Effects of Parental Military Deployment on Pediatric Outpatient and Well-Child Visit Rates

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KEY WORDS
military health system, well-child care, deployment

ABBREVIATIONS
IRR—incidence rate ratio
IQR—interquartile range
CI—confidence interval

The views expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Department of the Navy, the Department of Defense, or the US government.

www.pediatrics.org/cgi/doi/10.1542/peds.2009-2704

doi:10.1542/peds.2009-2704

Accepted for publication Feb 25, 2010

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PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

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FINANCIAL DISCLOSURE: *The authors have indicated they have no financial relationships relevant to this article to disclose.*

WHAT'S KNOWN ON THIS SUBJECT: Military members and their families experience unique stressors, particularly during wartime deployments. Increased pediatric outpatient visit rates may be associated with family demographic features, and parental deployment has been shown to have emotional and behavioral effects on children.

WHAT THIS STUDY ADDS: The objective of this study was to determine whether parental military deployment affected the rates at which children of military parents accessed health care, particularly regarding preventive well-child visits, within the military health system.

abstract

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OBJECTIVE: The objective of this study was to determine whether parental deployment affected the rates at which children of military parents accessed health care within the military health system.

METHODS: We linked outpatient health care claims data for military service members' children <2 years of age from fiscal year 2007 to the parental deployment history during the same period. Incidence rate ratios (IRRs) for all visits and well-child visits were determined according to parental deployment status.

RESULTS: A total of 169 986 children were identified, with 1 772 703 outpatient visits. Of those children, 32% had a parent deployed during the study period. Well-child visits constituted 27% of all outpatient visits. The unadjusted visit rates for all visits and well-child visits were 10.4 and 2.8 visits per year, respectively. Children of single parents had decreased rates of outpatient visits (IRR: 0.84 [95% confidence interval [CI]: 0.80–0.89]; $P < .001$) and well-child visits (IRR: 0.88 [95% CI: 0.84–0.93]; $P < .001$) during deployment. Children of married parents, however, had increased rates of both outpatient visits (IRR: 1.08 [95% CI: 1.03–1.09]; $P < .001$) and well-child visits (IRR: 1.08 [95% CI: 1.07–1.09]; $P < .001$) during deployment. There was interaction between parental marital status and deployment, which was most significant among parents <24 years of age and consistently decreased with increasing parental age.

CONCLUSIONS: Children of young, single, military parents are seen less frequently for acute and well-child care when their parent is deployed, whereas children of married parents are seen more frequently in the military health system. *Pediatrics* 2010;126:000

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Military service brings unique stressors to service members and their families. Frequent moves away from established social support networks and prolonged parental absences during military deployment are 2 such stressors.[1] Military families generally adapt well; however, some may have difficulty adjusting to these stressors.

A large study of children enrolled in a civilian health care plan found that the outpatient health care utilization rate could not be entirely explained by chronic conditions, and increased visit rates were associated with family demographic characteristics.[2] Parents exposed to increased psychological stress may bring their children to medical providers more frequently than they would if they were not exposed to stress.[3] If other factors that affect an individual's health care utilization and response to stress (eg, child age, chronic medical conditions, income, birth order, family size, and parental education) are factored into analyses, then the pediatric outpatient visit rate can provide a quantifiable outcome, for examination of its potential association with a psychological stressor.

Various studies have documented the effects of parental deployment on children, focusing primarily on emotional and behavioral issues.[4–7] Interestingly, increased stressors during parental deployment among children of military service members were not shown to result in increased levels of symptoms of depression, compared with children of nondeployed parents.[8] According to a Defense Manpower Data Center survey, 20% of military spouses reported increases in problem behavior exhibited by their children at home in response to parental deployment, and 21% reported increased levels of fear and anxiety among their children during deployment.[9] Also, 39% of respondents reported having problems managing child care or child schedules while their spouse was deployed, which might infringe on their ability to schedule appropriate well-child visits for their children.[9] Deployment also has been shown to affect military families through correlation with increased rates of child maltreatment.[10]

We hypothesized that parental military deployment would be associated with increased rates of pediatric outpatient visits and decreased rates of well-child visits. We aimed to determine the ratios of outpatient and well-child visit rates during deployment, compared with those not during deployment.

