Investigation and analysis of the factors of general practice research requirements

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Internal Medicine Educational Philosophy and Theory

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Abstract
Background: this study aims to further understand the scientific research ability and level of general practitioners in hospitals at all levels through investigating the general scientific research situation and scientific research intention of general practitioners on duty, so as to provide a basis for formulating scientific research training and scientific research objectives related to general practitioners.

Methods: general practitioners working in general medicine departments of hospitals at all levels were selected as the subjects of the survey. Self-filled questionnaires and interviews were used. R software was used for statistical analysis.

Results: with the improvement of professional title, the longer time spent in general medicine, the greater interest in scientific research, the more articles published, and the more project funding received. Hospital grade, general practice time, master and doctor degree were independent influencing factors. The higher the hospital grade, the greater the demand for articles, while the longer the general practice, the lower the demand for articles. And the hospital of different rank, promotion needs the requirement of the article to differ. General practitioners who work in tertiary hospitals, have the title of chief physician, master's degree or doctor's degree, are interested in scientific research, have the interest in scientific research training, have the requirement of articles for promotion, have joined the scientific research team and are more inclined to devote their spare time to scientific research. The number of articles published by general practitioners was positively correlated with age, hospital grade, professional title and whether they joined the research team. The number of gp grants was positively correlated with age, hospital grade, professional title and whether or not they joined the research team.

Conclusion: hospital grade, general practice time, master's degree and doctor's degree are the correlative factors that affect the requirement of scientific research. Hospital grade, professional title and age are the influencing factors for the scientific research achievements of general medicine, which are positively correlated with the number of articles published and the number of project grants received.
Background
In recent years, promoting the development of general practice and strengthening the standardized training of resident physicians in general practice have been the focus of Chinese medical and health reform [1]. General practice started relatively late in China. With the support and promotion of medical reform policies, general practice has developed in China to some extent. The future development direction is to vigorously promote the construction of general practice team. However, in addition to having a solid clinical foundation, the most important thing for general practitioners is to have a good clinical thinking ability, and the cultivation of scientific research ability is one of the effective ways to improve clinical thinking ability [2]. However, the scientific research foundation of general practice in China is still relatively weak. Compared with other specialties, general practice lags behind in both paper writing and scientific research design [3]. Although general practitioners can obtain research progress from other specialties to guide their work, due to the different working environment and work nature of general practitioners, the research work of other specialties cannot be well applied to the work of general practitioners [4]. At present, it is believed that the backward scientific research facilities and the shortage of scientific research talents are the reasons for the limited development of general medical research. "Whether general practitioners need to carry out scientific research" has also become a hot topic among medical practitioners.

At the present stage, the overall level of scientific research has become one of the important standards to measure the development level of a hospital, especially a comprehensive hospital [5]. Therefore, general practitioners working in a comprehensive hospital pay more attention to the coordinated development of medicine, teaching and research. General practitioners, as the first doctors of patients, work in the clinical front line. Carrying out scientific research suitable for general practitioners is conducive to the improvement of general practitioners' personal quality and the enhancement of team cooperation, as well as the discipline development of general practitioners, and the improvement of the academic status of general practitioners [6]. However, until now, the level of articles published in journals by general practitioners has been lower than in other specialties. The purpose of this study is to further understand the scientific research ability and level of general
practitioners in hospitals at all levels by investigating the general research status and research intention of serving general practitioners, so as to provide a basis for the development of scientific research training and scientific research objectives related to general practitioners.

1 Methods

1.1 The respondents were general practitioners working in general practice in hospitals at all levels.

1.2 The survey tool adopts the method of literature review and expert consultation to design the questionnaire. It mainly includes the basic information of general practitioners, the requirements of the work unit for scientific research, the articles published during the work period, the applied subjects, the interest in scientific research, and the training for scientific research.

1.3 Survey methods during March to April 2019, general practitioners were surveyed by means of self-filling questionnaires and interviews, and all questionnaires were collected within a limited time.

1.4 Through unified training, the interviewers and questionnaires of the quality control research group ensure the consistency of the interpretation of the survey content and the integrity of the feedback of questions, ensure the quality of the interview and questionnaire survey, and double-check and input all information.

