



DOI:

10.22301/IJHMCR.2528-3189.573

Article can be accessed online on:

<http://www.ijhmcr.com>

INTERNATIONAL JOURNAL
OF HEALTH MEDICINE AND
CURRENT RESEARCH

REVIEW ARTICLE

RESULTS AND DESIGNS OF P4P IN PRIMARY HEALTHCARE: A SCOPING REVIEW

Jafar Sadegh Tabrizi ¹, Mohammad Asghari JafarAbadi ^{2,3}, Mostafa Farahbakhsh ⁴,
Alireza Mahboub Ahari ⁵, Shabnam Iezadi ^{1,5,6*}

¹ Tabriz Health Services Management Research Center, School of Management and Medical Informatics, Tabriz University of Medical Sciences, Tabriz, Iran

² Road Traffic Injury Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

³ Department of Statistics and Epidemiology, Faculty of Health, Tabriz University of Medical Sciences, Tabriz, Iran

⁴ research center of Psychiatry & Behavioral Sciences, Tabriz university of Medical Sciences, Tabriz, Iran.

⁵ Iranian Center of Excellence in Health Management, Department of Health Service Management, Tabriz University of Medical Sciences, Tabriz, Iran

⁶ Student Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

ARTICLE INFO

Article History:

Received 25th August, 2017

Received in revised form

07th September, 2017

Accepted 20th September, 2017

Published online 27th September, 2017

Key words:

Pay-For-Performance, Quality Incentive, Payment Strategy, Quality Measure.

*Correspondence to Author:

Shabnam Iezadi

Tabriz Health Services Management Research Center, School of Management and Medical Informatics, Tabriz University of Medical Sciences, Tabriz, Iran

E-mail:

sh_iezadi@yahoo.com

ABSTRACT

Background: Despite the growing interest in implementation of pay-for-performance(P4P) programs for improving quality of healthcare, some questions about the effectiveness of P4P remain. At this systematic review two objectives were followed. The first objective was to synthesis the results of pay-for-performance in primary healthcare (PHC) and the second one was to synthesis the design of P4P.

Method: Relevant electronic databases including: PubMed, Web of Science, Cochrane Library, ProQ, Scopus and Ovid(Medline/EMBASE) were searched in 20 January 2016. Studies which evaluated the effect of P4P on PHC and have reported full summary of P4P design were included. Primary outcomes were all process and intermediate outcome measures in PHC. Secondary outcomes were client and healthcare providers' satisfaction, quality of services, hospital admission and continuity of care.

Results: Among 3527 citations 55 articles were included in the analysis. Most of the articles showed positive results especially in disease management,

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Citation: Jafar Sadegh Tabrizi ¹, Mohammad Asghari JafarAbadi ^{2,3}, Mostafa Farahbakhsh⁴, Alireza Mahboub Ahari ⁵, Shabnam Iezadi ^{1,5,6*}, 2017 "Results And Designs Of P4p In Primary Healthcare: A Scoping Review", *International Journal of Health Medicine and Current Research*, 2, (03), 572-585.

preventative care and quality improvement. A variety of measures in the area of disease management, mental health, Preventative care, family planning, patient experience, substance abuse and management, were identified through review. Payment strategy in most of the articles were achieving absolute level of measure.

Conclusion: This review showed that P4P in PHC achieved improvement in most of the fields especially disease management, smoking/alcohol abuse treatment, preventive care and patient experience of care. Various designs of P4P were detected by this review but limited studies have been conducted about the effectiveness of each design.

INTRODUCTION

Since the recommendation of Institute of Medicine (IoM) regarding to application of quality-based incentive programs for improving quality of healthcare, many countries have increasingly adopted pay-for-performance (P4P) programs for local or nationwide health plans with the aim of improving quality of healthcare (1). P4P is a quality improvement strategy which links financial incentives to predefined measures of individual or team performance through a benchmarking system (2). The primary goal of P4P is to encourage provision of constant high quality healthcare which leads to achieving desirable outcomes (3, 4).