METHODS

The <2-year-old children of US military service members who were enrolled in the military health system for fiscal year 2007 were identified by using the Defense Eligibility and Enrollment System. This age group was selected because of the large number of recommended health maintenance visits advocated by the American Academy of Pediatrics for children <2 years of age, compared with children of older ages.[11] This larger number of pediatric health maintenance visits increases the chances of detecting a significant difference, if one exists, in the time period studied. The Electronic Data Interchange Patient Number, which is a unique identifier commonly used in Department of Defense databases, was extracted for each eligible child with a parent on active duty. Children of service members in the National Guard or Reserves were excluded. All outpatient claims data for included subjects were collected from the Tricare standard ambulatory data record and the noninstitutional purchased care database, which are maintained by the Tricare Management Authority. The standard ambulatory data record captures all health care claims for direct care received in military hospitals and clinics, and the noninstitutional purchased care database records care received in civilian institutions. Outpatient visits were identified as well-child visits if the International Classification of Diseases, Ninth Revision code listed was V20.2 (routine infant or child health check).

Parent Electronic Data Interchange Patient Numbers were used to link outpatient claims to parents' deployment history during fiscal year 2007, as recorded by the Defense Manpower Data Center. Defense Manpower Data Center data included start and stop dates for all deployments, as well as demographic information such as age, rank, and marital status. Each visit was classified as occurring during or not during a parent's deployment by using visit dates and deployment start and stop dates.

Multivariate Poisson regression using longitudinal analysis determined the incidence rate ratio (IRR) of all visits and well-child visits according to parental deployment status. Records were clustered according to individual child, to account for interpatient variability. Person-time was calculated as 365 days for the entire year, because we did not have access to dates of birth for the subjects. Person-time was categorized into days exposed and days not exposed by using the dates of parental deployment. Age, gender, marital status, and pay grade of the parent; gender, age, and birth order of the child; and interaction terms involving deployment status were considered as potential confounders. P values of <.05 were considered statistically significant. All analyses were conducted by using Stata 10 (Stata, College Station, TX).

RESULTS

By using standard ambulatory data record data for fiscal year 2007, 203 059 eligible children who were

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<2 years of age and were eligible for Tricare were identified. Among the children included, 46% were <1 year of age, 49% were female, 64% were white, and 58% were first-born within their families. During the study period, 32% had a parent deployed at least once. The median length of deployment during the study period was 134 days (interquartile range [IQR]: 61–228 days). Parents were deployed for 18 018 person-years, which was 12% of the potential exposure time for the study period. Parents' median age was 28 years (IQR: 24–32 years). Among the service member parents, 88% were male, 94% were married, and 74% were within junior enlisted ranks (grades E1–E6). Well-child visits represented 27% of all outpatient visits. Additional demographic information is shown in Table 1.

The claims for the eligible children included 3 175 723 outpatient visits. Of these, 1 369 947 duplicate records (43%) were excluded and 33 073 records (1%) were excluded because they did not include a visit date. Remaining in the analysis were 1 772 703 outpatient visits (56%) by 169 986 children (84%).

The unadjusted visit rates for all visits and well-child visits were 10.4 and 2.8 visits per year, respectively. Among parents who did and did not deploy, the proportions of children who had ≥1 well-child visit in 2007 were 92.2% and 92.4%, respectively. Unadjusted logistic regression analysis indicated that parental deployment did not have a notable effect on whether a child had any well-child visits versus none (odds ratio: 1.02; $P < .01$). Unadjusted longitudinal analyses produced IRRs that showed increases during deployment for both outpatient visits (IRR: 1.07 [95% confidence interval [CI]: 1.06–1.07]; $P < .001$) and well-child visits (IRR: 1.08 [95% CI: 1.07–1.09]; $P < .001$). In unadjusted analyses stratified according to parents' marital status, deployment was associated with decreases in visit rates for children of single parents (outpatient visits, IRR: 0.84 [95% CI: 0.80–0.89]; $P < .001$; well-child visits, IRR: 0.88 [95% CI: 0.84–0.93]; $P < .001$) (Table 2). Decreased rates also were associated with deployment for children of female military parents (outpatient visits, IRR: 0.86 [95% CI: 0.83–0.91]; $P < .001$; well-child visits, IRR: 0.89 [95% CI: 0.86–0.93]; $P < .001$). With stratification according to parent age groups, there were increases in visit rates during deployment; these increases were greater among the youngest parents, those <24 years of age (outpatient visits, IRR: 1.14 [95% CI: 1.11–1.16]; $P < .001$; well-child visits, IRR: 1.21 [1.19–1.23]; $P < .001$), and gradually decreased as the age of the parents increased (Table 3).

