Theoretical distribution

In the cases so far discussed the observed values in one sample have been compared with the observed values in another. But sometimes we want to compare the observed values in one sample with a theoretical distribution.

For example, Dr Pink was studying 18 cases of the congenital disease, Everley's syndrome (Part XI). He found that these 18 people together with all their brothers and sisters made a total sibship of 64 all living. It is possible to identify the carrier state in this disease, and among the 46 sibs who did not have the disease he found 38 carriers. According to the genetic theory for the inheritance of Everley's syndrome a sibship of this kind would contain one-quarter with the disease, one-half as carriers, and one-quarter normal. Do Dr Pink's cases depart from those proportions?

The data are set out in table 16.3. The expected numbers are calculated by applying the theoretical proportions to Dr Pink's total, namely $0\cdot25 \times 64$, $0\cdot5 \times 64$, and $0\cdot25 \times 64$. Thereafter the procedure is the same as in previous calculations of χ^2. In this case it comes to 5·375. The χ^2 table is entered at 2 degrees of freedom. The value of $P > 0\cdot05$ does not reach a significant level. Consequently, the null hypothesis of no difference between the observed distribution and the theoretically expected one is *not* disproved. Dr Pink's data do not depart significantly from the expected frequencies.

TABLE 16.3—*Calculation of χ^2 from comparison between actual distribution and theoretical distribution*

	Observed cases	Theoretical proportions	Expected cases	O–E	$(O-E)^2/E$
Diseased	18	0·25	16	2	0·25
Carriers	38	0·5	32	6	1·125
Normal	8	0·25	16	−8	4·0
Total	64	1·0	64	0	5·375

$\chi^2 = 5\cdot375$. DF = 2. $0\cdot10 > P > 0\cdot05$.

Exercise 16. The construction of a reservoir several years ago in an African country brought bilharzia to four villages that stand near it. Measures taken by special teams from each village to eliminate the snails were only partially effective, and a survey in these villages gave the following figures for residual cases of bilharzia (with village population in parentheses): village A, 14 (103); village B, 11 (92); village C, 39 (166); village D, 31 (221). What are the χ^2 and P values for the distribution of the cases in these villages? Do they suggest that any one village has significantly more cases than the others? *Answer*: $\chi^2 = 8\cdot949$, DF = 3, $0\cdot05 > P > 0\cdot02$. Yes, village C; if this is omitted the remaining villages give $\chi^2 = 0\cdot241$, DF = 2, $P > 0\cdot5$. (Both χ^2 tests by quick method).

Contemporary Themes

Career problems of women doctors

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Summary

Information was received from 61 women doctors who were having difficulty continuing with medical careers. Two main problems were disclosed. Firstly, despite the special arrangements made for women doctors, it is difficult to obtain postgraduate training. The provision of supernumerary posts does not seem to offer a satisfactory solution. Secondly, doctors who have completed postgraduate training but cannot yet return to full-time work are unable to obtain posts at an appropriate level. Both of these problems stem primarily from the need for part-time work by the mothers of young children. Most of the doctors wish to return to full-time or nearly full-time work when family responsibilities are fewer. In view of the increasing proportion of women doctors it seems important that large numbers are not unnecessarily lost from professional work. Some possible approaches to solving the problems are suggested.

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Introduction

"Women are not equal to men—but then neither are men equal to women"—ISLAMIC SAYING.

There are at present about 19 000 women doctors in Great Britain—that is, about 22% of doctors are women.[1] Thirty-five percent of the students starting medical training in 1975 were women, and this proportion may well rise in the future. Surveys of the pattern of women doctors' work indicate that at any time about half work full-time, 30-35% work part-time, and 15-20% do not work.[2-4]

With the current medical manpower shortage[5] there can be no doubt that women doctors will be needed to make an important contribution to medical services if these are to be maintained, even at present levels. Nor need it be doubted that most women doctors want to justify their choice of medical studies by working after qualification. Yet the changes in social attitudes and expectations that have made it increasingly possible for women to enter the course of study of their choice have paradoxically made it more difficult for those women with family responsibilities to free themselves for professional work by employing others to take on the domestic and child-caring tasks. This is the result partly of wider employment openings for women who once

might have undertaken domestic-type work and partly of the narrowing differentials between professional and other salaries, so that domestic and skilled child care help has become less readily available and comparatively more highly paid than previously. Furthermore, it is increasingly felt that the young child needs the care of his mother during his formative years.

