth, the prevalence data collected provide high-quality estimates of the duration of breast-feeding and of amenorrhoea (11). Moreover, construction of current-status life tables and survival curves requires a minimum of calculations and statistical expertise, but yields valuable population-based data.

Below is outlined the simplified methodology that we used to carry out the study in the State of México in 1986.6

Materials and methods

IHSM collaborated in the study. Also, the PRODIAPS (Programme for the Integrated Development of Primary Health Care), a community health worker programme, was operating in the study area. The objectives of the study were to determine the distributions of the duration of both lactational amenorrhoea and of breast-feeding among the survey population, as well as the patterns of contraceptive use.

Study design

The simplified methodology employed a cross-sectional survey of the women served by PRODIAPS community health workers in six jurisdictions of the State of México. The study area, largely a periurban outgrowth of Mexico City, has high rates of migration and a young, fertile population. The households served are poor, with a minimal education level, and are largely dependent on the government for health and medical care. Each health worker in the programme provides households in his or her community with health education material and information on available services. The PRODIAPS health workers collected data for the present study from their regular clients in the community through personal interviews in the latter’s own homes during the course of a normal visit. All women who had given birth within the 19-month period prior to the home visit were eligible for the study.

Sample size

The initial sample size for the survey was based on the requirements of the methodology used and the birth intervals in the study population. The study surveyed women who had given birth in the 19 months prior to the survey date; statistical analysis with the current status method in general requires at least 50 births on average per month in the study period of reference. Hence, a sample of at least 950 births was sought. A more detailed description of the calculation used to determine the sample size is shown in the Annex. A non-random sampling method was used. In essence, each of the 98 PRODIAPS health workers who were involved

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6 For a more detailed description see Danko, R.A. A simplified methodology applied to the assessment of breast-feeding and amenorrhoea in Mexico. MPH Thesis. University of Texas Health Science Center, Houston School of Public Health, Houston, TX, 1986
interviewed the first 12 eligible women (according to the date of birth of their last-born child) on his or her rounds.

**Data collection**

The prevalence data needed for the current-status life table analysis were obtained from the answers to the following questions:

- Did you ever breast-feed your last child?
- Are you still breast-feeding your last child?
- Are you still amenorrhoeic?

Breast-feeding meant literally “giving the breast”, and amenorrhoea was defined as return of the menses as recognized by the subject. Colloquial definitions of amenorrhoea and breast-feeding were used and were derived from community perceptions of these phenomena.

During the interview, women were asked to state the number of months postpartum that elapsed before they started to use contraceptive methods. Since this question was not about their current status, the data obtained were subject to potential biases. Women also reported whether at the time of the interview they were practising contraception.

The interview instrument was derived from that developed by the WHO/MCH Working Group, and was adapted to the study population. Questions were translated into Spanish, then retranslated into English to check their validity. The instrument was pretested twice, with the final testing being carried out in the State of Mexico. With additional demographic and contraceptive questions, the interview took 10–15 minutes to complete.

**Quality assurance**

Quality control procedures were carried out at all stages of the study, and were important in view of the large sample size and number of interviewers, the multiple study sites, and the short time spent on the interviews. IHSM personnel were trained in the study methods and subsequently instructed the health workers during a 1-day session for each of six groups of interviewers. The sessions included a review of standardized instructions for each item in the interview, practice sessions, and a pilot interview followed by discussion of the results.

Health workers completed their quota of interviews in 1–2 days, which made direct observation of the interviews impossible. However, PRODIAPS health centre doctors each supervised approximately 10 health workers. These doctors were briefed on interview administration and were given comprehensive instructions in order to check completed interview forms for consistency and resolve any questions. The doctors sent the completed interview forms to the IHSM, where they were checked again for consistency. The interview forms were then returned to the health worker to make follow-up clarification visits, if necessary. The supervisors made a repeat visit to 10% of the interviewees as a reliability check.