Not with standing the increasing popularity of P4P in health systems, the mixed evidences have been found regarding the effectiveness of P4P (5, 6). For example, a study by Alshamsan showed positive effects of P4P on management of Diabetes Mellitus (7). Other study showed negative effects of P4P on prescribing patterns in primary healthcare (8). Another study by Crawley showed that P4P had no effects on disease management (9). One of the most important reason for such difference is that, effectiveness of P4P is greatly affected by design of P4P and context in which P4P is applied (10). Design of p4p program encompasses several elements and three mains are including: P4P measures, level of performance, and payment strategy. A P4P program may encompass structure, process or outcome measures. P4P may be directed at the level of the individual healthcare providers or team. It may be applied in line with other intervention or solely. Also, it may take different kinds of payment strategies (11). Payment strategy refers to the way in which the performance of health care providers is judged and rewards are paid. Three types of payment strategies are known through evidences; 1) "absolute level of measure" (eg; paying reward for achieving predefined targets),

"improvement" (eg; paying reward for X% improvement in measure), and "relative ranking" (comparing performance of healthcare providers with each other). Despite the growing application of P4P by healthcare providers and payers for improving quality of healthcare (10), there remains some questions about the appropriate design of P4P (10, 12). For example, what are the results of P4P programs when using each payment strategies? Is a P4P program effective when it is implemented in parallel with other interventions? What are the results of P4P when payment is conducted at the level of individuals or team performance? By taking all these into account, there is an essential need for conducting a systematic review to answer these questions.

A systematic review by Van Herck was conducted in 2009. This systematic review evaluated impact of P4P in PHC or acute hospital care. The review showed the possibility of relationship between results of P4P and design, choices and context of P4P (13). Another systematic review was conducted by Lin and colleges in 2013 to examine the "impact of pay for performance on behavior of PHC physicians and patient outcomes". This review showed that the baseline status of practice in case of quality and practice size can affect the impact of P4P (14). Other systematic reviews have synthesized limited outcomes such as economic outcomes (15, 16). At this review we aim to study the results of different P4P programs. Because of heterogeneity of P4P design and its mechanism in improving quality of healthcare, it is impossible to conduct a meta-analysis. However, two objectives were followed by this systematic review. The first objective was to synthesize the results of P4P programs in PHC, and the second one was to synthesis the design of different P4P programs.

METHODS

In order to synthesize the design and results of P4P in literatures a scoping review was conducted. at this review, search strategy, methods of the synthesis and eligibility criteria were specified in advance and the protocol was registered in Prospero; CRD42015029219. PRISMA checklist was used for preparing the report of review.

Study eligibility criteria

Types of studies:

Studies which have examined the effect of P4P on PHC including observational studies (before-after studies, controlled before-after studies, time series and longitudinal studies) and experimental studies

(randomized trial and controlled randomized trial) were selected. Review studies, cross-sectional, qualitative studies, editorials and commentaries were excluded from review.

Types of participants:

Participants were Primary healthcare providers, general practitioners, primary health centers/posts, and any organization which provides primary health care.

Types of outcome measures:

Primary outcome measures were all process and intermediate outcome measures in PHC including: disease detection and management, mother-infants care, preventive care, and substance abuse. Secondary outcomes were client and healthcare providers' satisfaction, quality of PHC, hospital admission related to disease which is controlled in PHC level, and continuity of care.

Intervention:

Pay for performance was intervention of interest. P4P is defined as any supply side financial incentives (either negative or positive) which were paid at individual level of providers or at team level for predefined quality or performance measures.