About 90% of women doctors marry, and most will have children,[2 4] so it is inevitable that at least for some part of their working lives some women doctors will need, or prefer, to find part-time work; if this is unobtainable some will not work at all rather than work full-time. Many of those who leave medicine for any length of time will lose confidence and may not return to professional work.[6]

Since the publication of the surveys noted above[2-4] the Department of Health has recognised that women doctors may have difficulty in combining medical work with family responsibilities at certain stages and has introduced schemes[7-9] to help them to continue in medical practice during a period of postgraduate training. Nevertheless, it is widely recognised that many women doctors with domestic responsibilities often still have great difficulty in continuing with medical work,[10] even though the exact numbers are not known.[10-13]

Methods

The aim of this investigation was to locate a group of women doctors who were experiencing problems in continuing their careers, in the hope that their problems could be identified and practical solutions suggested. Information derived from this study might be applied to future surveys of the work patterns of women doctors, so that the extent of the problems can be assessed and the success of efforts to deal with them monitored. We wrote to the medical and lay press, inviting women doctors with work problems to complete a questionnaire. As a result 61 completed questionnaires were received. The questionnaire inquired into problems of postgraduate training, working, child care, and other domestic responsibilities.

Results

RESPONDENTS AND THEIR WORK

The respondents were aged 27-45, most (43) being in their 30s or 40s. All but one were married—over half (33) to other doctors—and most (51) had children. Thirty-seven had a higher medical qualification. These include MRCP (6), FFA RCS (4), MRCPath (3), MRCPsych (3), MRCGP (1), FRCS and MRCOG (1), FRCR and DMRD (1).

Twenty-five of the doctors worked in hospital specialties, but five had two or more posts. Twelve doctors worked in community health or family planning and four in general practice. A further 12 made up their work with a mixture of sessions. Fifteen doctors had had to change specialty because they could not progress further after several years' experience in the original field—for instance, one with MRCOG and FRCS had become a trainee general practitioner.

Eight women worked no sessions, one worked unpaid sessions, 14 worked less than five, 21 worked five or six, five worked seven or eight, and 12 worked nine or more. All of those who were not working wanted to work. More work was wanted by 12 of those with under five sessions and by seven of those with five or six sessions. Those working seven or eight sessions were content, while four who were working nine or more sessions wanted fewer.

Thirty-eight of the doctors were prepared to undertake night duty in hospital and 44 were willing to be on call at home. Thirty-five of the 40 doctors with children of school age could work during school holidays.

CAREER PROBLEMS ENCOUNTERED

From the analysis of the questionnaires two main problems emerged, which women may face at different stages in their career.

Firstly, it was difficult to obtain a part-time post in the training grades, despite official provision of supernumerary posts for this purpose. Fourteen of the respondents were having difficulty in obtaining or completing their training, and a further eight, who were in training posts, were anxious about the next step to be taken, when the time came to leave their present posts.

Secondly, when training was complete, and if the doctor was still unable to undertake full-time work, she was likely to find that there were virtually no permanent part-time posts available in the hospital specialties or above the basic grade in the community health service. This difficulty in arranging part-time work can also be a problem in general practice. For 22 of the doctors who had completed postgraduate training, this was the main problem. Some of them were working in grades below that merited by their qualifications and experience, while others were engaged as locums. Other doctors were anxious because their work provided no career prospects or permanency. This was particularly the case for those doctors who had sessional work in more than one branch of medicine and those engaged in family planning. A few doctors seemed to be in need of guidance and counselling, but for most the difficulties were such that no satisfactory solution existed within the present structure of the NHS.