Parental deployment demonstrated an interaction with parents' marital status. Results obtained with adjustment for this interaction; the age, gender, pay grade, and marital status of the parent; and the age, gender, and birth order of the child are shown in Table 4. In adjusted stratified analysis, deployment effects were seen to be disparate for children of single parents and children of married parents. During times of deployment, children of single parents had decreased rates of outpatient visits (IRR: 0.71 [95% CI: 0.54–0.93]; $P = .014$), whereas children of married parents had increased rates of outpatient visits (IRR: 1.26 [95% CI: 1.19–1.33]; $P < .001$). Similar decreases in rates were seen for well-child visits, although the IRR was not statistically significant (IRR: 0.85 [95% CI: 0.66–1.10]; $P = .218$), with increased rates among children with

TABLE 1 Clinical Characteristics of 169 986 Children and Their 165 477 Military Parents

Age, mean ± SD, y	0.54 ± 0.50
Female, %	49
Black, %	16
First-born, %	58
Parent deployed during study period, %	32
Age of parent, median (IQR), y	28 (24–32)
Male military parent, %	88
Branch of service of parent, %	
Army	41
Air Force	23
Navy	22
Marine Corps	11
Married parents, %	94
Junior enlisted rank of parent, %	74

TABLE 2 Unadjusted IRRs for Pediatric Outpatient Visits and Well-Child Visits Between Exposed and Nonexposed Person-Time, According to Parental Marital Status

	Outpatient Visits		Well-Child Visits	
	IRR (95% CI)	P	IRR (95% CI)	P
All parents	1.07 (1.06–1.07)	<.001	1.08 (1.07–1.09)	<.001
Single parents	0.84 (0.80–0.89)	<.001	0.88 (0.84–0.93)	<.001
Married parents	1.08 (1.03–1.09)	<.001	1.08 (1.07–1.09)	<.001

Exposure was parental deployment. IRRs were determined through longitudinal Poisson regression analyses.

TABLE 3 Unadjusted IRRs for Pediatric Outpatient Visits and Well-Child Visits Between Exposed and Nonexposed Person-Time, According to Parent Age

Parent Age	Outpatient Visits		Well-Child Visits	
	IRR (95% CI)	P	IRR (95% CI)	P
<24 y	1.14 (1.11–1.16)	<.001	1.21 (1.19–1.23)	<.001
24–27 y	1.08 (1.05–1.10)	<.001	1.09 (1.07–1.11)	<.001
28–31 y	1.03 (1.01–1.06)	<.001	1.04 (1.03–1.06)	<.001
≥32 y	1.05 (1.02–1.07)	<.001	1.02 (1.00–1.04)	.032

Exposure was parental deployment. IRRs were determined through longitudinal Poisson regression analyses.

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TABLE 4 Adjusted IRRs for Pediatric Outpatient Visits and Well-Child Visits Between Exposed and Nonexposed Person-Time, According to Parental Marital Status and Age

Parent Age	Outpatient Visits		Well-Child Visits	
	IRR (95% CI)	*P*	IRR (95% CI)	*P*
Married parents				
<24 y	1.18 (1.14–1.20)	<.001	1.24 (1.22–1.26)	<.001
24–27 y	1.08 (1.06–1.10)	<.001	1.10 (1.08–1.12)	<.001
28–31 y	1.03 (1.01–1.05)	.012	1.04 (1.03–1.06)	<.001
≥32 y	1.04 (1.01–1.06)	.002	1.02 (1.00–1.04)	.031
Single parents				
<24 y	0.82 (0.74–0.91)	<.001	0.96 (0.87–1.05)	.375
24–27 y	0.83 (0.74–0.92)	<.001	0.88 (0.80–0.97)	.009
28–31 y	0.86 (0.77–0.97)	.011	0.99 (0.88–1.12)	.909
≥32 y	0.97 (0.83–1.13)	.664	0.93 (0.83–1.04)	.203

Exposure was parental deployment. Point estimates and CIs were determined through Poisson regression analyses clustered according to child.

married parents (IRR: 1.43 [95% CI: 1.37–1.50]; $P < .001$).

With stratification according to the age and marital status of the parent, the effects of marital status on both outpatient visits and well-child visits were less marked with increasing parental age (Table 4 and Figs 1 and 2). The impact of marital status was larger among parents <24 years of age than among any other age group, with significantly differing effects of deployment on rates of outpatient visits among single parents (IRR: 0.82 [95% CI: 0.74–0.91]; $P < .001$) and married parents (IRR: 1.18 [95% CI: 1.14–1.20]; $P < .001$). For parents >32 years of age, there was less disparity in deployment effects on the rates of outpatient visits between single parents (IRR: 0.97 [95% CI: 0.83–1.13]; $P = .664$) and married parents (IRR: 1.04 [95% CI: 1.01–1.06]; $P = .002$).