English language articles were searched in relevant electronic databases including: PubMed, Web of Science, Embase and Medline via Ovid, Cochrane Library and Cochrane Central Registry of Controlled Trials, ProQ and Scopus in 20 January 2016. The search was restored in 4 December 2016 but no variation was found in the results. Final key words were identified through Mesh and pilot search. Pilot search was conducted in 12 January 2016. Publications which were published from year 2010 were retrieved by reviewers. Complete search strategy for scopus is available in table1. Reference and citation lists of relevant articles were screened manually. At first stage of screening title and/or abstract were reviewed by two reviewers independently according to review's eligibility criteria. At second stage, full texts were screened by both reviewers independently in order to find eligible articles. At each screening level, any case of disagreement was resolved by consulting with third reviewer. Finally, data including: type of study, context, performance dimensions and measures, payment strategies, outcome measures and results of P4P programs were extracted by one reviewer and were submitted in data sheet.

Information sources and screening

Table 1. Search Strategy: Sample For Scopus.

(((((TITLE-ABS-KEY ("Pay* for performance") OR TITLE-ABS-KEY ("P4P") OR TITLE-ABS-KEY ("pay* 4 performance") OR TITLE-ABS-KEY ("pay* for quality") OR TITLE-ABS-KEY ("pay* for value") OR TITLE-ABS-KEY ("pay* for outcome") OR TITLE-ABS-KEY ("Pay* for result") OR TITLE-ABS-KEY ("pfp") OR TITLE-ABS-KEY ("Pay* for output") OR TITLE-ABS-KEY ("performance based payment*") OR TITLE-ABS-KEY ("quality based payment*") OR TITLE-ABS-KEY ("value based payment*") OR TITLE-ABS-KEY ("output based payment*") OR TITLE-ABS-KEY ("result based payment*") OR TITLE-ABS-KEY ("outcome based payment*") OR TITLE-ABS-KEY ("performance based purchasing") OR TITLE-ABS-KEY ("quality based purchasing") OR TITLE-ABS-KEY ("result based purchasing") OR TITLE-ABS-KEY ("outcome based purchasing") OR TITLE-ABS-KEY ("output based purchasing") OR TITLE-ABS-KEY ("value based purchasing") OR TITLE-ABS-KEY ("performance based incentive"))) AND DOCTYPE (ar)) OR ((TITLE-ABS-KEY ("outcome based incentive") OR TITLE-ABS-KEY ("quality based incentive") OR TITLE-ABS-KEY ("result based incentive") OR TITLE-ABS-KEY ("output based incentive") OR TITLE-ABS-KEY ("value based financing") OR TITLE-ABS-KEY ("quality based financing") OR TITLE-ABS-KEY ("outcome based financing") OR TITLE-ABS-KEY ("output based financing") OR TITLE-ABS-KEY ("result based financing") OR TITLE-ABS-KEY ("Performance based compensation") OR TITLE-ABS-KEY ("value based compensation") OR TITLE-ABS-KEY ("quality based compensation") OR TITLE-ABS-KEY ("outcome based compensation") OR TITLE-ABS-KEY ("result based compensation") OR TITLE-ABS-KEY ("output based compensation")) AND DOCTYPE (ar)) OR ((TITLE-ABS-KEY ("result compensation") OR TITLE-ABS-KEY ("quality compensation") OR TITLE-ABS-KEY ("Performance compensation") OR TITLE-ABS-KEY ("value compensation") OR TITLE-