The main cause of these difficulties lies in the need for part-time work by the mothers of young children. Full-time medical work usually involves far more than the standard 40-hour working week and can be too exhausting, both physically and emotionally, to those with other major responsibilities. Family responsibilities occasionally produce other restraints, foremost among these being the need for the husband's work to determine the place of residence.

TRAINING

Three schemes are offered by the DHSS,[7-9] and advice to postgraduates on training and work problems is obtainable from regional postgraduate medical deans and from the Medical Womens Federation liaison officers. To find out how far these provisions meet the needs for which they are designed, we asked the respondents about their knowledge and use of these facilities.

Women doctors retainer scheme—This scheme[8] was introduced in 1972 to enable doctors to keep in touch with medical practice while domestic commitments are maximal. In September 1975 there were 208 doctors in the scheme. Of the 61 respondents 58 were aware of the scheme. Ten doctors had tried to make use of it; two found it very valuable but eight had problems in using it. Four had difficulty in getting information, two being told it was not available in their area (this could not be correct). Two others had to wait six months and two years for implementation; four had difficulty in finding the necessary (paid) clinical sessions.

Re-employment of women doctors—The retraining scheme[7] introduced in 1969 allowed for the creation of supernumerary part-time posts within the hospital service in training and clinical assistant grades for individual doctors. Recently it has been extended to include general practitioner vocational training. There have always been delays in arranging these appointments, and more recently shortage of funds has restricted them still further. The circular HM(69)6 also advises hospital authorities to split existing posts that are difficult to fill on a whole time basis but this is a little-used option. From 1973 to February 1976 113 senior registrar and 153 registrar posts were authorised under the provisions of HM(69)6. Among the 61 respondents 37 were aware of this scheme and 17 had tried to use it. Five had found it very valuable, and four of these were training for or had got higher qualifications. Six others were successfully training under the scheme, but commented that they were uncomfortable in being made to feel that, as supernumerary doctors, they were not accepted as part of the team, that their contribution did not seem to be important, and that they were excluded from certain aspects of the work. Some understood from male colleagues that the women were felt to have an unfair advantage, since they did not have to compete for their posts. Seven women commented on the time lost in processing these posts; none took under six months, and one took over a year. Four others were unable to get posts arranged, two being told that no money was available. If a change of post becomes necessary, say on promotion or moving house, the application must be negotiated entirely afresh.

Retraining in general practice after absence from medicine—Sixteen doctors knew about this,[9] but none had used it.

Advice from postgraduate deans—Forty-three were aware of this provision, and 17 had sought help from deans. Two received the help needed, but 10 were disappointed. The difficulty here seemed to be a misunderstanding of the advisory function of the dean, in that the doctors expected the deans to direct them to readily available posts.

Medical Womens Federation liaison officers—Twenty-two doctors knew of these officers, but only three had contacted them. One doctor had found them very helpful, while two had not.

DIFFICULTY WITH EXAMINATIONS

The doctors were asked whether the need to take higher examinations posed any problems. Twenty-one doctors were worried about this, but it was mainly anxiety about not being able to fulfil the requirements of work experience in order to be admitted to the examination. Very few doubted their academic ability.

DIFFICULTY IN FINDING SUITABLE WORK

General practice—Five doctors had difficulty in finding part-time work in general practice. They had written many letters to practices, hoping to find a vacancy. One doctor had written 70 letters. Our appeal for information produced some inquiries from GPs seeking part-time help.

Hospital specialties—Among the 22 doctors who could not find suitable work after completing training, several were trained in the so-called "shortage specialties"—there were two psychiatrists, three pathologists, and four anaesthetists. Six of these fully trained doctors had been working only as locums for long periods. This is an unpredictable source of work and of income and professionally unsatisfactory, since it precludes continuing involvement with patients and colleagues. Often the doctors were aware of a local need for their specialty, and some had had support from colleagues in campaigns to obtain appointments, without success. It seems that many regional authorities refuse to make permanent part-time consultant appointments, even when no suitable full-time candidate is available. They are prepared to employ the part-time applicants as long-term locum consultants, however, presumably in the hope that the vacancy will eventually be filled on a full-time basis.