The replies to the interviews were coded by hand, and the data analysed on a microcomputer using Survey Mate (15), a survey data processing program that permitted checks to be made for logical errors and automatically performed quality assurance procedures. The program produced frequency distributions of the variables used as a final visual check for data inconsistencies. Sixty-nine of the completed and checked interview forms contained inconsistencies that could not be corrected in the field. This corresponds to an incompletion rate of 6%, an acceptable level.

**Analysis**

The basic analysis of the data was completed within 12 hours of finishing the last quality control check and corrections. For the current-status life tables, the reference period was divided into 19 monthly units of 4 weeks each, counting backwards from when the interview was conducted. Here, the term “months postpartum” reflects the number of completed monthly units between a birth and the interview; for example, an interview that was conducted at less than 4 weeks postpartum falls in the 0 month, while an interview at 6 weeks postpartum reflects only one completed month, and thus falls in the 1-month period. Women who were currently breast-feeding or amenorrhoeic at the time of the interview were separated into cohorts according to the monthly unit in which they had given birth. The necessary cross-tabulations to assign the women to their appropriate monthly unit were carried out using Survey Mate, although this could have been accomplished by sorting the questionnaires manually. The data were arrayed to show the proportion of women whose current status was positive, expressed according to the number of monthly units postpartum for the 19-month reference period. A smoothed distribution of the month-to-month data was obtained by determining 3-month moving averages.

From the smoothed data, survival curves for the duration of breast-feeding and for the presence of amenorrhoea in the community were constructed. The median durations of breast-feeding and amenorrhoea were determined directly from the curves by reading the number of months postpartum when 50% of the population were still breast-feeding or

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*See footnote a, p. 223.*
amenorrhoeic. The mean duration of amenorrhoea or breast-feeding \((D)\) was determined from the relation \(P = I \times D\), where \(P\) is the prevalence and \(I\) the incidence. The mean annual duration was estimated by dividing the number of women who currently had a positive status \((P)\) by the total number of births during the most recent 12 months.

The data for the use of contraceptives were analysed in a similar way.

**Results**

Data on 1131 complete interviews were used to obtain the current-status life table for amenorrhoea (Table 1), which shows that 85% of the women were amenorrhoeic at 1 month postpartum, about 50% were still amenorrhoeic at 3 months, 25% were still so at 5–8 months postpartum, and that the level continued to decline until the end of the study period. The smoothed data are sketched in Fig. 1. For amenorrhoea, the median and mean durations were 3 months and 3.99 months, respectively.

The proportion of women who continued to breast-feed over the study period, as indicated by the smoothed data, is shown in Fig. 2. The results indicate that 78% of all infants were still being breast-fed at 1 month postpartum, 50% were being breast-fed at 5 months, and 25% at 12 months. For all births, the median and mean durations of breast-feeding were 5 months and 5.68 months, respectively.

<table>
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<th>No. of months postpartum</th>
<th>No. of live births</th>
<th>No. of women still amenorrhoeic</th>
<th>% of women still amenorrhoeic:</th>
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<td>62</td>
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If only those infants who were breast-fed are considered, the mean duration was 7.03 months.

The proportion of women who used contraceptives over the study period is shown in Fig. 3. About 45% of the 2-month cohort were using contraceptives at the time of the interview. The prevalence of use increased to 67% among the 5-month cohort and fluctuated between 64% and 73% up to the 18-month cohort. However, unlike amenorrhoea and breast-feeding, use of contraceptives can be discontinued and resumed several times over a given period. Therefore, the plot shown cannot be interpreted as indicating uninterrupted use of contraceptives in the population. Since not all women begin postpartum use of contraceptives at the same time, the current level of such use for a population is subject to fluctuation—a campaign by health workers, for example, would increase the current level of contraceptive use by women, regardless of how long ago.
they had given birth. The curve shown in Fig. 3 therefore shows only the proportion of women in each cohort who were using contraceptives at the survey time.

