Determination of consumer satisfaction: a basic step for quality improvement of an occupational hygiene service

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In order to define priorities for improvement of the Occupational Hygiene Service, Institute for Occupational Health, Tel Aviv University, consumer satisfaction was evaluated by postal questionnaire. The questionnaire covered items on service accessibility and quality, including staff courtesy and respect for the consumer, cost, satisfaction with the service in general over time, and satisfaction with the last service received, and was sent to all 144 regular clients of the institute during the years 1990 and 1991. Satisfaction items were rated from 1 (not at all satisfied) to 5 (completely satisfied). Multivariant analysis showed that (i) satisfaction with the waiting period for the last service report and satisfaction with the courtesy of the last service and respect for the consumer had the strongest influence on general satisfaction with the service over time; (ii) satisfaction with the waiting period for the last service report was also the most important component in satisfaction with the last service received. Despite the increasing interest in Israel in health service costs, and because the price of the service is subsidized (50%), this item was not found to be significant with regard to satisfaction with the service. In conclusion, we recommend the use of this relatively easy and inexpensive methodology which allowed us to define precisely the key factor for service improvement, the waiting period for the service report.
Unit of the IOH conduct chemical and physical hygiene surveys and report their findings is shown in Figure 1.

The present study used data collected during 1992. Questionnaires were sent by mail to all 144 regular clients of the IOH from the years 1990–1991. Regular clients were defined as those who had signed a contract with the IOH to receive periodic occupational hygiene services. Although IOH services are partially government-subsidized, consumers must pay an additional sum, depending on the work performed. For the year 1990, this subsidy was 50% for an average service. Clients who did not reply to the questionnaire within three months were requested to do so by phone. Those who had not replied after five months were sent a second questionnaire by mail. The data collection period ended six months after the mailing of the first questionnaire.

The questionnaire included items pertaining to: general characteristics of the workplace; duration of regular contact with the IOH; function and professional education of the respondents; aspects of access to the service. Satisfaction items addressed: the service in general over time; the last service received; particular components of both the service in general over time and the last service received, such as access (eg waiting period for the service) and service quality (eg professional staff competence, staff courtesy, time spent on on-site measurements, quality of the report, the waiting period for the report); and cost. Excluding the last item, which had three response options (1 = too high, 2 = acceptable and 3 = too low), all satisfaction items had five response options, ranging from 1 (not at all satisfied) to 5 (completely satisfied). To construct the questionnaire, we referred to previous reported experiences with forms designed to assess customer satisfaction6,11,12. Satisfaction items and scales were derived from the report by Ware et al.13. In addition, clients were asked about the importance (from 1 = less important to 5 = more important) of the factors that influenced the continuation of their contract with the IOH. The questionnaire was satisfactorily tested in a pilot study, and, as a consequence of this, an open question regarding any reasons for dissatisfaction and recommendations for service improvement was included.

Data analysis
In the first step of the analysis, we examined the distribution of degrees of satisfaction (in quintiles) by item. To evaluate the importance of the influence of each factor on the continuation of the contract with IOH, mean values (from 1 to 5) of the 68 responses for each factor were calculated.

In the second part of the analysis, we defined two linear regression models. In the first model, satisfaction with the last service received was regressed against satisfaction with particular items of this service corresponding to access and quality, which included waiting time for the service from the initial request to scheduling an appointment, on-site measurements (at the factory), and receipt of the service report, competence of the service staff, and courtesy and respect of the staff for the consumer. In the second model, satisfaction with the service in general over time was regressed against satisfaction with the last service received, access to the service in general, and cost of the service. In a variation of the second model, satisfaction with the last service received was replaced by satisfaction with specific components of this last service. For the stepwise analysis, only variables with a significant coefficient of \( P < 0.05 \) were allowed to enter the equation.

RESULTS
Sixty-eight of the 144 clients responded to the questionnaire (47%). Excluding the plastics industry, with a response rate of 73% (8/11), and the non-metallic mineral products industry, with a response rate of 17% (4/24), most of the remaining industries showed a response rate close to the overall rate: chemicals = 54%; metals = 50%; electronics = 47%; others (mining, textiles, wood, precision instruments, etc.) = 52%.