1.5 Data entry and statistical analysis methods R software was used for statistical analysis. The counting data were analyzed by chi-square test and Logistic regression analysis to explore the independent influencing factors of general practice medical research.

2 Results

2.1 Basic situation analysis

A total of 932 questionnaires were collected, including 1 invalid questionnaire and 931 valid questionnaires. (1) the average age of the doctors participating in the survey was 38.17 ±12.39 years, among which 75% came from Zhejiang province and 77.2% came from first-class hospitals or community health service centers; (2) with the promotion of professional title, the time spent in general practice increases (deputy directors and above increase compared with hospitalization and attending; There was no statistical difference between the chief physician and the deputy chief physician (p=0.352), and the degree of education was also higher (the proportion of master and
doctor's degree was higher than that of undergraduate degree).(3) with the increase of professional titles, the number of published articles increased significantly (at the domestic level, there was no difference in the number of published articles between attending physicians and residents, p=0.715;Domestic secondary and other, the number of attending physicians and residents published no difference, p=0.145;SCI, there was no difference in the number of papers published by attending physicians and resident physicians (p=0.995), and there was no difference in the number of papers published by chief physician and deputy chief physician (p=0.559).(4) whether the topic or article must be different, p=0.015;(5) There are differences in scientific research interests, increased professional titles and interests;(6) research direction, no difference p=0.051;(7) training intention, no difference p=0.668;(8) article requirements for unit promotion, no difference p=0.708;(9) there was a difference in the proportion of joining the scientific research team, p<0.001.(see table 1)

2.2 Analysis of factors influencing the research requirements of the unit
(1)Logistic regression (factors in the first column) : among them, only the grade of the hospital, the time spent in general practice, and the degree of master and doctor are independent influencing factors. The analysis indicates that the higher the level of the hospital, the greater the demand for promotion (secondary hospital OR=3.71, tertiary hospital OR=8.36);The longer I worked in general practice, the demand for articles decreased slightly (OR=0.99);Units have higher requirements for the promotion of those with master's OR doctor's degree OR above (OR=2.15).(see table 2)
(2) Article requirements for unit promotion and grouping results by unit level: the higher the level of the hospital, the greater the possibility of article requirements for promotion, and there was a statistical difference in the proportion of article requirements between primary, secondary and tertiary hospitals (p<0.05).(see table 3)This shows, the requirement of unit to promotion article still basically is concerned with the level of the hospital.

2.3 Analysis of factors affecting individual research hospitals
For general practitioners, working in tertiary hospitals, having the title of chief physician, having the degree of master and doctor, having the interest in scientific research, having the interest in scientific research training, having the requirements for promotion, and having joined the scientific research
team are all influencing factors, and they are more inclined to devote their spare time to scientific research. (see table 4)

2.4 Analysis of factors affecting individual scientific research results

(1) Take the number of published articles as the result of analysis

Linear model (adjusted R² for linear model is 0.308. The linear relationship is good, the model variance is even, there is no multicollinearity. Table 5 shows only the significant influencing factors. The results showed that the number of articles published by doctors was positively correlated with age, hospital grade, professional title and whether they joined the scientific research team. Doctors in tertiary hospitals are 1.77 times more likely to publish one more article than doctors in primary hospitals. The probability of publishing one article with the title of director was 4.52 times higher than that of residents. Doctors who joined the team were 1.26 times more likely to publish an article than those who did not.

(2) The result is the amount of project funding obtained

Linear model (adjusted R² for linear model is 0.218. The linear relationship is good, the model variance is even, there is no multicollinearity. Table 6 shows only the significant influencing factors. It is suggested that the number of grants received by general practitioners is positively correlated with age, hospital grade, professional title, and participation in scientific research teams. The possibility of receiving more than one grant was increased by 0.22 times. Director titles were 0.42 times more likely to receive one grant than residents. The possibility of obtaining one more grant for master's or doctor's degree is 0.58 times higher than that for junior college degree. Doctors who joined the team were 0.35 times more likely to receive one grant than those who did not.