Of the women surveyed, 76.5% used a contraceptive method at some time during the 19-month reference period, with 42% of the users beginning before the end of the first month postpartum (Fig. 4). By the end of the third month postpartum, approximately 75% of the users had begun to use contraceptives, while after the fourth month less than 4.5% began use in any given month. Non-permanent contraceptive methods (oral contraceptives, injections, jellies, foams, suppositories, diaphragms, condoms, herbs, or the rhythm method) were employed by 74% of the users, who were thus at risk of becoming pregnant when their use was discontinued. The permanent methods of contraception that were used included tubal ligation, hysterectomy or vasectomy.

The major difference between the pattern of use of permanent and non-permanent methods during the early postpartum period (Fig. 4) is attributable to the high prevalence of immediate postpartum tubal ligation.

**Discussion**

**Practical applications of the findings**

At the simplest level, the data obtained in the study serve as a baseline for subsequent evaluation of IHSM programmes to increase the prevalence and duration of successful breast-feeding in the community. The data also provided information that would be useful for making planning decisions about campaigns for postpartum contraceptive use. At present in the PRODIAPS area, health workers contact women and encourage them to begin using contraceptives immediately postpartum. Our findings indicate that over half of the contraceptive users began to use them by the end of the second month postpartum. At present, the amenorrhea status of recipients is not considered when contraceptives are offered in the study area. The current status information could therefore be useful in determining whether the prevalence of breast-feeding or amenorrhea is ever high enough to warrant delaying the introduction of contraceptive methods to the PRODIAPS served population, in which over 60% of the women are still amenorrheic at 3 months.

The duration of sustained contraceptive use complicates the analysis. Concern has been expressed about the low rate of contraceptive use for periods greater than 1–2 months in Mexico (15), and this concurred also with the opinion of the IHSM staff for the study population. The results we have reported may be useful for planning contraceptive programmes, although the study did not include a direct assessment of the duration of contraceptive use. If a considerable proportion of women began using contraceptives during the first month postpartum (when the overall level of fecundity is lowest), and a large percentage subsequently drop out after a short time, the protection afforded by the contraceptives ends just at the time when that afforded by amenorrhea stops for many women. This situation is exacerbated when early use of high estrogen contraceptives interferes with lactation (3, 5), resulting in unsuccessful breast-feeding, which further hastens the end of amenorrhea and its contraceptive protection.

By delaying contraceptive campaign visits from immediately postpartum to 1–3 months postpartum, a longer period of overall protection may result, first from amenorrhea and second by starting to use contraceptives as the prevalence ofamenorrhea begins to decline. Such a strategy would maximize

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**Fig. 3.** Plot showing the percentage of women who were using contraceptives on various months postpartum.

**Fig. 4.** Distribution of contraceptive users who started using them on various months postpartum.
the degree of postpartum protection for populations that are not inclined to use contraceptives for long periods of time.

A decision to delay the introduction of postpartum contraception based on population-level data contrasts with approaches based on individualized assessments. For example, there is consensus that during the first 6 months postpartum, women who breast-feed their children exclusively and remain amenorrhoeic have greater than 98% protection against becoming pregnant (2); hence, women could delay using contraceptive methods until the end of full breast-feeding or the return of menses. Use of this as the basis for developing a health-care programme would, however, require qualitative assessment to clearly define individual breast-feeding practices and amenorrhoea status. Although the levels of precision obtained by monitoring individual women’s breast-feeding and amenorrhoea patterns are desirable, the time and skills required to assess and counsel each woman may not be available to resource-poor programmes.

The data obtained on the duration of breast-feeding or amenorrhoea, together with the patterns of postpartum contraception found in the study, were used by the IHSM to weigh up the benefits and risks of its breast-feeding and family planning programmes in terms of the budgetary aspects, number of unwanted pregnancies, successful breast-feeding, and duration of protection from pregnancy.