ABS-KEY ("outcome compensation") OR TITLE-ABS-KEY ("output compensation") OR TITLE-ABS-KEY ("value based reimbursement") OR TITLE-ABS-KEY ("quality based reimbursement") OR TITLE-ABS-KEY ("outcome based reimbursement") OR TITLE-ABS-KEY ("result based reimbursement")) AND DOCTYPE (ar))) AND ((TITLE-ABS-KEY ("primary health care") OR TITLE-ABS-KEY ("primary care") OR TITLE-ABS-KEY ("PHC") OR TITLE-ABS-KEY ("health care") OR TITLE-ABS-KEY ("primary medical care") OR TITLE-ABS-KEY (healthcare) OR TITLE-ABS-KEY ("primary healthcare") OR TITLE-ABS-KEY ("prophylaxis care") OR TITLE-ABS-KEY ("preventative care") OR TITLE-ABS-KEY ("General practice") OR TITLE-ABS-KEY ("General practitioner") OR TITLE-ABS-KEY ("GP") OR TITLE-ABS-KEY ("health promotion*") OR TITLE-ABS-KEY ("Chronic care") OR TITLE-ABS-KEY ("Chronic care management") OR TITLE-ABS-KEY (screen*) OR TITLE-ABS-KEY ("Patient Care Management") OR TITLE-ABS-KEY ("Health service*") OR TITLE-ABS-KEY ("Comprehensive Health Care") OR TITLE-ABS-KEY ("Disease Management") OR TITLE-ABS-KEY ("Public Health")) AND DOCTYPE (ar)))

Data synthesis

Data related to design and results of P4P were synthesized manually. The data considered for synthesis were classified into several categories including results of P4P programs in PHC and design factors of P4P. Factors related to design of P4P included performance

measures, parallel intervention, level of performance (e.g. individual performance or team performance) and payment strategy. Because of the variety of outcome measures, we outlined a strategy to synthesis the results of P4P programs. Please see table 2 for more details.

Table 2. strategy of synthesizing the results of records in the review.

If	All outcome measures in an article show positive results	=	Positive Result
	All outcome measures in an article show negative results		Negative Result
	All outcome measures in an article show no change in		No Effect
	Some outcome measures show positive results and some outcome measures show no change		Positive Result
	Some outcome measures show negative results and some outcome measures show no change		Negative Result
	Some outcome measures show negative results and some outcome measures show positive results		Mixed Results

RESULTS

Totally, 3527 citations were found through either the databases or hand search. After removing duplicates, 1140 citations remained. Among them 63 articles found to be relevant to review's objectives. After screening for title\abstract, eight studies were excluded

by reasons namely: no full text(17, 18), no outcome of interest (6, 19), no comparison of interest (20, 21), no detailed information about the P4P program (22, 23). Finally, a total of 55 articles were included in the review. The flowchart of search strategy and screening is presented in Figure 1.