3 Discussion

General practice is a new secondary discipline, specializing in clinical practice, but there are also many practical problems that need to be further verified and solved through scientific research. Scientific research is indispensable to the development of general practice, which is of great significance to promote the development of general practice, improve the status of general practitioners, strengthen the teamwork of general practice, and deepen the reform of community
health [6]. At present, the scientific research foundation of general practice is still weak: (1) community health service centers often lack scientific research facilities and high-level scientific research talents; (2) the basic research of general medicine specialty is weak, and the previous research volume is small; (3) lack of clear research direction and goals; (4) more clinical work, less attention to scientific research, with fear. All of the above are important reasons for the backwardness of general medical research.

From our survey of 931 general practitioners, we found that as the professional title improved, the more time spent in general practice, the greater the interest in scientific research, the more articles published, and the more project funding received. However, there was no significant difference in the promotion requirements for scientific research, the choice of scientific research direction and the hospital in which the scientific research team joined, indicating that general practitioners had the same direction and choice for scientific research. In further studies on related factors, we found that hospital grade, time spent in general practice, and master's and doctor's degree were independent influencing factors. The higher the level of the hospital, the greater the demand for articles. On the contrary, the longer the general practice, the less the demand for articles. And different levels of hospitals, promotion needs different requirements. From the analysis of individual factors, it is found that general practitioners who choose to work in tertiary hospitals, have the title of chief physician, master's degree and doctor's degree, are interested in scientific research, are interested in participating in scientific research training, are required by the unit for promotion, have joined the scientific research team and are more inclined to devote their spare time to scientific research. The number of articles published by general practitioners was positively correlated with age, hospital grade, professional title, and participation in scientific research teams. The number of general practitioners receiving funding is positively correlated with age, hospital grade, professional title, and participation in scientific research teams. It can be seen that the scientific research needs of general practitioners are significantly correlated with hospital grades and doctor titles.

For comprehensive hospitals, they often need the coordinated development of medical, teaching and research, with the goal of cultivating the advantages of excellent talents and focusing on innovative
scientific research [7]. Therefore, general practitioners in general hospitals have better hardware conditions and teams for scientific research, so they pay more attention to scientific research. However, from the professional level, the scientific research ability of general practice is still lower than that of other specialties, mainly because of the discipline characteristics of general practice. Although there are many scientific research projects in comprehensive hospitals, most of them exceed the scope of general practice and require more basic research, which is a major weakness for general practitioners who focus on clinical practice. In addition, general practice started relatively late in China, and the current researches mainly focus on teaching and training, chronic disease management and other aspects, which cannot be compared with the specialties with profound research foundation from the perspective of basic research. At the same time, the general medical profession currently lack for general practitioners of cultivating the ability of scientific research projects, general practitioners often only on small subject for research, and is under more pressure of promotion, this is not conducive to the scientific research ability of general practitioners, cannot stimulate the gp scientific research and creative ability and interest, has affected the initiative of the scientific research [8]. Therefore, it is necessary to strengthen scientific research physicians, closely combine clinical practice with research, and encourage general practitioners to actively participate in the research work of scientific research projects, so as to improve their interest in scientific research and cultivate their innovation ability [9].

From the perspective of community health service centers, the lack of scientific research hardware and funds is the main reason why large-scale scientific research cannot be carried out at the grassroots level. At the same time, the grassroots did not list scientific research projects as promotion requirements, which also greatly reduced the desire for scientific research of general practitioners, facing scientific research ambivalence. However, due to the limitation of scientific research hardware and software as well as the lack of initiative, the academic leaders at the basic level of general science also have low scientific level and lack of consciousness of creating scientific research teams. However, under the implementation of medical reform, general practitioners should not only strengthen their clinical skills, but also their comprehensive scientific research ability [10].
development of general practitioners' scientific research is the need of discipline development, as well as the improvement of general practitioners' comprehensive ability [11]. General practitioners have always been known as "generalists", who need to master knowledge of various disciplines. In particular, general practitioners working at the grassroots level will receive and treat patients with various chief complaints for various reasons every day. Therefore, the scientific research of general practitioners should serve for clinical purposes.