Fifty-six per cent of the respondents were from large factories with more than 100 workers. Almost all respondents were responsible for factory safety or were factory managers with professional education in safety: ie safety engineers (25.5%), safety technicians (42%), personnel who had taken courses in safety training (9%), other professionals (16.5%), managers of small factories and others (7%). The majority of clients (80%) had received the IOH Occupational Hygiene Service for more than three years.

The majority of respondents reported high levels of satisfaction with the service in general over time and satisfaction with the last service received. Figure 2 shows the distribution of satisfaction categories for these two items. Because of the low percentage of answers showing lack of satisfaction and due to graphical limitations, the first and second categories (not at all satisfied and slightly satisfied) were combined into one category.
Satisfaction with accessibility

Fifty-two per cent of the respondents were mostly or completely satisfied with general accessibility to the service, as determined by the sum of the partial scores for satisfaction with ‘reaching the proper person for the appointment’, ‘facility for arranging appointments by telephone’, ‘waiting time for an appointment’ and ‘accessibility in general to the IOH’. Ten per cent showed slight satisfaction or dissatisfaction, and the remainder (38%) were moderately satisfied. One-third responded that it was quite difficult to reach the proper person they waited too long on the line and that the line was very often busy. The majority of respondents (87%) were satisfied with the schedule for the service, while 13% would have liked a more rapid service.

Satisfaction with quality

Ninety-five per cent of the respondents were satisfied (mostly or completely) with the competence of the staff who had performed the last service, and 78% had the same degree of satisfaction with the professional quality of the service report. These two components of service quality were positively intercorrelated (Spearman’s $r = 0.68, P = 0.08$). Seventy-three per cent were mostly or completely satisfied with both items, while the remainder (27%) were mostly satisfied with only one of them.

Cost

The majority of respondents (80%) considered the service cost acceptable, whereas 20% thought it too high. Most of the respondents in the last group were from small factories (less than 25 workers).

Figure 3 shows the percentages of the two highest levels of satisfaction according to different components of the last service received. Figure 4 presents the distribution (means and standard deviations) of the importance consumers attributed to different factors when continuation of the contract with IOH was considered. Factory safety improvement, legal requirements and service credibility were found to be important at close to 4 on a scale of 1 to 5.

Table 1 shows the results of the regression model examining the predictors of satisfaction with the last IOH service received. The model explained 66% of the variation in satisfaction among consumers who responded to the questionnaire. After adjustment for potential
confounders, the waiting time for the service report appears as the strongest predictor.

Table 2 shows that the waiting time for the last service report continued to be the strongest factor influencing satisfaction with the service in general over time, even after controlling for the general characteristics of the workplaces and for other factors specific to the last service. This model explained 63% of the variation in satisfaction with the service in general over time.

DISCUSSION

In our study, consumer satisfaction with the waiting time for the last service report had the strongest significant influence on both satisfaction with the last service received and satisfaction with the service in general over time. The self-evident assumption that the longer the waiting time the lower the satisfaction is supported by comments of clients in the open question section.

The high level of satisfaction with the service shown by the majority of respondents suggests the existence of selection bias, because dissatisfied customers may have simply abandoned the service and therefore would not have been included in the sample. We suspect, however, that this did not apply in the present situation, because all clients (satisfied or not) who need such services due to legal requirements (see Figure 4) must utilize the IOH, which is the only service in Israel authorized to perform comprehensive hygiene evaluation. Moreover, for an organization such as the IOH, which wishes to improve the satisfaction of existing clients, such a potential bias is not an obstacle in determination of the most efficient policy in terms of cost-effectiveness. Although the response rate of 47% for the postal questionnaires was expected to increase the reliability of the results, we did not utilize the present results to learn about the population from which the sample was extracted but to identify factors that influence variation in satisfaction among those who did answer the questionnaire. The results of this study indicate that the IOH should undertake an elective policy of achieving a shortened waiting time for the service report. An improvement in consumer satisfaction should then be apparent immediately after the next service.

Our data also suggest that consumer satisfaction with the service in general over time is not significantly affected by cost. We were not surprised by this result in this case, as the IOH service is partly state-subsidized. However, it is interesting to note that the majority of factories for which cost of the service appears too high were small factories, and the respondents to the questionnaire were not mainly responsible for factory safety but were factory managers.