CHILD CARE

The doctors were asked what specific aspects of caring for children were causing (or had caused) difficulties with continuing work. Thirty-seven said that they wanted to look after their children themselves, at least for part of the time. Twenty-eight found it difficult to obtain a suitable person to look after the children; lack of crèche accommodation was often mentioned. Nineteen felt that the cost of child care was too high in relation to their own earnings (but see below).

FINANCIAL CONSIDERATIONS

Twenty-five doctors stated that they were actually deterred from taking on more work because the financial return was largely cancelled out by the expenses incurred, these being mainly the cost of child care facilities, domestic help, and travel. Nevertheless, many others made the point that the small net financial gain from working did not act as a deterrent but that they felt strongly motivated to work for other reasons.

FUTURE WORK INTENTIONS

Doctors were asked how much work they hoped to undertake in the future. Most (44) intended to work nine or more sessions and a further 12 intended to work seven or eight sessions when child care has ceased to be an overriding consideration.

They were asked whether they were interested in certain specialties (which appear to be less competitive, more suited to part-time work, or offer more predictable working hours). Most of the doctors who were not in a settled specialty (45) selected community medicine, general practice, psychiatry, and dermatology. Others named geriatrics, anaesthetics, and rheumatology.

They were also asked whether they would be interested in a permanent non-consultant career grade in hospital. Of the fifty-two doctors to whom this question was relevant, 37 were interested in this grade, whereas 16 were not.

ALTERNATIVE SOLUTIONS

Finally, the doctors were asked which of the following alternatives they thought was the best solution to the problem of the woman doctor with domestic responsibilities who wanted to continue working: (*a*) to give every possible help with domestic chores and child care—for example, appropriate tax relief, provision of crèches, etc, to enable women to work on the same terms as men; or (*b*) to reorganise medical work in such a way that part-timers would be fully integrated into the service, and not regarded as supernumerary.

Six said they would prefer *a*, 43 preferred *b*, and 12 thought that both alternatives should be available. Many doctors felt very strongly about this topic, as the following quotations illustrate.

Comments

"It must be approach *b*, as this solves the problem by enabling one to fulfil both aspects of one's life; approach *a* does not solve anything; it simply attempts to cover up the guilt, and for me would leave me with just as many doubts as to where my priorities lay as would be the case if I did not work in medicine at all. Approach *a* implies that bringing up the children is subsidiary to medicine."

"*a*. If you try to make things different for women they'll be inferior—they must be on equal terms, with equal chances of promotion."

"It is not practical for a woman to work on the same terms as men for a certain part of their lives (I mean married women with families). Some women do work on the same level, but somebody will suffer—maybe the children. *b* is exactly what I feel is right because I have gone through it."

"I think *b* is a desirable approach in medicine anyway—for men and women. I believe a father has as great a right to a home life and to caring for his children as a mother. The convention of all doctors working wildly excessive hours should be spoken out against—women leading the way as usual. However, in practical terms we could also fight for *a*."

"I think it would be an excellent scheme to use women doctors on night duty in hospitals. It is ludicrous that we don't have a shift system."

"I think *b*, as one of the real obstacles is feeling that one is out on a limb and often being offered work on sufferance, with no feeling of a career structure, of 'belonging' to the medical establishment."

"Ideally both, because some women want equality etc; others wish to be integrated in a part-time capacity; therefore I see no reason why these two possibilities are mutually exclusive. If pressed, *b* is more important. The determined egalitarian in *a* is better able to cope now than the part-time 'extra' is."

"Many medical jobs are ideally suited to part-time work, or rather two part-timers doing work of the whole timer. DHSS approves of this, but authorities will not make it possible."

"I find if I do too much in the medical line, and having to care for family and household I get tired (and cross)."

Discussion

The information presented in this paper is derived from a self-selected group of women doctors who were well motivated to continue working, despite other commitments, and who were sufficiently frustrated in their attempts to find suitable work that they offered to provide information. They may not be representative of all women doctors with domestic responsibilities, but certain problems and attitudes are mentioned by them sufficiently often for it to be likely that these are common among women doctors.