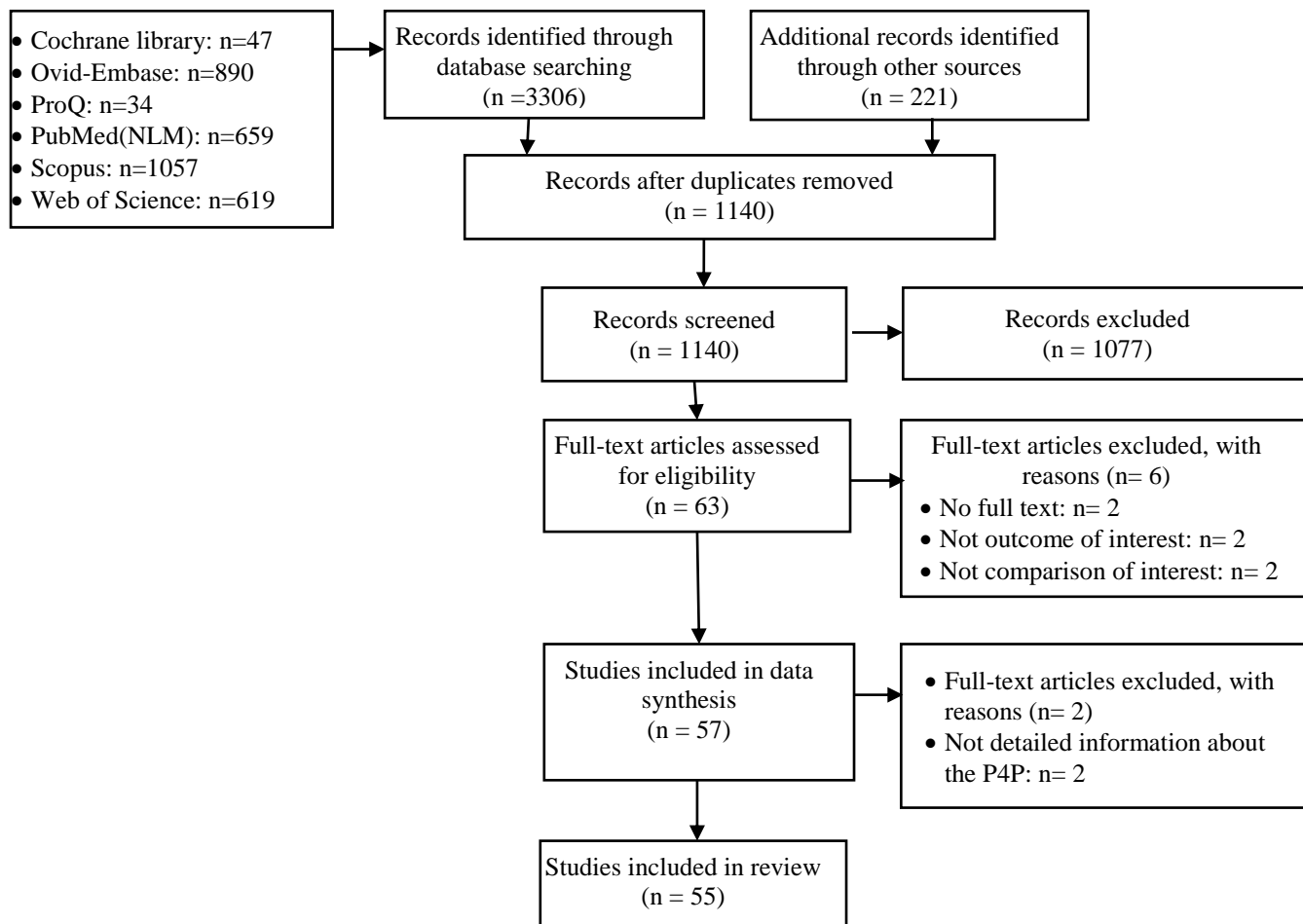


Figure 1. flowchart of search strategy and screening.

Characteristics of included studies

Included articles consist of 40 observational studies (1, 4, 5, 10, 11, 24-58), nine quasi experimental studies (3, 59-66) and six experimental studies(67-72). Duration of included studies varied from one year to ten years. Majority of articles were related to UK QOF. The main goal of the P4P programs was improving quality of healthcare but in some cases, other goals were disclosed such as: improving the medical management of disease(4, 11, 42, 61), improving the childhood immunization coverage(27), encouraging facilities to maintain certain operating standards(60), promoting skilled birth attendants to encourage deliveries in public health centers(35), improving preventative care(4, 30, 38), improving access(3, 53), utilization(62) and effectiveness of services(61).

Results of P4P

Primary outcome

Primary outcomes were measures of process of care and intermediate outcomes in PHC. seventeen outcomes were identified through the review in which the effects of P4P on primary healthcare were studied. In

27 manuscripts, the effect of P4P on diseases management was assessed including: Diabetes Mellitus, Heart Failure, Chronic heart Disease(CHD), Hypertension, COPD, Ischemic Heart Disease (IHD), Stroke and Transient Ischemic Attack (TIA), Depression, Epilepsy, Lipid Management, Tuberculosis, Asthma, and Malaria. The studies focused on Diabetes Mellitus showed the range of results from negative to positive in which 12 showed positive results (1, 5, 11, 25, 31, 34, 39, 42, 43, 47, 54, 67), one showed no effect (10), and one reported negative result (59). About each of COPD, IHD, TIA, Heart Failure and Malaria positive results were observed (25, 39, 41, 55, 67). Regarding to CHD three articles got positive results (25, 36, 41). For Hypertension, five articles showed positive results (41, 54, 61, 67, 69) and one showed no effect (51). On the other hand, for Lipid Management, four positive results (52, 54, 58, 61) and one no effect (72) were reported. Regarding to depression one articles drew positive result(44) and other one showed mixed results(37). Two identified articles in the area of Tuberculosis management showed positive results(64, 65). In the area

of Asthma management in PHC settings two articles drew positive results(61, 73).