**The simplified methodology in primary health care research**

In the survey, field staff who had had no extensive training in statistical or research methods carried out a highly accurate epidemiological assessment. The cooperation of the support staff from the IHSM was, however, essential for the quality assurance procedures, which were vital for monitoring and processing the data from the large number of interviewers. Also, established lines of communication helped to maintain the rigour of the approach.

The methodology itself, which is designed to be easily implemented, proved to be satisfactory. While the IHSM could have carried out a more complex analysis, the State of México provided a model in which the simplicity of the methodology could be tested. The system of health workers was already in place and the institute desired basic information quickly for use in its primary health programmes.

The technology required to implement the methodology was minimal. Interviewers were needed to collect the data, but the analysis could have been performed without even a hand calculator. Only a few items of information had to be collected during the interviews: the dates of any live births each respondent had experienced during the reference period, and her amenorrhoea and breast-feeding status at the time of the interview. Also, additional questions on contraceptive use patterns provided information for making more comprehensive decisions on programmes.

The costs of carrying out the survey that were not covered by regular programme funds were modest. For example, the production of the survey instrument and record-keeping materials together with transport costs for supervisors amounted to US$ 1000 and were borne by the survey budget. The interviewers, supervisors, and support staff were provided by IHSM, and contributed their time as they would have done for a routine programme project. The data obtained in the survey can be used to make savings in family planning funds. For example, based on findings obtained in a study of 16 national family planning programmes in 1980, the cost of providing contraceptives for one couple per month ranged from US$ 0.42 to US$ 6.00, with an average of US$ 1.67 (9). Thus, if, based on survey results, the decision is made to delay the introduction of contraceptives for 2 months, the survey costs could be recovered, on the average, after the first 300 births.

One important constraint of the methodology is the large sample size needed for current-status life table analysis. For sparsely populated areas, small communities, or programmes without a large workforce, the investigation would therefore not be practical to implement.

**Conclusions**

The study addressed two issues. The first was to establish the distributions of the duration of breast-feeding, amenorrhoea, and contraceptive use in the population served by the PRODIAPS community health worker programme in the State of México. The second was to implement the simplified methodology as an aspect of primary health care research for programme decision-making.

From the distributions of the durations of breast-feeding, amenorrhoea, and contraceptive use obtained, the IHSM was able to re-evaluate some of its health care programmes. In particular, the community-based data indicated that, by delaying contraceptive campaigns until a few months postpartum, the period of protection from pregnancy could be increased in the population and interference with breast-feeding reduced.

The field implementation of the simplified methodology proved successful. IHSM personnel—from directors to field and support staff—participated in all phases of the field work, and this resulted
in an effective transfer of expertise. Nevertheless, the methodology could be used successfully also in less well-endowed settings.

The study served as a concrete example of how rapid epidemiologic methods, which consist of a mix of sound approaches and community-level resources, can serve to further the goal of decentralized, comprehensive population health assessment and planning, and demonstrated how rigorous scientific research can be compatible with the principle of primary health care.

Acknowledgements
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Résumé
Mexique: Méthodologie simplifiée pour l'estimation à l'échelon communautaire de la durée de l'allaitement et de l'aménorrhée
La recherche en matière de soins de santé primaires doit s'en tenir à des critères élevés de rigueur scientifique tout en restant adaptée aux intérêts, aux ressources et aux capacités de prise de décision locaux. La mise au point de méthodologies simplifiées et de l'évaluation épidémiologique rapide a permis d'effectuer des recherches sérieuses et fiables, dont les résultats ont été pris en compte pour une action au niveau local.

La présente étude, qui a été menée en collaboration avec l'Institut de la Santé de l'Etat de Mexico, a fait appel à une méthode simplifiée, proposée par le Groupe de travail Allaitement maternel et Fertilité du service Santé maternelle et infantile de l'OMS, pour évaluer la durée moyenne de l'aménorrhée et de l'allaitement dans la population. Les données ainsi rassemblées ont été ensuite utilisées dans les programmes des agents de santé communautaires.