We recognise that there will always be some women who will seek, and attain, the highest professional achievements alongside male colleagues. There will also be some women whose circumstances will cause them to relinquish professional responsibilities and devote all their energies to children and husband. Most women doctors, however, will want and need to combine professional and domestic life, in differing proportions at different times; and it is in their interests and in the interests of the community who supported their training and would benefit from their services that we would like to offer the following suggestions.

The Royal Commission on the NHS is to consider staffing, structure and manpower. We hope the need to incorporate fully the contribution of women doctors into the medical services will be considered. With the increasing proportion of women doctors it is unrealistic to consider their services to be supernumerary to the establishment, with posts having to be created on a personal basis.

In view of the serious disparity between service needs and career prospects in the hospital services—and no satisfactory solution has yet been offered to this problem—we urge the profession to look again at the responsibilities of the consultant

grade and consider once more whether there is a place for some other grade of specialist. Perhaps this could be a clinical post without administrative responsibilities. Many women would be interested in such permanent career posts, both part- and full-time, and would be willing to take part in necessary duties at all hours. Such posts, as well as part-time consultant posts, would also be of interest to doctors of both sexes who want to pursue interests outside clinical medicine—for example, research or writing.

Possibly certain specialties are unsuited to part-time work. Nevertheless, many of the less competitive and less dramatic areas of medicine could be well served by doctors who would provide continuity of care over longer periods of time than is provided by doctors in the present training grades. A start could be made in these specialties to integrate the work of part-timers into the total service. Staffing structures vary considerably from hospital to hospital, while the volume of work may not vary in the same way. Furthermore, many full-time posts are not *clinically* so, but involve time for research, teaching, study, administration, and various other duties. Therefore it may not be too difficult to reapportion responsibilities. Arie[14] has shown that in the demanding field of psychogeriatrics an excellent service with high staff morale can be provided by part-time doctors. Perhaps work organisation experts could study this possibility in other specialties.

General practice is proving to be a suitable specialty for part-timers, but there is no co-ordinating system for placing doctors seeking work into the available vacancies. This could be remedied simply by a regional or central agency.

In light of the difficulties that highly skilled doctors, even in so-called shortage specialties, are finding in getting career posts and completing training we would recommend women, so far as possible, to avoid esoteric specialties where few posts exist. This course of action also means that an unexpected change in circumstances need not totally disrupt a career. Until definite arrangements are made for engagement of part-time doctors in the other specialties women who are uncertain about their career wishes should be advised to consider general practice. There are indications that medical care is likely to move towards decreasing sophistication as financial costs increase, and this may make the outlook for the very highly skilled specialist in a narrow field even more uncertain.

Women will wish to have different work commitments at various stages of life, but complete flexibility is clearly impracticable. Women doctors seem to need part-time posts of between five and eight sessions at all levels of work. Women may be expected to remain in the non-consultant training grades for about twice as long as a full-time worker would stay. Some would then (or after completing training posts full-time) want to work in part-time consultant or other permanent posts for a few years. Many would then apply for standard full or maximum part-time posts. It is now not unusual for consultants to change posts after a few years' service or change between maximum part-time and full-time contracts. By analogy, a change between posts offering different sessional commitments, by women at different stages of career and family development need not cause disruption of services.

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Hospital Topics

Use of creatine kinase for detecting severe X-linked muscular dystrophy carriers

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Summary

Women thought to be at risk of being carriers of Duchenne muscular dystrophy were given "odds" against their having an affected child. These were calculated from a combination of the genetic risk from the family history and an estimation of the biochemical risk from measuring the serum creatine kinase concentration. The women were told the actual risk estimate and it was put into perspective for them as a high, medium, or low risk. Of 25 women at high risk six have had children, all girls; the two in the medium-risk group have had no children; and the 46 women at low risk have had 19 boys and 25 girls. None of the boys has the disease.

With detailed counselling most potential carriers of this disease reach decisions in child bearing that are in line with their degree of risk.

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