A similar but nonsignificant trend for well-child visits was shown for parental age and marital status. Parents <24 years of age showed differences in deployment effects between single parents (IRR: 0.96 [95% CI: 0.87–1.05]; $P = .375$) and married parents (IRR: 1.24 [95% CI: 1.22–1.26]; $P < .001$). For parents >32 years of age, deployment affected single parents (IRR: 0.93 [95% CI: 0.83–1.04]; $P = .203$) and married parents (IRR: 1.02 [95% CI: 1.00–1.04]; $P = .031$) similarly.

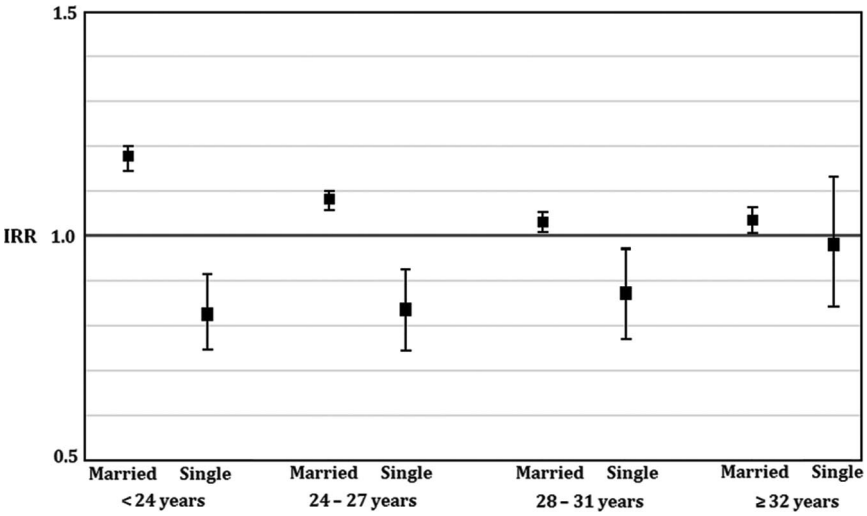

FIGURE 1
Adjusted IRRs (with 95% CIs) for outpatient visits among children <2 years of age, according to parental military deployment.

DISCUSSION

In this population of children 0 to 2 years of age with military parents, parental deployment influenced rates of outpatient and well-child visits for certain groups on the basis of parental age and marital status. Overall increases of 7% for outpatient visits and 8% for well-child visits were seen during periods of deployment, compared with periods during which the parent was not deployed. These increases may represent increased needs among children attributable to medical effects of parental deployment or may represent the effects of deployment on parents. Parents exposed to increased psychological stress may bring their children to medical providers more frequently than they would if they were not exposed to stress.[3]

A study of Marine Corps families based in Okinawa, Japan, examined the outpatient visit rate as a marker of the effect of deployment on the well-being of military families.[12] Higher rates were 1 of 8 components used to classify families as maladapted to deployment stress. This study was not designed to examine whether evidence of family or child maladaptation to parental deployment influenced the outpatient health care utilization rate.

Children of single parents had decreased rates of both outpatient visits and well-child visits during periods of deployment, whereas children of married parents had increased rates of both types of visits during periods of deployment. Deployment may have different effects on single and married parents because during deployment children of single parents often are left with a nonparent caretaker, such as a grandparent, who may be less affected

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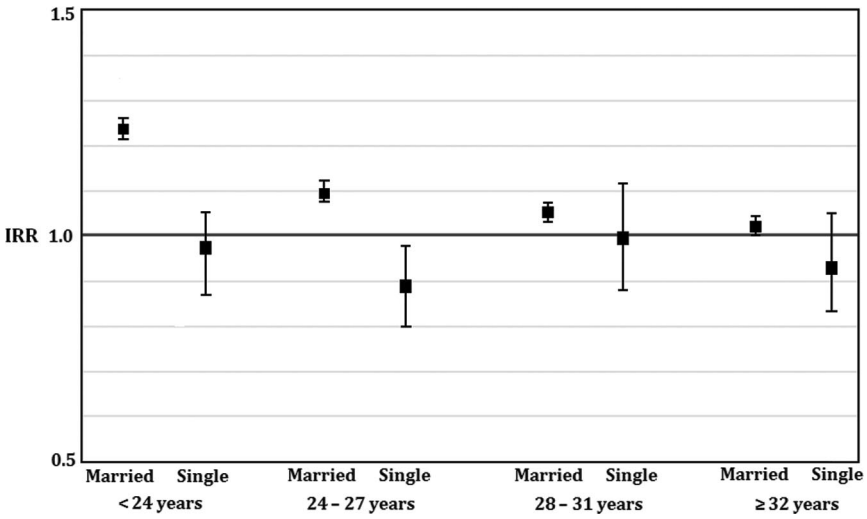