Cette méthodologie est basée sur de nombreux résultats de recherche qui indiquent que dans une population donnée l'allaitement prolongé augmente la durée de l'infertilité du postpartum. Cette analyse a pris en compte les données relatives à la prévalence, les tables de mortalité et les courbes de survie pour déterminer la durée de ces deux variables dans le postpartum.

Les données de l'étude ont été recueillies par les agents de santé communautaires de l'Etat de Mexico auprès de leurs patientes à l'occasion de visites régulières. Les informations relatives à l'allaitement et à la durée de l'aménorrhée ont été recueillies au moment de l'enquête auprès de 1131 femmes, tout comme celles relatives à la contraception utilisée dans le postpartum. Pendant toute la durée de l'enquête sur le terrain, l'assurance de la qualité et la fiabilité des données ont fait l'objet de vérifications.

L'étude a révélé que 78% des nourrissons étaient nourris au sein 1 mois après l'accouchement, 50% l'étaient au bout de 5 mois et que 25% l'étaient encore au bout de 12 mois. De plus, un mois après l'accouchement, 85% des femmes présentaient une aménorrhée, chiffre qui tombait à 50% au bout de trois mois et à 25% au bout de cinq mois. L'utilisation des contraceptifs a repris très tôt; par exemple, 42% des femmes avaient recommencé à les prendre à la fin du premier mois ayant suivi l'accouchement.

L'un des objectifs de cette étude était d'évaluer l'intérêt des résultats obtenus par cette méthodologie simplifiée pour la prise de décision concernant les programmes de soins de santé primaires. L'Institut de la Santé de l'Etat de Mexico s'est servi de ces données recueillies au niveau communautaire pour peser les avantages et les inconvénients de ses programmes d'allaitement et de planification familiale par le plan financier d'une part, et d'autre part en ce qui concerne le nombre de grossesses non désirées, le nombre d'enfants nourris au sein et la durée de la contraception dans la population. Les résultats obtenus ont incité l'institut à envisager de retarder, dans les campagnes en faveur de la contraception, la date à laquelle elle doit être reprise, ce ne sera plus juste après l'accouchement, mais 1 à 3 mois plus tard afin d'allonger la période d'infertilité du postpartum dans la population et de favoriser l'allaitement. La méthodologie simplifiée s'est donc avérée directement applicable sur le terrain et a pu être également employée dans des endroits moins favorisés.

Cette étude constitue un exemple concret de la manière dont les méthodes épidémiologiques rapides, qui associent méthodes fiables et ressources communautaires, peuvent servir les objectifs d'une évaluation et d'une planification décentralisées et complètes de la santé des populations. Elle a, par ailleurs, permis de démontrer
qu'une recherche scientifique rigoureuse peut être compatible avec les principes des soins de santé primaires.

References


Annex

Determination of the sample size for current-status analysis studies

The sample size required for the investigation depends on the length of the reference period and the number of births per month needed for the current status analysis.

The duration of the reference period must be sufficiently long to permit inclusion of closed birth intervals (and consequently some consecutive births) in the sample. In Mexico the mean birth interval is 29.3 months (4). We therefore expected that an 18-month interval would be long enough to include some consecutive births, but not so long that women who had given birth early in the reference period would provide inaccurate responses to the recall questions. By extending the reference period to 19 months, its beginning was set on 5 May 1986 (Cinco de Mayo), a Mexican national holiday that served as a significant event to which women could refer. Since current-status analysis requires a minimum of 50 births per month in the reference period, the target sample size was 950.

The IHSM supplied sufficient interviewers to sample a population that corresponded approximately to 10% of the 12 000 families served by PRODIAPS in the State of México. Hence the final sample corresponded to 1200.