Based on this study, we recommended that the IOH improve automation in the process of preparation and sending of reports and increase communication between IOH staff and consumers (including provision of information about delays). We also recommended other changes to increase telephone access to the appropriate IOH personnel.

We believe that the methodology used in this study is simple and applicable not only to the present setting, but also to other occupational services in which a policy for consumer satisfaction improvement needs to be defined and implemented. Unfortunately, we could not compare our results with those of other reports, because we could not find any publications on this subject.

The methodology utilized in this study enabled us to define precisely the key factor for service improvement. If our recommendations are implemented, evaluation of the impact of the changes made could demonstrate the validity of our conclusions.

ACKNOWLEDGEMENTS

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REFERENCES


APPENDIX

This form is an English translation of the original form in Hebrew. In this presentation, we have omitted the codification area and other technical items.

CONSUMER OPINION SURVEY FORM

1. Consumer data:
   Factory name: ........................................
   Factory address: ......................................
   No. of workers: ......................................

2. Person who answered this questionnaire:
   Name: ...................................................
   Occupation: a) Factory manager .... b) Factory safety officer ...
   c) Other, specify ......................................
   Phone No.: .............................................

3. For how many years have you been receiving service from this Institute for Occupational Health? : yrs.

4. When did you make your most recent request to our Institute? Month, Year......

5. Who referred you first to the Institute? .... Occupational doctor .... Industrial inspector .... Own initiative .... Do not remember .... Other. Specify: ..................................................

6. When you most recently telephoned to our Institute to make an appointment for a service:
   A) How difficult was it to reach the proper person:
      1) very difficult .... 2) somewhat difficult .... 3) not difficult
   B) What made it difficult:
      1) phone was busy .... 2) put on "hold" too long .... 3) other
   C) Did the receptionist:
      1) arrange appointment immediately .... 2) call back with appointment .... 3) tell you to call back to make appointment
   D) Was the date of your appointment:
      1) about the date you requested .... 2) later than date requested

7. The next questions are about the most recent service our Institute performed for you, and requests you to note your level of satisfaction in each category. Whether you were not at all satisfied, slightly satisfied, moderately satisfied, mostly satisfied or completely satisfied.

8. We are very interested in knowing whether:
   a) the cost of the most recent service was:
      i) too high; ii) acceptable; iii) very low
   b) you would wish to receive confirmation of the appointment prior to the visit:
      No: ...... Yes: ...... How long before the visit? ........

9. The following questions are related to the last service report you received.
   a) How do you rate your satisfaction with this last report?
      not at all satisfied .... slightly satisfied .... moderately satisfied .... mostly satisfied .... completely satisfied ....
   b) What is your opinion about the length of the report?
      too long .... acceptable .... too short
   c) Are there sections in the report that are not useful to you?
      No .... Yes: Please specify: ..................................................
   d) Did the report include recommendations for the improvement of factory safety? (You may mark more than one choice).
      No .... Yes, but not clearly enough .... Yes, but not sufficiently complete .... Yes, but not sufficiently focused on the problem .... Yes, absolutely
   e) If you have any other suggestion for the report, please feel free to write you comment: ..................................................

10. Overall, how do you rate your satisfaction with the service of the Institute over time?
    not at all satisfied .... slightly satisfied .... moderately satisfied .... mostly satisfied .... completely satisfied

11. What was the reason for your request for the last service? (Please answer all choices)
    a) Factory interested in safety improvement 1 2 3 4 5
    b) Legal requirements 1 2 3 4 5
    c) Credibility and acceptability of the Institute 1 2 3 4 5
    d) Availability of Institute service 1 2 3 4 5
    e) Service cost 1 2 3 4 5

12. In your opinion and for your convenience, what changes or new services should the Institute implement in the near future?

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<td>A) The amount of time you had to wait from initial contact requesting service to performance of the service.</td>
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<td>B) Confirmation of appointment made by the Institute near to time of visit</td>
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<td>C) Amount of time spent at the factory by the Institute for the service</td>
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<td>D) Length of waiting period for the final report after the service was performed</td>
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<td>E) Quality of service provided by the Institute</td>
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<td>F) Courtesy and consideration shown by the Institute staff</td>
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<td>G) Cost of the service</td>
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<td>H) This most recent service, overall</td>
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