Regarding the results of P4P in preventive care, a total of 16 articles were identified among which 11 articles showed positive results (5, 25, 27, 38, 43, 45, 46, 59, 61, 66, 74) and five articles showed no effect (3, 30, 31, 39, 62). About maternity care two articles were identified and both of them indicated positive results (3, 62). About child care, one article reported positive result (3) and one showed no effect (53). In the case of family planning one article got positive result (24) and one showed negative result (60). All six articles in case of smoking/alcohol abuse drew positive results(32, 52, 56, 61, 70, 71). Finally, three articles were found in relation to guideline based prescription in PHC so that two of them reported positive results (61, 63) and one got negative results (49) .

Secondary outcome

A total of eight articles were found regarding the quality of PHC, among them five articles indicated positive results (28, 29, 40, 58, 61) and three showed no effect (48, 50, 69). In the case of continuity of care one article showed positive results(4). The other secondary outcome of interest was hospital admission. For this outcome, among six identified citations, four articles showed positive results (1, 26, 33, 58), one demonstrated negative result (50) and other one showed no effect(65). As for patient experience of care three articles showed positive results (1, 26, 39) and one showed no effect (63). About utilization two articles showed positive results and one showed no result(35, 62). The summary of positive and negative results of P4P in PHC are presented in tables 3 and 4 respectively.

Table 3. Summary of Positive Results Of P4P in PHC

R	Positive results of P4P in PHC
1	Increase in preventive screening rate (5, 31, 38, 42, 55, 66)
2	Increase in substance abuse screening (32, 52, 56, 61)
3	Improvement in smoking/alcohol management intervention (32, 67, 70, 71)
4	Guideline based immunization coverage (5, 27, 45, 46, 59)
5	Improvement in family planning care (24, 60)
6	Increase in facility deliveries (3, 35, 62)
7	Increase in deliveries with skilled attendants (35)
8	Improvement in maternity care (3, 62)
9	Improvement in child preventive care (3)
10	Decrease in hospital admission rate (1, 11, 26, 33, 50, 58)
11	Improving quality of care (1, 25, 28, 29, 40, 58, 61)
12	Decrease in the percentage of patients who were able to book a GP appointment over two days ahead (26)
13	Improvement in patients' experiences with GP's functioning (39)
14	Guideline based HbA1c testing for diabetics (5)
15	Improvement in glycemc control in people with diabetes (47)
16	Improvement in total cholesterol control in people with diabetes (47)
17	Comprehensive debates examinations and tests (11, 31, 42)
18	Improvement in diabetes care (42, 54)
19	Decrease in risk of macrovascular complications (34)
20	Improvements in population blood pressure measurement (36, 61)
21	Guideline based care for patient with comorbidity (67)
22	Improvement in risk factor control in people with cardiovascular disease in PHC (41)
23	increased lipid monitoring and treatment (58)
24	Increase in treatment rates for recurrent depression (37, 44)
25	Increasing new depression-related diagnoses (44)
26	Significant improvements in asthma education(61)
27	Improvement in management of suspected malaria fevers (68)
28	improvement in both the cure rate of tuberculosis (64, 65)
29	improvement in average length of treatment for cured cases (64)

R	Positive results of P4P in PHC
30	Improvement in medical documentation (56, 61)
31	Improvement in guideline based medication (49, 54, 63)
32	Continuing care (4)

Table 4. summary of Negative results of P4P in PHC

R	Negative results of P4P in PHC
1	increase in the mean percentage of epilepsy patients seizure free(26)
2	decrease HbA1c testing among diabetics(59)
3	decrease low-density lipoprotein (LDL) screening, among diabetics(59)
4	Reduction of rates of GP antidepressant treatment for patients with incident depression(37)