To sum up, the purpose of scientific research conducted by general practitioners is to use scientific principles and methods to solve practical problems in clinical practice. Community health service center is an advantageous place for the research on two-way referral and resident file management, which can not be replaced by other secondary and tertiary hospitals. Similarly, the scientific research of general practitioners can be inclined to the management of chronic diseases and the early prevention of diseases, which is also the disciplinary feature of general practice and cannot be replaced by other specialized institutes. At the same time, scientific research is an important means to improve the comprehensive ability of general practitioners. On the one hand, it can make general practitioners more rigorous in clinical thinking [12]; on the other hand, it can also enable general practitioners to timely grasp the frontier of disciplines and grasp the latest academic trends [13]. One of the personal values of general practitioners lies in scientific research [14]. Through scientific research, they actively communicate with other disciplines and keep abreast of the latest academic trends, which is also conducive to the promotion of academic status. General practitioners can solve clinical problems through complete scientific research, so as to better serve patients [15]. Therefore, as a secondary discipline, general medicine also needs scholars who love scientific research, a strong scientific research team, an active academic atmosphere, and a sound management strategy to turn clinical problems into scientific research, which runs through clinical research and converts the results of scientific research into clinical application.

4 Conclusion
Hospital grade, time spent in general practice, master's degree and doctor's degree are the related factors that affect the scientific research requirements of the unit. Hospital grade, title and age are the
influencing factors of general medical research achievements, which are positively correlated with the number of articles published and the number of project grants obtained. To promote the scientific research of general practitioners and improve the scientific research results of general practitioners is an important means to improve the clinical level of general practitioners, promote the development of disciplines and cultivate comprehensive talents. With the continuous development of general practice medicine, both community hospitals and comprehensive hospitals should require the coordinated development of clinical practice, scientific research and teaching.

Declarations
- Ethical Approval and Consent to participate
The study obtained Ethical Approval of Sir Run Run Shaw hospital. Because it was an expert interview, it was given orally.
- Consent for publication
N/A
- Availability of supporting data
The data can be searched by contacting the author.
- Competing interests
All authors declare that there is no conflict of interest.
- Funding
None
- Authors' contributions
GQ wrote the article, Y did the analysis, LZ guided. All authors read and approved the final manuscript.
- Acknowledgements
N/A
- Authors' information (optional)
N/A