FIGURE 2
Adjusted IRRs (with 95% CIs) for well-child visits among children <2 years of age, according to parental military deployment.

by the deployment than a spouse of a deployed parent. This effect also might be attributable to the fact that the caretaker during deployment might not have sufficient knowledge of or access to the military health system. During deployment, children of single parents often must relocate to live with a caretaker or relative, which may result in medical care being accessed outside the military health system if the caretaker uses other health insurance or funding. Such visits would not be captured in this study.

This study also documented increased rates of outpatient and well-child visits among children of married parents. This might be an indication that the stressors experienced by children during parental deployment are manifested as symptoms that prompt more-frequent medical visits. These findings also might indicate a reaction to the stress experienced by the nondeployed parent, who perhaps has become overly concerned and vigilant about the health of the child. Regardless of the causes of these increased visit rates, it is important to note that this increased access to health care providers affords greater opportunities to identify and to respond to biopsychosocial needs of children during parental deployment. Also, civilian providers who treat children of military service members must be prepared to address the needs of military families related to deployment.

Marital status influenced the effects of deployment in this way among younger parents much more than among older parents. There are several reasons why young single parents might be affected by the stressors associated with deployment more than older single parents. Older single parents might have more established social networks and financial resources than younger parents, which would allow them to rely on others for support during deployment. In addition, older parents might be more likely to have more life experiences to prepare them to cope with stressors such as deployment.

The findings of this study are limited, in that we were not able to identify children with 2 military parents. The family deployment experience might be different if both parents are military members, rather than just one. This might have resulted in misclassification of person-time if, during the "nondeployed" time, the other parent was deployed. Only 2.9% of military members, however, are married to a spouse on active duty and have dependent children, and it is not likely that inclusion of that group would affect our results drastically.[13] Because the data captured related only to the military sponsor of the child, there was no information available regarding the second parent.

Our deidentified data did not provide dates of birth, which could have been used to calculate exact exposure times for children <1 year of age; therefore, we included 365 days for the first year of life. Because we increased exposure times by including the entire first year, without increasing visit counts, the rates were decreased, which blunted our observed effects.

Our findings also were limited because of our reliance on the accuracy of medical claims data. Because medical visits obtained with nonmilitary funding, including other health insurance, were not captured for this analysis, this study can conclude not that all children of single, young, deployed parents had decreased rates of health care but only that they had decreased rates within their entitled health insurance plan. Caretakers may pay out of pocket or may use other health insurance if they live far from a military medical facility or they do not know how to use the child's military health insurance for civilian provider care. These additional costs to individuals and insurers increase the burden on caretakers of children of deployed service members.

The strengths of this study lie in the size and scope of the military health system and its databases. The records of all children of military service members who receive medical care through the military health system are

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tracked, which allowed us to address a universal population. This comprehensive data set allowed us to account for interpatient variability by using longitudinal analyses in which records were clustered for each individual child.

We likely were able to identify effects of deployment more easily during the study period than during other periods because of the current intensity and frequency of US military deployments. The wartime environment for military members and their families would amplify effects that might not be detectable during peacetime, which might be relevant to other military populations and operational circumstances.

CONCLUSIONS

Rates of outpatient and well-child visits for children in military families increase when a parent deploys. In some families, however, particularly those with young, single parents, rates decrease during deployment. Further studies should explore whether deployment creates a greater need for medical care for children or whether the increase in visit rates is an expression of stress felt by the remaining caregivers. There was a disparity in effects experienced by children of single and married parents, particularly among younger parents, which suggests that the military medical community and military social services should target families with young, single parents. Further studies also should explore whether similar effects are seen during types of family separation other than military deployment.

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DOI: 10.1542/peds.2009-2704

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The online version of this article, along with updated information and services, is located on the World Wide Web at:
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