Level of performance

Another design factors which is synthesized in this review is level of performance. The level of performance in most of the studies was team performance. However among 29 publications 24 articles showed positive results (4, 24, 27, 29, 32, 33, 35, 36, 39-41, 43, 44, 46, 47, 52, 54, 56, 62, 63, 66-68, 70), two showed No effect (48, 51) and three showed Mixed results (26, 37, 59). The target of payment in 17 article were individual performance. Among them 12 article showed Positive results (3, 5, 11, 25, 34, 38, 42, 45, 50, 55, 58, 71), one of them showed negative result (49) and four showed no effect (10, 53, 57, 72). Also, the results indicate that in seven studies either individual or team performance were applied. At this regard six articles drew positive results and one didn't show significant effect. In two remained studies, there weren't specific separation in performance level. So that each one used individual and team level of performance in some groups or for some plans (28, 69).

Parallel intervention

Other design factor which is neglected in most of the times is using parallel intervention with P4P. In ten articles, P4P was implemented in parallel with other interventions (32, 37, 55, 59, 64-66, 70-72). Fagan et al in 2010 applied an especial third-party disease management program by targeting older adults with diabetes in line with P4P which resulted in positive result in influenza vaccine among diabetics but in contrast, significant decrease in Hemoglobin A1c (HbA1c) testing and significant decrease in low-density lipoprotein (LDL) screening, among diabetics in last 12 months were observed (59). Another study by Hamilton et al in 2014 showed that planned alcohol screening and brief intervention in line with P4P got 60.9% increase in screening of individuals with cardiovascular and mental health (32). On the other hand, the study of Kendrick and colleagues showed mixed results of QOF and introduction of depression guidelines by National

Institute of Clinical Excellence (37). Li and colleagues in a clustered randomized trial showed that enrollment of primary care professionals into more participatory, multifunctional teams in line with P4P resulted in improvement of Pap smears, mammograms, senior flu shots and colorectal cancer screenings(71). Also, implementing P4P in parallel with introduction of National Health Insurance (NHI) program resulted in improvement of Tuberculosis treatment (64, 65).

Measures and domain of performance in P4P programs

A variety of measures in the area of disease management, mental health, Preventative care, family planning, patient experience, substance abuse and management, were identified through review. The most applied domain of P4P in primary healthcare was related to technical quality (which is related to technical aspects of healthcare e.g. Clinical guideline Appliance) and service quality (which is relate to features of health services and customers' satisfactions).

Payment strategy

Payment strategy of 33 articles were "achieving absolute level of measure". Majority of them (24 articles) drew positive result (3, 24, 25, 28, 29, 31, 33, 36, 38, 40, 41, 43-47, 52, 54, 60, 62, 67, 68) (56, 70), six articles reported no effects (30, 48, 51, 53, 69, 72) and three articles showed mixed results (26, 37, 59). Applied strategy for paying incentive in one article was improvement and its result was positive (66). regarding "relative ranking" as payment strategy all three articles indicated positive results (4, 61, 63). Two articles applied absolute level of measure and improvement in parallel with each other as payment strategies among them one articles got negative result (49) and one sowed no effect (57). In six articles improvement and relative ranking were used together as payment strategies and all

of them drew positive results (1, 5, 11, 34, 42, 58). In one article, all three strategies were used together and got positive result (39). In nine articles, no payment strategy was reported in P4P programs. In those articles, the payment method was piece rate payment and instead of one article (10) others showed positive results (27, 32, 35, 50, 55, 64, 65, 71).

DISCUSSION

Applying P4P programs in PHC have reached desirable results in most of the conditions especially disease management, preventive care and smoking/alcohol abuse. Adopting other interventions such as training, coaching, reminder, etc., in line with P4P is recently welcomed by healthcare providers and payers and in most of the situations it has led to positive results. P4P is implemented in various ways by variety of designs but the results of P4P with each design are different. Hence, we cannot conclude which design of P4P is appropriate.