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Tables

| Table 1 General information of general practitioners about scientific research |
|-----------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                                                | Residents (n=2,55) | Attending physician (n=399) | Associate chief physician (n=207) | Chief physician (n=76) | Total (n=937) |
| Age                                            | 29.91 (5.81)      | 38.34 (5.54)      | 43.29 (4.43)      | 47.08 (4.05)      | 37.85 (7.66)   |
| Provinces                                      |                  |                  |                  |                  |                |
| In Zhejiang province                           | 166 (65.1%)       | 297 (74.4%)       | 176 (85.0%)       | 64 (84.2%)       | 703 (75.0%)    |
| Outside Zhejiang province                      | 89 (34.9%)        | 99 (24.8%)        | 30 (14.5%)        | 12 (15.8%)       | 230 (24.5%)    |
| Foreign                                        | 0 (0%)            | 3 (0.8%)          | 1 (0.5%)          | 0 (0%)           | 4 (0.4%)       |
| Unit level                                     |                  |                  |                  |                  |                |
| Level 1 or community health center             | 195 (76.5%)       | 337 (84.5%)       | 152 (73.4%)       | 39 (51.3%)       | 723 (77.2%)    |
| The secondary hospital                         | 12 (4.7%)         | 16 (4.0%)         | 14 (6.8%)         | 3 (3.9%)         | 45 (4.8%)      |
| Tertiary hospitals                             | 48 (18.8%)        | 46 (11.5%)        | 41 (19.8%)        | 34 (44.7%)       | 169 (18.0%)    |
| General practice time                          | 4.31 (4.81)       | 10.93 (6.51)      | 14.82 (7.86)      | 13.34 (9.13)     | 10.18 (7.73)   |
| Education background                           |                  |                  |                  |                  |                |
| Junior college                                 | 45 (17.6%)        | 40 (10.0%)        | 14 (6.8%)         | 3 (3.9%)         | 102 (10.9%)    |
| Bachelor                                       | 185 (72.5%)       | 320 (80.2%)       | 162 (78.3%)       | 53 (69.7%)       | 720 (76.8%)    |
| Master                                         | 24 (9.4%)         | 39 (9.8%)         | 28 (13.5%)        | 16 (21.1%)       | 107 (11.4%)    |
| Doctor                                         | 1 (0.4%)          | 0 (0%)            | 3 (1.4%)          | 4 (5.3%)         | 8 (0.9%)       |
| Publications                                   |                  |                  |                  |                  |                |
| Domestic first-class magazine                   | 0.15 (0.77)       | 0.29 (1.16)       | 0.80 (1.46)       | 2.36 (4.07)      | 0.53 (1.70)    |
|                                | Base class | Clinical class | Social Science | Teaching class | Willingness to participate in scientific research training |
|--------------------------------|------------|----------------|----------------|----------------|----------------------------------|
| Level 2 and other magazines    | 0.24 (2.53)| 0.67 (1.62)    | 1.93 (2.29)    | 5.18 (5.43)    | 1.20 (2.86)                       |
| SCI                            | 0.06 (0.35)| 0.08 (0.36)    | 0.25 (0.89)    | 0.36 (1.24)    | 0.13 (0.63)                       |
| Project funding                | 0.05 (0.30)| 0.09 (0.38)    | 0.47 (1.14)    | 0.86 (1.86)    | 0.22 (0.84)                       |
| National                       | 0.01 (0.09)| 0.01 (0.09)    | 0.03 (0.19)    | 0.03 (0.16)    | 0.01 (0.13)                       |
| Provincial and ministerial-level| 0.02 (0.14)| 0.01 (0.09)    | 0.17 (0.90)    | 0.14 (0.39)    | 0.06 (0.45)                       |
| Bureau level                   | 0.01 (0.09)| 0.04 (0.22)    | 0.19 (0.57)    | 0.63 (1.24)    | 0.11 (0.50)                       |
| Other                          | 0.05 (0.29)| 0.10 (0.51)    | 0.35 (0.78)    | 0.53 (0.86)    | 0.18 (0.59)                       |
| Are topics and articles required|          |                |                |                |                                  |
| Yes                            | 118 (46.3%)| 136 (34.1%)    | 84 (40.6%)     | 33 (43.4%)     | 371 (39.6%)                      |
| No                             | 137 (53.7%)| 263 (65.9%)    | 123 (59.4%)    | 43 (56.6%)     | 566 (60.4%)                      |
| hobby                          |            |                |                |                |                                  |
| Yes                            | 133 (52.2%)| 224 (56.1%)    | 140 (67.6%)    | 51 (67.1%)     | 548 (58.5%)                      |
| No                             | 122 (47.8%)| 175 (43.9%)    | 67 (32.4%)     | 25 (32.9%)     | 389 (41.5%)                      |
| Scientific research direction  |            |                |                |                |                                  |
| Base class                     | 27 (10.6%) | 23 (5.8%)      | 10 (4.8%)      | 1 (1.3%)       | 61 (6.5%)                        |
| Clinical class                 | 189 (74.1%)| 323 (81.0%)    | 170 (82.1%)    | 60 (78.9%)     | 742 (79.2%)                      |
| Social Science                 | 24 (9.4%)  | 27 (6.8%)      | 11 (5.3%)      | 7 (9.2%)       | 69 (7.4%)                        |
| Teaching class                 | 15 (5.9%)  | 26 (6.5%)      | 16 (7.7%)      | 8 (10.5%)      | 65 (6.9%)                        |
| Willingness to participate in scientific research training |           |                |                |                |                                  |
| A temporary training | 73 (28.6%) | 129 (32.3%) | 69 (33.3%) | 27 (35.5%) | 298 (31.8%) |
|----------------------|------------|------------|------------|------------|------------|
| Regular training     | 163 (63.9%) | 235 (58.9%) | 126 (60.9%) | 45 (59.2%) | 569 (60.7%) |
| No training required | 19 (7.5%) | 35 (8.8%) | 12 (5.8%) | 4 (5.3%) | 70 (7.5%) |
| Unit promotion article requirements | | | | | |
| Yes                  | 130 (51.0%) | 204 (51.1%) | 110 (53.1%) | 44 (57.9%) | 488 (52.1%) |
| No                   | 125 (49.0%) | 195 (48.9%) | 97 (46.9%) | 32 (42.1%) | 449 (47.9%) |
| Whether to join the scientific research team | | | | | |
| Yes                  | 42 (16.5%) | 75 (18.8%) | 66 (31.9%) | 26 (34.2%) | 209 (22.3%) |
| No                   | 213 (83.5%) | 324 (81.2%) | 141 (68.1%) | 50 (65.8%) | 728 (77.7%) |
| Scientific research time | | | | | |
| ≥80%                  | 0 (0%) | 0 (0%) | 2 (1.0%) | 0 (0%) | 2 (0.2%) |
| 50-80%                | 8 (3.1%) | 9 (2.3%) | 3 (1.4%) | 1 (1.3%) | 21 (2.2%) |
| 30-50%                | 17 (6.7%) | 35 (8.8%) | 28 (13.5%) | 11 (14.5%) | 91 (9.7%) |
| <30%                  | 129 (50.6%) | 184 (46.1%) | 124 (59.9%) | 56 (73.7%) | 493 (52.6%) |
| 0%                    | 101 (39.6%) | 171 (42.9%) | 50 (24.2%) | 8 (10.5%) | 330 (35.2%) |

Table 2 Regression analysis of impact on scientific research requirements
| Factor                        | OR  | 95%CI       | p     |
|------------------------------|-----|-------------|-------|
| Age                          | 1.03| 0.99-1.06   | 0.103 |
| Province In the province     | Ref | Ref         |       |
| Outside the province         | 1.11| 0.78-1.56   | 0.572 |
| Overseas (too few samples to | /   | /           | /     |
| be counted)                  |     |             |       |
| Hospital level First         | Ref | Ref         |       |
| Second                       | 3.48| 1.78-7.23   | <0.001|
| Third                        | 8.19| 4.67-15.16  | <0.001|
| Working time                 | 0.96| 0.93-0.99   | 0.003 |
| Professional title Attending | 1.24| 0.81-1.90   | 0.320 |
| Associate chief physician    | 1.16| 0.66-2.07   | 0.603 |
| Chief physician              | 0.71| 0.31-1.59   | 0.404 |
| Education background Junior  | Ref | Ref         |       |
| Bachelor degree              | 0.83| 0.59-1.48   | 0.759 |
| Master's and PhD             | 2.15| 1.01-4.66   | 0.049 |

Ref[] Consult

Table 3 Factor analysis of unit promotion article requirements
Table 4 Analysis of influencing factors of individual scientific research hospitals with scientific research time as the outcome

| Factor                        | OR   | 95%CI          | p     |
|-------------------------------|------|----------------|-------|
| Hospital level                |      |                |       |
| Tertiary hospitals           | 3.46 | 1.80-7.02      | <0.001|
| Professional title            |      |                |       |
| chief physician               | 3.26 | 1.29-8.76      | 0.014 |
| Education background          |      |                |       |
| Master or doctor              | 3.60 | 1.42-9.94      | 0.009 |
| Research interest             |      |                |       |
| Yes                           | 1.78 | 1.27-2.50      | <0.001|
| Training interest             |      |                |       |
| Attend regular training       | 2.27 | 1.25-4.20      | 0.008 |
| Article requirements for promotion | 1.58 | 1.15-2.18      | 0.005 |
| Join the research team        |      |                |       |
| Yes                           | 4.94 | 2.89-8.95      | <0.001|

Table 5 Analysis of influencing factors of published articles

| Factor                        | B   | 95%CI         | p     |
|-------------------------------|-----|--------------|-------|
| Age                           | 0.14| 0.09-0.19    | <0.001|
| Hospital level                | 1.77| 1.00-2.56    | <0.001|
| Professional title            | 4.52| 3.28-5.77    | 0.014 |
| Join the research team        | 1.26| 2.89-8.95    | <0.001|
Table 6 Analysis of influencing factors resulting from the amount of project funding obtained

| Factor                      | B     | 95%CI     | p       |
|-----------------------------|-------|-----------|---------|
| Age                         | 0.015 | 0.004-0.026 | 0.007   |
| Professional title          |       |           |         |
| Associate chief physician   | 0.22  | 0.02-0.42 | 0.028   |
| Professional title          |       |           |         |
| chief physician             | 0.42  | 0.16-0.69 | 0.002   |
| Education background        |       |           |         |
| Master or doctor            | 0.58  | 0.34-0.82 | <0.001  |
| Join the research team      |       |           |         |
| Yes                         | 0.35  | 2.89-8.95 | <0.001  |

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