The results of P4P in PHC in majority of the areas were encouraging. Millett and colleagues concluded that, implementation of P4P contracts in U.K. primary care have improved the diabetes care in all ethnic groups (75). Although in some cases, the negative and/or mixed results were obtained. This variety of results may be rooted from the design of P4P or context in which the program is implemented. Little is known about the effectiveness of P4P in relation to design factors of P4P. P4P is a strongly context based program. At this regard, one affecting factor is involvement of healthcare providers in designing, planning and implementing the P4P program. Success of the program depends on providers' acceptance. The study of Ye et al suggested that the involvement of healthcare providers in designing and planning incentive program is a key component of success of the program because it makes commitment in healthcare providers to effectively participate in program. Then, the overall acceptance will be achieved easier (4). Bardach and colleagues in a cluster-randomized trial recommended that the effect of P4P is contingent upon stakeholders' knowledge of program's design (67).

Level of performance is a key design factor of P4P programs. In relation to effect of individual or team performance on P4P outcomes, only one trial identified to examine the effect of individual physician-level and practice-level financial incentives on PHC. Study of Petersen et al showed that physicians who were randomized to the individual-based incentive groups

were more likely than team-based incentive groups to improve their treatment procedures. Individual financial incentives, not practice-level or combined incentives, resulted in greater blood pressure control or appropriate response to uncontrolled blood pressure (69). A few studies showed that small monetary incentives based on individual performance may result in incremental improvement in ambulatory care(28).

The other important aspects of P4P design is payment strategy. As mentioned above several types of payment strategies were used in P4P programs. But due to the variety of results we cannot judge which one is more effective than others. To the best of our knowledge, there is no randomized trial in which the effects of payment strategy on effectiveness of P4P have been examined. Rosenthal et al showed that paying healthcare provider to reach absolute target may largely reward those with better baseline performance while most improvement have been shown in physician with lowest baseline performance. It means physicians who had lowest performance at the beginning of the study gained the most improvement comparing to physicians whose performance was above the target at the beginning of the study (12). Philosophers have argued that using absolute targets in P4P program cannot motivate healthcare providers whose baseline performance were above target levels to enhance their performance. On the other hand, providers who historically had poor performance get less motivation to improve their performance because targets seem too hard to gain(5). In some occasions, authorities adopt both absolute targets and improvement in P4P program in order to overcome their weakness (5). But this review showed that only in two articles absolute level of measure and improvement were used together recently.

A Few or no randomized trial has been conducted about identifying the factors which affect the results of P4P program. Then, making decision about the effectiveness of P4P is controversial. Other systematic reviews at this regard have discussed about the difference of baseline performance level as an important predictor of P4P effectiveness(14).

This study has three limitations. First, due to major heterogeneity of P4P interventions, it is not possible to conclude about the relationship between P4P effectiveness and its design. Second, majority of studies are observational and retrospective and this makes it difficult to robustly decide about the results of P4P. The Third one is the inclusion of English-language only manuscripts.

CONCLUSION

This review showed that in PHC setting P4P programs were conducted with the aim of improving quality of healthcare and it has achieved improvement in most of the fields especially disease management, alcohol/smoking abuse treatment, preventive care and patient experience of care. Considering the context based features of P4P programs various designs of P4P were detected by this review but limited studies have been conducted about the effectiveness of each design. More trials are needed to evaluate that which design of P4P is more effective.

ACKNOWLEDGEMENTS

This study was extracted from PhD dissertation which was approved by the School of Management and Medical Informatics, Tabriz University of Medical Sciences, Iran.

Conflicts of Interest

The authors declare that they have no Conflicts of Interest.

Funding

This study was financially supported by School of Management and Medical Informatics of Tabriz University of Medical Sciences and Tabriz Health Services Management Research Center.

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